Physical Skills Group

F

FITNESS

Fitness Requirements

Requirement **Approved by**

Do this:

1. With your parent, guardian, or Webelos den leader, complete the Health and Fitness Character Connection.

   a. **Know:** Tell why is it important to be healthy, clean, and fit. _____

   b. **Commit:** Tell when it is difficult for you to stick with good health habits. Tell where you can go to be with others who encourage you to be healthy, clean, and fit. _____

   c. **Practice:** Practice good health habits while doing the requirements for this activity badge. _____

And do six of these:

2. With a parent or other adult family member, complete a safety notebook, which is discussed in the booklet "How to Protect Your Children from Child Abuse" that comes with this book. _____
3. Read the meal planning information in this chapter. With a parent or other family member, plan a week of meals. Explain what kinds of meals are best for you and why. _____
4. Keep a record of your daily meals and snacks for a week. Decide whether you have been eating foods that are good for you. _____

5. Tell an adult member of your family about the bad effects smoking or chewing tobacco would have on your body. _____
6. Tell an adult member of your family four reasons why you should not use alcohol and how it could affect you. _____
7. Tell an adult member of your family what drugs could do to your body and how they would affect your ability to think clearly. _____
8. Read the booklet *Take a Stand Against Drugs!* Discuss it with an adult and show that you understand the material. _____

What does *fitness* mean? It means being healthy and in good physical and mental shape.

One of your jobs in life is taking care of your wonderful and complex body. You need to become an expert at keeping it working at its best.

That means you must have a healthy diet and plenty of exercise and rest. You must avoid harmful substances.

You can earn the Fitness activity badge at home, on your own and with a family member. You'll learn about taking care of yourself, so you'll be your best when you work, play, and learn. When you have completed each requirement, ask an adult member of your family to sign it on the previous page or this page.

Your Safety Notebook

Part of taking care of yourself is knowing how to be safe and how to react in an emergency. In requirement 2, when you make a safety notebook with your parent or other adult family member, you'll have a place to keep emergency telephone numbers, your parent's work number, and other important numbers to have on hand. You'll write down the safety rules that you and your family follow. For more details on requirement 2, you and your parent

can check the booklet "How to Protect Your Children from Child Abuse" that comes as a pull-out section with this book.

How to Plan Meals

There's a great advantage to requirement 3: You help choose the menus for meals you might eat for a whole week! But choose wisely and include foods that are best for you.

How to start? You'll find what you need for planning right here:

- The MyPyramid Plan, explained below and on page 249, shows you types of foods to include and tells how much of each you need each day.
- The sample serving list gives you examples of foods to include and tells how much equals an ounce (grains and meats) or cup (vegetables, fruits, milks).
- The sample menu for a day on page 253 gives you an idea how meal planning is done. It's really easy if you use the tools on www.mypyramid.gov.

Plan your menus with a parent or family member. If you or any family member has any dietary restrictions, keep those in mind.

In this chapter, you'll also find out how to read labels on food packages so you can compare foods.

MyPyramid Helps You Plan

In 2005, the U.S. Department of Agriculture (USDA) replaced their Food Guide Pyramid with the MyPyramid Plan. Because one size *doesn't* fit all, MyPyramid Plan can help you choose the foods and amounts that are right for *you*. All you have to do to find out what and how much you need to eat is go to www.mypyramid.gov and enter your age, sex, and activity level.

MyPyramid.gov has tools to help you plan your meals, and can also give you a detailed assessment of your own food intake and physical activity level over time with MyPyramid Tracker.

You can use the advice "Inside MyPyramid" to help you make smart choices from every food group, find your best balance between food and physical activity, and get the most nutrition out of your calories.

Every member of your family has different nutritional needs, and each of them can go to mypyramid.gov to find out what those are. (Or you can do it for them.) That information is what you need to be ready to plan family meals.

By using MyPyramid, you'll plan a balanced diet that includes protein, vitamins, minerals, carbohydrates, and fiber. You need all of these to grow and stay healthy and strong. See the pyramid on the next page. You need the most each day from the widest areas of the pyramid, and the least amounts from the narrowest areas.

Grains—Make half your grains whole. Eat at least 3 ounces of whole-grain cereals, breads, crackers, rice, or pasta every day. One ounce is about 1 slice of bread, about 1 cup of breakfast cereal, or ½ cup of cooked rice, cereal, or pasta.

Vegetables—Vary your veggies. Eat more dark-green veggies like broccoli, spinach, and other dark leafy greens. Eat more orange vegetables like carrots and sweet potatoes. Eat more dry beans and peas like pinto beans, kidney beans, and lentils.

Fruits—Focus on fruits. Eat a variety of fruit. Choose fresh, frozen, canned, or dried fruit. Go easy on fruit juices (they are high in sugar and low in fiber).

Milk—Get your calcium-rich foods. Go low-fat or fat-free when you choose milk, yogurt, and other milk products. If you don't or can't consume milk, choose lactose-free products or other calcium sources such as fortified foods and beverages.

Meat and beans—Go lean with protein. Choose low-fat or lean meats and poultry. Bake it, broil it, or grill it (don't fry it). Vary your protein routine—choose more fish, beans, peas, nuts, and seeds.

Fats, sugars, and salt (sodium)—Choose these with caution. Get most of your fat from fish, nuts, and vegetable oils. Limit solid fats like butter, stick margarine, shortening, and lard. Check nutrition labels to keep your intake low on saturated fats, trans fats, and sodium. Choose foods and beverages that are low in added sugar.

Water—Not on the pyramid. but essential. Be sure you drink plenty of water, too, especially if you've been playing hard, hiking, or exercising.

Source: www.mypyramid.gov

How Much at a Meal?

The serving size for a meal can vary for different foods and different people. MyPyramid tells you how many ounces of grains and meats you need daily, and it uses cups to measure vegetables, fruits, and milk. As you plan your meals, check the following list of examples from each food group. The list may give you ideas for meals, too.

If five or six ounces from the bread, cereal, rice, and pasta group seems like a lot, look at the list carefully. You already may be eating that much, because you get two servings in a sandwich or in one cup of pasta.

Some dishes are combinations. Pizza combines a bread crust, cheese, tomato sauce, and possibly vegetables and meat. You'll have to guess at the serving sizes in a piece of pizza.

Grains (Bread, Cereal, Rice, and Pasta)

These are examples of what to count as one ounce:

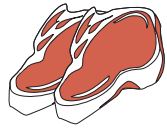
- 1 slice of bread (a sandwich has two servings)
- 1 tortilla
- ½ cup cooked rice, pasta, or cereal
- 1 ounce ready-to-eat cereal
- ½ hamburger bun, bagel, or English muffin (one whole bun has two servings)
- 3 to 4 plain crackers (small)
- 1 pancake (a stack of three pancakes has three servings)
- ½ doughnut or Danish (medium)
- 1/16 cake (average)
- 2 cookies (medium)
- 1/12 pie (two-crust)

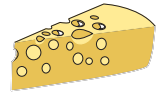
Vegetables

These are equivalent to a half cup of vegetables:

- ½ cup chopped raw or cooked vegetables
- 1 cup raw, leafy vegetables

- ¾ cup vegetable juice
- ½ baked potato




Fruits

These are equivalent to a half cup of fruit:

- 1 apple, banana, orange, pear, nectarine, peach, or melon wedge
- ¾ cup fruit juice
- ½ cup chopped, cooked, or canned fruit
- ¼ cup dried fruit

Milk

These are equivalent to a cup of milk:

- 1 cup low-fat or skim milk
- 1 cup yogurt
- 1½ ounces natural cheese
- 2 ounces processed cheese
- ½ cups cottage cheese
- 1 cup frozen yogurt

Meat and Beans

These are equal to 1 ounce of meat, poultry, or fish:

- ½ cup cooked beans
- 1 egg
- 2 tablespoons peanut butter
- ⅓ cup nuts

Fats, Sugars, and Salt

Use sparingly. Examples of fats and oils in your diet are:

- One pat (1 tablespoon) butter or margarine
- Oils used in cooking
- Shortening used in pastry
- Salad dressings (read the label) Fat-free dressings are available.

Sweets include most desserts, cookies, candy, cakes, pies, puddings, and syrups. Some reduced-fat and reduced-sugar products are available.

What About Snacks?

Everyone likes snacks! You'll want to include a couple of healthful snacks in each day's plan. A snack can provide nutrients and give you energy between meals. The low-fat snacks listed below are good choices.

Fruits

- 1 apple, banana, orange, pear, nectarine, or peach
- ¾ cup orange or grape juice
- ½ cup pineapple or grapes
- ¼ cup prunes or raisins

Vegetables

- 1 carrot
- ¾ cup mixed vegetable juice
- 1 stalk celery (1 cup chopped)

Grains

- 1 graham cracker, wheat cracker, ½ English muffin, or rice cake
- ½ bagel
- 1 low-fat granola bar
- 1 cup popcorn, light (not much fat added)
- 1 ounce pretzels

Milk

- 1 ounce skim mozzarella cheese
- 1 cup of 1 percent chocolate milk
- 1 cup powdered breakfast drink made with skim milk
- 1 cup skim milk
- 8 ounces yogurt with fruit

Mixtures

- 1 cup low-sodium (low-salt) chicken noodle or vegetable soup
- 1 cup low-sodium (low-salt) chicken broth

Sugars

- 1 slice angel food cake (bread group)
- 3 gingersnaps or vanilla wafers (bread group)
- ½ cup ice milk (milk group)
- 1 juice bar (fruit group)

A Sample Menu

Make different daily plans with a variety of foods. Check to see if you have enough servings from each food group.

Sample Menu for a 2,000-Calorie/Day Diet

	Group				
	Grains	**Vegetables**	**Fruits**	**Milk**	**Meat and Beans**
Breakfast					
Orange			½ medium		
Milk				1 cup	
Cereal with raisins	½ cup		(¼ cup in cereal)		
Whole-grain toast	1 slice				
Lunch					
Ham sandwich on whole-grain bread	2 slices bread	Lettuce leaf			2.5 oz. ham
Carrot sticks		½ cup			
Apple			1 medium		
Milk				1 cup	
Afternoon Snack					
Celery		1 stalk			
Dinner					
Chicken					3 oz.
Peas		½ cup			
Brown rice	½ cup				
Tossed salad		1 cup			
Low-fat salad dressing					
Ice milk				1 cup	
Evening Snack					
Popcorn	½ cup				
Daily Total	6 ounces	2.5 cups	2 cups	3 cups	5.5 ounces

The amounts you need may be different than these. See www.mypyramid.gov to find out your daily amounts of each food group.

What About Fat?

You hear and read a lot about people avoiding fat in foods. But our bodies actually need some fat in our diets, and we can't avoid fat altogether, anyway.

But a diet high in fat can be harmful in terms of weight gain and health. A good rule is to eat a balanced diet, be aware of high-fat foods, and make low-fat choices when you can.

Apples, bananas, and other fruits are obvious low-fat choices for snacks. Skim milk has very little fat compared with whole milk. Although children younger than 2 years need whole milk, a better choice for older children, teens, and adults is low-fat or skim milk.

If you make good choices every day, an occasional higher-fat choice, like fast food or real ice cream, shouldn't be a problem.

One way to identify high-fat foods—and learn more about foods you eat—is to read food labels.

Read Those Labels

You can learn a lot from a food label. Compare these labels from two snack food products.

Look at each label. What makes one serving for each? Is that about the amount you might eat for a snack, or would you eat more?

A *calorie* is a unit of energy stored in food. Notice the calories in one serving and the number of calories from fat. In one serving of the cheese-flavored snack are 150 calories, and 90 of those calories come from fat. That's 60 percent of the calories from fat. You can figure it this way:

90 (calories from fat) ÷ 150 (calories per serving) = 0.60 (60% of calories from fat)

(Note: If the label lists only grams of fat, you can figure calories yourself: 1 gram fat = 9 calories.)

Experts say we should get no more than 20 percent to 35 percent of our daily calories from fat. You can see how a person who eats many high-fat items in a day may end up getting too many of his calories from fat. In other words, he's not getting the most nutrition out of his calories.

Fat-free pretzels

Nutrition Facts

Serving Size 1 oz. (28g/About 12 pretzels)
Servings Per Container 15

Amount Per Serving	
Calories 110	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 520mg	22%
Total Carbohydrate 23g	8%
Dietary Fiber 1g	5%
Sugars less than 1g	
Protein 2g	

Vitamin A 0%	·	Vitamin C 0%	
Calcium 0%	·	Iron 10%	

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calories needs.

Calories:		2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 · Carbohydrate 4 · Protein 4

Cheese-flavored snack food

Nutrition Facts

Serving Size 1 oz. (28g/About 12 pieces)
Servings Per Container 10

Amount Per Serving	
Calories 150	Calories from Fat 90
	% Daily Value*
Total Fat 10g	15%
Saturated Fat 2.5g	12%
Cholesterol less than 5mg	1%
Sodium 350mg	14%
Total Carbohydrate 15g	5%
Dietary Fiber less than 1g	1%
Sugars 1g	
Protein 2g	

Vitamin A 0%	·	Vitamin C 0%	
Calcium 2%	·	Iron 2%	

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calories needs.

Calories:		2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 · Carbohydrate 4 · Protein 4

If you read labels, you begin to get an idea of the nutritional content of different types of foods. Some have higher sodium (salt) content than others. Some products have protein, potassium, vitamins A and C, calcium, and iron, and some have little or none. Some have fiber, and some don't. Some have extra sugars that add calories but few nutrients. Read the ingredient list and make sure that added sugars (with names like sucrose, glucose, and high fructose corn syrup) aren't one of the first few ingredients.

Eating right is a kind of balancing act. What you don't get from one food you may get from another. The more you learn about what your body needs, the better prepared you'll be to make wise choices about food.

The Dangers of Tobacco

Why do some kids smoke or chew tobacco? They do it because they think it makes them more grown up.

In fact, smoking and using chewing tobacco are bad choices for anyone—child, teen, and adult. Many adults have given up smoking and chewing tobacco because scientists have shown that these habits are very harmful to health.

Cigarette smoking has these bad effects:

- It causes lung cancer, heart disease, and other ailments.
- It reduces a person's ability to breathe deeply. Athletes who smoke cannot play as hard or as long as those who don't.
- Smoke may irritate the eyes, making them red and sore.
- Smoke stains teeth and fingers.

Chewing tobacco is as dangerous as smoking.

- The tobacco may damage the delicate tissues of your mouth.
- It causes diseases.
- It certainly will stain your teeth.

Using tobacco is like putting sand in the gas tank of a new car. The beautiful car won't run, and the engine will be ruined.

The Dangers of Alcohol, Other Drugs, and Inhalants

Drinking alcoholic beverages and doing drugs are even more dangerous than smoking because these actions can have terrible consequences the very first time a person tries them.

The effects of alcohol: Perhaps you have seen someone unsteady on their feet because of drinking too much beer, wine, or liquor. Alcohol slows down the brain and body. It destroys balance. It may make a person see double or even pass out.

Alcohol makes some people do bad things they would never consider doing when they are sober. Drunk drivers are responsible for thousands of deaths on our nation's streets and highways every year.

A person who drinks too much for several years may suffer from serious illnesses of the liver and other organs.

The effects of drugs: Some drugs are prescribed by doctors to ease pain or relieve symptoms of disease, but prescription drugs are dangerous if they are misused. You should never take a prescription drug unless it is prescribed for you by a doctor. All other drugs are dangerous for you—whether they have been legally prescribed for someone else or sold illegally on the street.

The effects of inhalants: Sniffing glue and inhaling the fumes of paint thinner or gasoline can be dangerous and even fatal. These substances contain toxins that can affect the liver, kidneys, and muscular system. Inhaling these poisonous substances can also cause psychological problems.

Stay away from inhalants and drugs and people who sell them. Marijuana, cocaine and "crack," heroin, "speed," "pep pills," LSD, and other illegal drugs bring nothing but trouble.

Some drugs make people drowsy. Some make it hard to know what is real and what is a dream. Others make people feel so awake and active that they cannot relax and rest. Overdoses are often fatal.

All illegal drugs are bad news.

Drugs: A Deadly Game

Requirement 8 asks you to read a booklet called *Take a Stand Against Drugs!* It's meant to be another reminder about the dangers of drugs—*all drugs*—including cigarettes and beer. Maybe you'll learn something you didn't know about drugs. You can discuss what you learn with adults or members of your den. You can never know too much about the bad news of drugs.

Note: Take a Stand Against Drugs materials may be obtained through your local council service center.

Outdoor Group

F

FORESTER

Forester Requirements

Requirement	Approved by
Do five of these:	
1. Make a map of the United States. Show the types of forests growing in different parts of the country. Name some kinds of trees that grow in these forests.	_____
2. Draw a picture to show the plant and tree layers of a forest in your area. Label the different layers. (If you don't live in an area that has forests, choose an area that does and draw a picture of that forest.)	_____
3. Identify six forest trees common to the area where you live. Tell how both wildlife and humans use them. (If you don't live in a region that has forests, read about one type of forest and name six of its trees and their uses.)	_____
4. Identify six forest plants (other than trees) that are useful to wildlife. Tell which animals use them and for what purposes.	_____
5. Draw a picture showing	_____
• how water and minerals in the soil help a tree grow	_____
• how the tree uses sunlight to help it grow	_____
6. Make a poster showing a tree's growth rings or examine the growth rings of a tree stump. Explain how the rings tell its life history.	_____

7. Collect pieces of three kinds of wood used for building houses. Tell what kinds of wood they are and one place each of them might be used.
8. Plant 20 forest tree seedlings. Tell how you planted them and what you did to take care of them after planting.
9. Describe both the benefits and the harm wildfires can cause in a forest ecosystem. Tell how you can help prevent wildfire.
10. Draw your own urban forestry plan for adding trees to a street, yard, or park near your home. Show what types of trees you would like to see planted.

Trees and other forest plants are important parts of the interconnected life on Earth. A forester's work—taking care of trees and managing forest land—is important to the well-being of the planet. You'll learn why when you earn the Forester activity badge.

Wherever you live, on a farm, in a small town, in a large city—or even in the middle of a forest—you can learn about identifying trees and planting new trees.

You might visit a forest with your Webelos den. Take your time and notice everything—all kinds of trees and other plants, animals, birds, and insects. The forest is a fascinating place.

Learning about forests will help you understand more about how all the living things on our planet work together to keep each other healthy. Forests provide much more than building material and shade. They help keep a livable climate for us and other animals. We learn to make medicines from studying forest

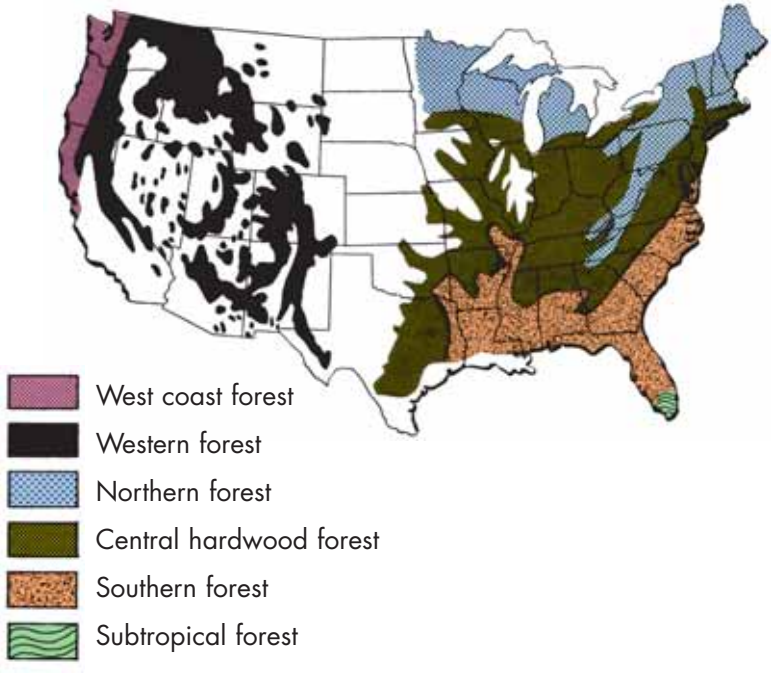
plants. Learning about forests is important because we need to manage our forests wisely to keep them healthy. When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on pages 260–261.

Forest Regions of the United States

Most trees grow best in certain kinds of places. Each type of tree needs a certain range of climate, rainfall, and soil. The United States has several different kinds of forests.

West coast forest: Mild climate, lots of rain. Some of the trees are Douglas fir, ponderosa pine, redwood, giant sequoia.

Western forest: Chiefly on mountain slopes. Cold winters, short summers, dryness in summer in the southern part. Typical trees are ponderosa pine, blue spruce, western larch, quaking aspen. Pinyon pine in the southwest.



Northern forest: Low temperatures, short growing season. Common trees are eastern white pine, northern white cedar, white and black spruces, paper birch, sugar maple, northern red oak.

Central hardwood forest: Climate varies from north to south. Rich soils. Good rainfall, usually. Some of the trees are red, white, and black oak; black walnut; sycamore; sweetgum; silver maple; poplar; hickory. Hardwood trees lose their leaves in the fall. Some conifers (trees that have cones) also grow in this region.

Southern forest: Drier soils, but usually enough rainfall. Typical trees are shortleaf and longleaf pines, magnolia, red and white oak, pecan, poplar, overcup oak, holly. In swamps, bald cypress and gums.

Subtropical forest: Warm climate and humid (damp). Common trees are West Indies mahogany, mangroves, palms.

What Is a Riparian Forest?

Forests along streams and wetlands are called *riparian forests.* They are very much influenced by how close they are to water and have unique vegetation compared with areas farther away from water.

The plant life in the rich soil and the aquatic life in the water attract more kinds of birds, insects, and small animals to the riparian forest, compared with other kinds of forests.

The combination of forest and water attracts some species of birds that migrate in the fall and spring and is important to their survival.

Forest Structure

Did you know a forest has *layers*? Here are the five basic forest layers, from top to bottom.

The canopy: The canopy of a forest is made up of the tops of the tallest trees. It's like the roof of the forest. This layer gets the most sunlight, so it often produces the most food for wildlife. Birds, squirrels, reptiles, and insects live here.

The understory: Shorter trees grow in the understory of the forest. They get less sunlight, but they also produce food and habitat for animals, birds, and insects.

The shrub layer: Shrubs are woody plants, smaller than trees, that have more than one stem. Mammals, birds, and insects live and feed in the shrub layer.

The herb layer: These plants are small and have softer stems that are not woody. Depending on the type of forest and the amount of sunlight at this level, you'd find ferns, grasses, and wildflowers here. Insects, mice, other small animals, and snakes live here.

Large animals like deer and bears depend on the food in the understory, shrub layer, and herb layer.

The forest floor: This bottom layer collects dead leaves and plants, fallen trees, animal droppings, dead animals—and returns them to the soil in a process called *decomposition.* Earthworms, fungi, and insects, along with bacteria and other microscopic organisms, gradually break down the materials. The plants of the forest absorb the nutrients released by decomposition.

Look for plants in the different forest layers in your area (or in a forest area in your state). What kinds of trees are the tallest? Which trees are in the understory? In an eastern hardwood forest, the tallest trees might be oak and hickory. The understory could contain flowering dogwood, redbud, sassafras, and sumac. The shrub layer might have blackberry and wild grape. In a western conifer forest, the tallest trees might be Douglas fir,

western hemlock, and western red cedar. The understory might have Pacific yew, dogwood, and ocean spray. The shrub layer might have salal and sword fern. The forest you study could have entirely different trees and plants.

Forest Trees

Foresters learn everything about the many kinds of trees, smaller plants, and animals that grow and live in the forests they manage. A few of the forest trees that grow in the United States are shown on these pages.

Douglas Fir
Pacific Northwest coast and Rocky Mountains
Height: 100–250 feet
Used for lumber, plywood, paper.

Sweetgum
Southeastern states and north to Connecticut, New York, Ohio, Illinois, Missouri, Oklahoma
Height: 80–120 feet
Used for veneer, furniture, cabinets, and woodwork. (Veneer is a thin layer of wood used to make furniture surfaces.)

Eastern White Pine
Northeastern states
Height: 50–100 feet
Used for cabinets, interior lumber, woodenware.

Ponderosa Pine
All western states, into southern Canada and northern Mexico
Height: 60–200 feet
Used for lumber, fences, railroad ties; very important for millwork.

Shagbark Hickory
Eastern half of the United States
Height: 60–80 feet
Used for furniture, wall paneling, tool handles, cooking fuel; provides nuts for wildlife.

Walnut
Eastern half of the United States
Height: 80–100 feet
Used for furniture, gunstocks, doors, and cabinets; wildlife and humans eat the nuts.

White Oak
Eastern half of the United States
Height: 60–120 feet
Used for lumber, furniture, boats, fuel wood; the acorns are important food for wildlife.

Hemlock
Northeast (eastern hemlock)
Far west (western and mountain hemlocks)
Height: 60–100 feet (mountain hemlock); 125–200 feet (western hemlock)
Used for lumber, pulpwood for paper, and railroad ties.

Longleaf Pine
Southeastern coastal states
Height: 100–120 feet
Once used for turpentines and resins; now used for lumber and framing.

Animals and Humans Depend on Forests

Many kinds of trees are used for building materials and wood for furniture. Foresters know which types of trees are best for building and which are more useful for making paper—or which are important for *both* building and making paper.

Trees like walnut and pecan supply nuts to use in baking cookies and pies. Wild plums and other fruits grow on forest trees. People often pick wild blackberries, huckleberries, and gooseberries, which grow on shrubs in the shrub layer.

Animals find even more to eat in the forest than humans do. Think about seeds, acorns, grasses, tree leaves—do you know which animals eat them?

Here are a few more ways wildlife and humans use forest plants.

Wildlife uses:

- Bluebirds, catbirds, and mockingbirds eat the red berries of the holly tree.
- Deer eat tree bark, leaving marks. Deer also eat tree leaves, stems, and other green plants.
- Bears mark their territory by clawing and biting tree trunks. Mountain lions sharpen their claws on trees.
- Moose, elk, and deer use tree trunks or flexible saplings to rub the velvet off their antlers.
- Beavers eat the bark and cut down trees to build dams and homes for themselves.

Human uses:

- Hickory and white ash are used to make baseball bats and tool handles.
- Western red cedar is used to make porches, decks, and shingles for roofs.

- Mesquite and hickory chips on cooking fires flavor food.
- Candles are made from the waxy covering of the southern bayberry fruit.
- Maple syrup is made from the sap of sugar maples harvested in the early spring.

Identifying Forest Trees and Plants

A forest is a community of plants, from the tallest trees down to the smallest mosses and lichens that you have to kneel on the ground to see.

When you visit a wooded area or forest, take along a tree field guide. A wildflower guide is handy, too. Your public library may have these books.

Take time to look closely at everything. Use a magnifying glass to study tiny details.

When you're looking at trees, check for:

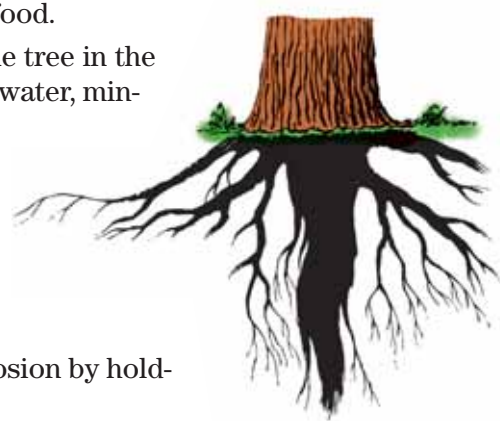
- Type of leaf. Feel it. Is it smooth or rough? Notice the shape.
- Leaf edges—smooth or toothed?
- Type of bark—smooth or rough, peeling, light or dark?
- Unusual features—thorns, flowers, berries. Some trees will have more than one leaf shape. The sassafras has three leaf shapes.
- With conifers, notice the length, shape, and grouping of the needles. Spruce needles are sharp and short, with four sides, and they grow separately on the twigs. Pine needles grow in bundles, so count the number in a bundle for a clue to the kind of pine it is. Needles of a longleaf pine could be 18 inches long,

but jack pine needles are only about 1 inch long. The size and type of cone will also provide clues to the identity of the tree.

The tree supports much life. Look for woodpecker holes, insects hiding under the bark, mistletoe rooted in the branches, fungi growing on the bark, and the nests of birds and squirrels. Move slowly and quietly so you can have a chance to see birds, squirrels, and other animals.

How a Tree Grows

The tree grows in its roots, trunk, and crown (its top, where all the branches and leaves are). The tree needs food to grow, and its roots and leaves play a part in the process of making food.



Roots: Roots anchor the tree in the earth. They soak up the water, minerals, and nitrogen from the soil that the leaves need to make food for the tree. A layer of growth cells at root tips makes new roots each year. Tree roots help slow erosion by holding soil in place.

Trunk: The trunk is a pathway for water and minerals to move from the soil upward to the leaves. It grows outward each year. (See "The Inside Story of a Tree," page 272.) As the trunk grows taller, the crown of the tree grows higher in search of more sunlight. In trees used for lumber, the trunk produces most of the useful wood.

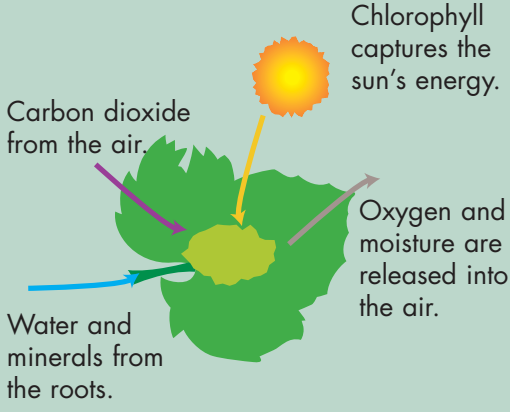
Crown: The crown is the upper part of the tree, including the branches and leaves. The leaves take in sunlight and use it to make food for the tree in a process called *photosynthesis* (discussed on the next page).

The crown of the tree grows each year by adding a new growth of leaves and twigs. This growth comes from young cells in buds on the twigs.

Tree Bud

Photosynthesis

Trees, like all plants with green leaves, use sunlight to make food from air and water, in a chemical process called *photosynthesis*. The food *(carbohydrate)* is made in the leaves.



Carbon dioxide from the air comes through pores in the leaves. Water and minerals come up through the roots in tubelike pathways in the tree to the veins in the leaves. (You can see these tubes on the branch and in the stem when you detach a leaf.)

Chlorophyll is what makes a leaf green. It also captures the sun's energy and uses it to process carbon dioxide and water, making liquid sugar. This flows to every living part of the tree, nourishing it and helping it grow.

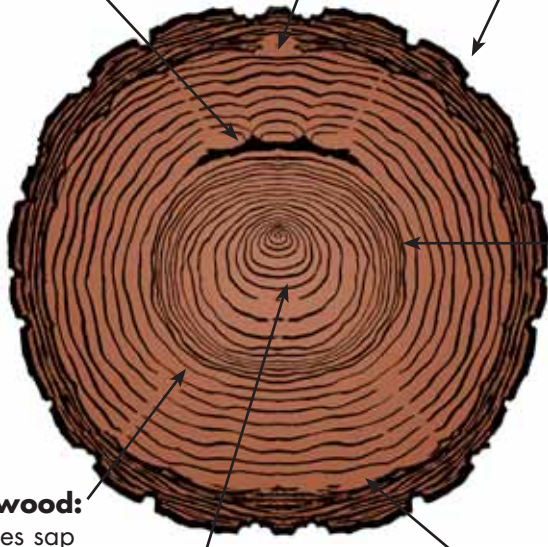
Some of the oxygen taken from the water is left over. The tree doesn't need all the leftover oxygen, so the leaves release excess oxygen and also water, keeping the air around the trees damp and cool.

The Inside Story of a Tree

Inner Bark: Carries food made in the leaves down to the branches, trunk, and roots. It consists of hollow tubes.

Fire Scar: A tree can be damaged by fire even if it is not burned down. Disease and insects can enter through fire scars.

Outer Bark: Protects the tree from injuries.



Thinning: At this point, nearby trees were cut down, giving the tree more light. There were 20 years of growth before thinning, and 10 years of growth after.

Sapwood: Carries sap from roots to leaves.

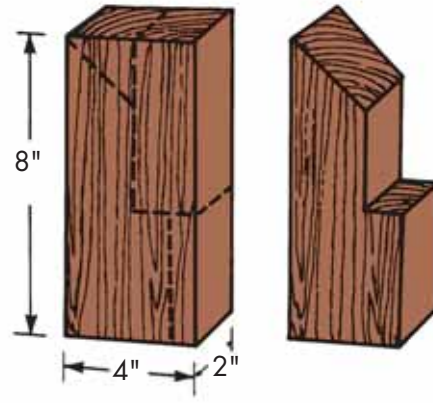
Heartwood: Originally sapwood, inactive; gives strength to a tree.

Cambium: This thin layer of cells between bark and wood is where the trunk grows. Each year it forms a ring of new wood toward the inside of the trunk and new inner bark toward the outside of the trunk.

Collecting Wood Samples

Many kinds of wood are used in building houses. In any house, you are likely to find oak, pine, and cedar as part of the structure, decoration, or furniture.

You may be able to get scraps of these woods and others by visiting a lumberyard.



Show the grain from four different angles by cutting each sample as shown here. Sand each surface with sandpaper. You may want to lacquer or varnish half of each surface. This shows what the wood looks like when it's finished.

Tree Planting

Planting new trees is the key to *sustainable forestry.* Sustainable forestry means that people in the future will have the same abundant forests that we enjoy today.

- Carry seedlings in a bucket or box. Keep the roots damp.
- Plant them at least 6 feet apart.
- Dig holes just deep enough to hold the roots. Loosen the sides and bottom of the hole so that tiny roots can push into the soil. The roots should not be stuffed into the hole, or the tree's chances of surviving are low.
- A seedling should be planted so that its old ground line is about ¼ inch below the new ground level. (The *ground line* is the dark mark on the trunk.)
- A seedling should be planted with its trunk straight up and the hole filled with soil even with the ground. The soil should not be sunk in or mounded up above the ground.

- Press the soil down firmly around the roots to prevent air pockets. If you don't, the roots will dry out and the tree will probably die.
- A newly planted seedling needs lots of water, so soak the soil around the seedling with water, and then soak it again.
- Cover the ground around the base of the seedling with several inches of *mulch*—composted leaves, wood chips, grass cuttings, straw, or sawdust. This holds in moisture and helps make the soil richer for the new tree.

Fire in the Forest

Fire can both benefit and destroy a forest. A cool fire burning slowly along the ground does not hurt the trees. By burning away excess brush, the fire provides nutrients and space for new trees to grow. A new, young forest then provides habitat for many animals and birds.

But a hot wildfire burns high into the tree crowns and can injure and kill many trees. A wildfire in a forest can do much more than destroy trees. It also destroys food and cover for

Fall Color

Why do some hardwood tree leaves change color and fall off the tree? Chlorophyll production stops in the fall, revealing the yellow and orange pigments that were hidden by the green of the chlorophyll. Reds and purplish colors also develop in leaves rich in sugar, in trees like hard maples, dogwoods, and sweetgums.

As winter approaches, days grow shorter. The place where the leaf stem is connected to the branch weakens. Wind and frost can cause the connections to break, and the leaves fall.

wildlife. Sometimes it destroys the animals themselves. And, as more people build their homes near or in forests, more and more homes are at risk of being destroyed by wildfire.

Wildfire can burn the plant cover that protects the soil and sometimes might cause erosion. When soil and ashes wash into streams and lakes, good fishing may be spoiled. Campsites and other recreation areas may be destroyed by fire.

You can help prevent wildfire in these ways:

- Be extremely careful with any fire you build in the outdoors.
- Always build your fire in a safe place and watch it at all times.
- Don't leave a fire until it is out and *cold*. If you can still feel heat through the ashes, the fire is not completely out. (Be careful not to burn your hands!)
- If you see a fire, report it immediately to the nearest fire warden or fire department.

Because some kinds of fires can help the forest, foresters sometimes intentionally set controlled fires (called *prescribed fires*) or allow a "natural fire" caused by lightning to burn in order to reduce the buildup of deadwood or leaves on the forest

floor. When this material gets too deep, a wildfire will burn hotter, increasing the destruction.

Foresters also use prescribed fires to maintain savannas, which are grasslands with scattered trees and shrubs. Fires help control the invasion of too many trees into the grassland.

The lodgepole pine, which grows in the west from Alaska to Baja, California, actually needs fire to release its seeds. Its cones stay closed and attached to the tree for years. When a ground fire comes through the forest, the heat causes the cones to open and release the seeds.

Urban Forestry

Foresters work in cities, too. That's called urban forestry. These foresters know what kinds of trees grow well in a city environment.

Planting trees in cities helps in these ways:

- New trees beautify streets and show that people care about the way their city looks. People enjoy walking along tree-lined, shady sidewalks. Trees in front of businesses make the property more attractive to customers.
- Flowering trees put on a show in the spring. Fall leaf colors brighten the city in autumn.
- Adding trees in parks creates shady places to play and picnic.
- Shade trees can be located to shade pavement and buildings, cooling them in summer and cutting down on air-conditioning costs.
- A grove of trees can shelter an area from winter winds.
- Trees provide habitat and food for birds and other wildlife in the city.
- Trees purify air by taking in carbon dioxide and releasing oxygen.

Urban foresters plan tree-planting projects, decide what kinds of trees to plant, and supervise crews of workers who plant and care for new trees. The foresters also may advise volunteer groups working on community tree-planting projects.

Outdoor Group

G

GEOLOGIST

Geologist Requirements

Requirement	Approved by
Do five of these:	
1. Collect five geologic specimens that have important uses.	_____
2. Rocks and minerals are used in metals, glass, jewelry, road-building products, and fertilizer. Give examples of minerals used in these products.	_____
3. Make a scale of mineral hardness for objects found at home. Show how to use the scale by finding the relative hardness of three samples.	_____
4. List some of the geologic materials used in building your home.	_____
5. Make a drawing that shows the cause of a volcano, a geyser, or an earthquake.	_____
6. Explain one way in which mountains are formed.	_____
7. Describe what a fossil is. How is it used to tell how old a formation is? Find two examples of fossils in your area.	_____
8. Take a field trip to a geological site, geological laboratory, or rock show. Discuss what you learned at your next Webelos den meeting.	_____
9. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Geology.	_____

A geologist is a person who studies the history of the earth and its life. In this case, the history books are rocks. Geologists are interested in learning how the earth is made.

Geologists study rock formations at the tops of mountains and deep in the earth's crust. They investigate earthquakes, volcanoes, and geysers. They know about the uses of rocks and minerals. Some geologists search for mineral deposits like gold, diamonds, coal, and oil.

In earning this activity badge, you'll find out how the earth is formed and what is in it. You'll find out what fossils are. You'll learn what they can tell us about the earth millions of years ago. When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on page 280.

Rocks and Pebbles

Your own backyard and neighborhood are good places to begin collecting rocks. Use a guide to rocks and minerals to help you identify the rocks you pick up. (See more about collecting on pages 286–287.)

While you're examining a rock, think about the rock you can't see and pick up. It's under your feet, under your yard, and it runs deep into the planet. It's the earth's *crust*.

Rhyolite

Granite

Shale layer on sandstone

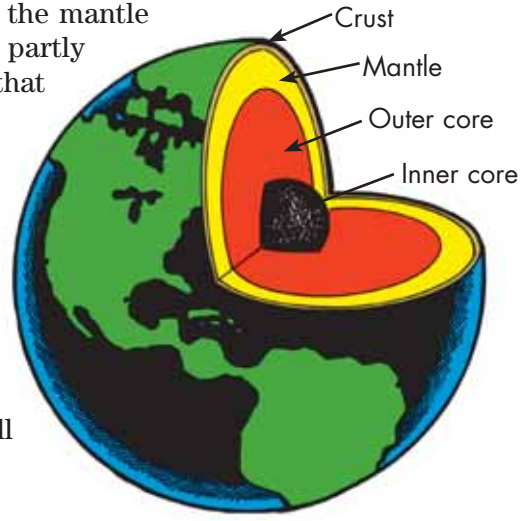
The Earth's Crust and Core

The earth's crust is up to 65 miles thick and is made up of many kinds of rock, formed in layers at different times. In places, the layers are broken or have been folded, pushed up, or dropped down in blocks. In some places, the crust is fractured along a line called a *fault*. (See page 293.) Some faults run for hundreds of miles.

When you see mountain peaks, rock cliffs along rivers, or layers of rock where a highway has been cut through, you're seeing the upper parts of the earth's crust.

Below the crust is the *mantle*, which is about 1,750 miles deep. The upper part of the mantle (the *asthenosphere*) is partly molten (melted). Below that the mantle is solid.

While we don't yet know, the most widely accepted theory is that below the mantle is an *outer core* of iron and nickel melted together in a hot liquid, and an *inner core* at the center of the planet; a solid ball of iron and nickel.



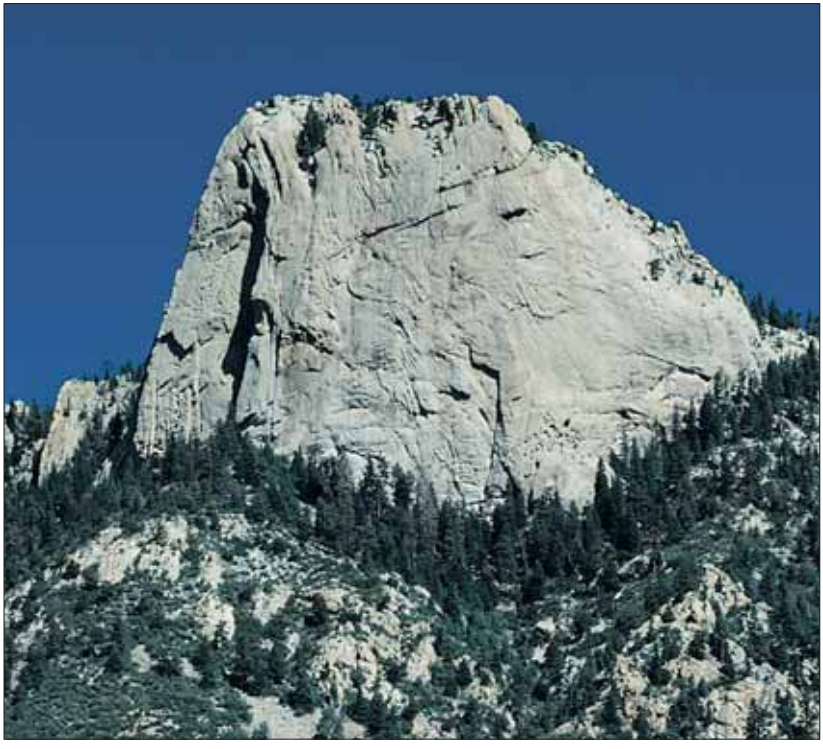
Three Kinds of Rock

All rocks belong to one of the three main groups making up the earth's crust: igneous, sedimentary, and metamorphic rocks.

Igneous Rock

Igneous rock is any rock made by the cooling of magma or lava. Magma is molten material that flows under the earth's crust. Sometimes it finds a weak spot and breaks through to

form great areas of rock called flood basalts, or it may erupt as a volcano. Besides basalt, examples of igneous rock are granite and obsidian.



The Tooth of Time at Philmont Scout Ranch is an example of igneous rock formed by volcanic action 22 to 40 million years ago.

Sedimentary Rock

Sediment is gravel, sand, clay, or soil that settles out of water in riverbeds, ponds, lakes, and oceans. Sediment may contain shells and skeletons. Sedimentary rock is formed in layers, like a giant cake, after sediment has been under great pressure for millions of years. If the sediment was originally sand, it becomes sandstone. Clay turns into shale. Shells and skeletons make limestone. Small pebbles and sand form conglomerate.

Metamorphic Rock

Metamorphic rock has been through a process much like baking. (*Meta* means changed, and *morphic* means form.) The change is caused by intense heat and great pressure deep in the earth. Under these conditions, sedimentary limestone becomes marble. Sedimentary sandstone turns into quartzite. Igneous granite changes into gneiss (pronounced "nice").

How Rocks Break Down

Wind, water, heat, and cold are all strong forces in the world. They slowly break down any rock, no matter how hard it is. The result is sand, gravel, clay, and soil.

Lichens growing on rock also break it down, slowly loosening rock particles.

When material from decayed plants and animals mixes with the broken-down rock, soil forms. Rock is always being broken down, very slowly.

Useful Minerals

The earth contains useful minerals. Some, like silica (sand), are easy to see and collect. Others, like iron and zinc, are found in rocks. They must be removed from the rock by a process called *smelting* or *refining*.

There are three classes of useful minerals—metals, nonmetallic minerals, and fuels. Here are some examples.

Metals	Nonmetallic Minerals		Fuels
	Used in building materials and supplies	Precious and semiprecious stones	
Iron Tin Platinum Zinc Mercury Aluminum Lead Gold Uranium Copper Silver Magnesium	Gypsum Potash Limestone Sand Borax Talc Quartz	Turquoise Topaz Garnet Tourmaline Diamond Zircon Sapphire Ruby	Coal Natural gas Petroleum Uranium (used for nuclear fuel)

Precious and Semiprecious Stones

Minerals Used in Tools

Some precious stones are used in scientific and industrial tools. Examples are the diamond, which is so hard that it is used to make the most effective cutting and grinding tools, and ruby, which focuses the light in high-powered lasers used by scientists.

Collecting Specimens

One way to begin a collection of geologic specimens is to visit a business that sells building stone or one that makes gravestones. These businesses might have small scraps of marble, granite, sandstone, limestone, pumice, shale, or slate that they will give you.

Or, go on a field trip. If possible, go with a collector who knows a lot about rocks (called a *rock hound*). A rock hound will know which rocks contain useful materials.

Look for minerals in gravel or sand pits, road cuts, diggings, mountains, hills, and stream banks. But stay away from dangerous areas like quarries, mine dump heaps, and old mines. Always have an adult with you. Be careful when climbing on rocks or cliffs.

Watch out for snakes. They may crawl under rocks, so learn to poke around a rock with a stick before reaching under it.

Keep your rock samples small. Small ones are easier to carry and easier to care for.

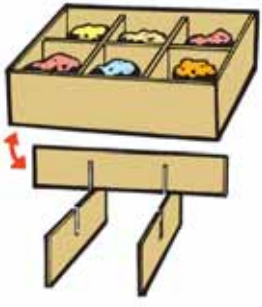
Collecting rocks is not allowed in national parks and in many state parks. Ask permission before you collect anywhere.

Geologist's Equipment

- Safety glasses to protect your eyes.
- A pocket magnifier for seeing things up close.
- Geologist's hammer for pulling rocks out of hillsides and breaking them open.
- Cold chisel, ½-inch to 1-inch wide, for chipping stone with a hammer and for digging things loose.
- Small notebook and pencil for recording where and when you found a sample. Number each sample in the notebook.
- Clear plastic food storage bags. Write the number of the rock sample on paper and slip it into the bag with the rock sample.
- Heavy gloves for rough work.
- A small day pack for carrying equipment and rocks.

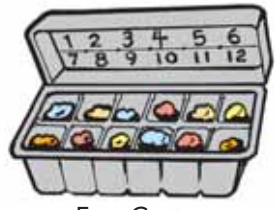
Your Collection

You can display your rock collection by putting specimens in egg cartons, or you can make dividers for boxes.



Cigar Box With Dividers

Specimen Boxes



Egg Carton

On each specimen, paint a spot of quick-drying white enamel. When it is dry, write a number on the spot with a dark felt-tip pen. For each specimen, keep a card with that number. The card should tell what the specimen is and where and when you found it.

Identifying Rocks and Minerals

Rocks and minerals are often hard to identify. You can get help by borrowing a field guide to rocks and minerals from a library. Or arrange to show your specimens to a high school science teacher. He or she may be able to help identify them.

Geologists use the following tests to identify minerals.

Color Clue: Scratch the specimen on a plate of unglazed porcelain or the back of a piece of tile. The color that appears helps to identify it.

Luster Clue: How does the specimen look when light is reflected from it? Is it shiny, dull, or greasy?

Cleavage Clue: How does it split or break up? Does it turn into powder? Split in layers? If it breaks into crystals, how many sides does a crystal have?

Chemical Clue: Does it contain limestone? If a drop of vinegar bubbles on it, the answer is yes.

Hardness Clue: How hard is it? See the hardness scale.

Hardness Scale for Minerals

Scale No.	Mineral Example	Scratch Test
1	Talc	Easily with fingernail
2	Gypsum	Barely with fingernail
3	Calcite	Barely with copper penny
4	Fluorite	Easily with knife blade
5	Apatite	Barely with knife blade
6	Feldspar	Not by blade; easily with glass
7	Quartz	Easily marks steel and hard glass
8	Topaz	Harder than common minerals
9	Corundum	Scratches topaz
10	Diamond	Scratches corundum; hardest mineral

Geologic Materials in Construction

Here are some of the geologic materials used in construction. Maybe you can add others.

Ore	Metal	Use
Hematite Limonite Magnetite	Iron	Beams, girders, posts, nails, machines, screws
Azurite Malachite Chalcocite	Copper	Electric wiring, gutters, roofing, pipes
Sphalerite	Zinc	Galvanizing pipe, sheet metal
Bauxite	Aluminum	Siding, windows, doors, roofs
Quartz	Silicon	Glass
Kernite Borax	Boron	Glass
Limestone	Calcium	Cement, building stone

Volcanoes

Volcanoes are simply vents in the ground formed by the pressure of magma building up. They come in many sizes and shapes. The streams of melted rock that pour out of the earth during some volcanic eruptions are called *lava*.

Lava changes the earth's shape as it flows and cools. In time, it may build up into a mountain peak with a vent up the center. From this chimney comes smoke, steam, and gas mixed with melted minerals.

Mount St. Helens in Washington state erupted in 1980.

As lava pours out, it spreads over the countryside and keeps building up. Geologists say that in some places this mineral rock may be thousands of feet deep.

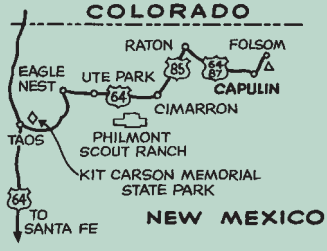
Cool lava becomes igneous rock. The foaming surface of lava forms lightweight pumice stone, which is used as an abrasive cleanser or polish.

Capulin Volcano

Capulin Volcano, an extinct volcano in northeastern New Mexico, is more than 1,000 feet high from its base to the crater rim. Long ago, wagon trains traveling west used it as a landmark. From its rim you can see parts of five states: New Mexico, Oklahoma, Texas, Kansas, and Colorado.

Capulin Volcano National Monument is not far from Philmont Scout Ranch. If you visit Philmont, maybe you'll have a chance to see Capulin Volcano, too.

Capulin Volcano is one of the United States' largest recent cinder cones. But that's "recent" in geologic terms: Geologists estimate that it was active about 7,000 years ago. The cone is also one of the most perfectly shaped. The rim is 1 mile around, and the center is 415 feet below the rim.



Geysers

Geysers form when underground water meets hot gases and molten rock deep in the earth. This water is partly changed into steam by the red-hot magma. The steam gathers in the geyser's tube. When enough pressure builds, a column of steam and boiling water erupts into the air.

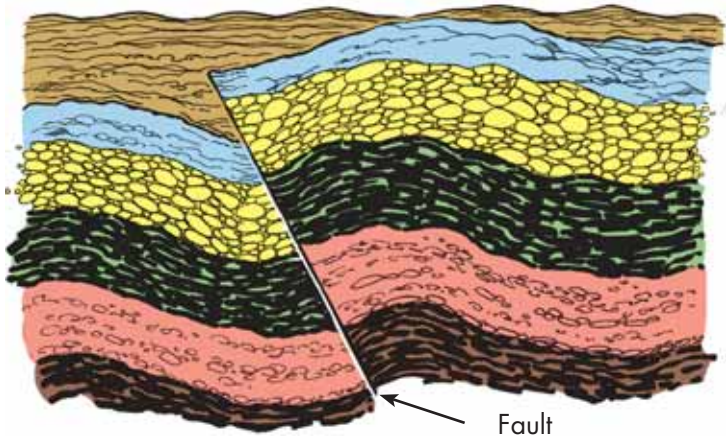
Old Faithful geyser is in Yellowstone National Park. It shoots 100 to 150 feet into the air. Until 1959, this occurred about every 70 minutes. Since then, its timing has been affected by several earthquakes, making it less predictable.

In some geysers, the steam pours out in a steady cloud.

Underground hot water and steam are also present in areas around geysers called *geothermal fields*. In some places, steam from the geothermal field is piped to power plants and used to make electricity, but this often kills the nearby geysers.

In some geysers there is so much water it isn't turned into steam. This heated water flows out as a hot spring. Because the water is hot, it dissolves minerals from the rocks it passes over. Some of these mineral springs have become health resorts.

Old Faithful geyser in Yellowstone National Park



A fault is a fracture in the earth's crust. Earthquakes may occur along a fault.

Earthquakes

The earth's rock crust is not in one piece like an unbroken shell around the planet. It's made up of parts called *plates*. The plates that are mostly land are called continental plates, and the plates under oceans are called oceanic plates.

The plates are huge, and they are moving all the time. They move slowly, perhaps 1 inch a year, but they have great force.

Most earthquakes occur along plate boundaries, when the edges of two plates slide into each other or past each other. Far below the surface, the rocks are strained to the limit by this pressure and finally break up, sending out vibrations called *seismic waves*. The seismic waves reach the surface, causing anything from a short, light shaking to violent tremors that can wreck a city.

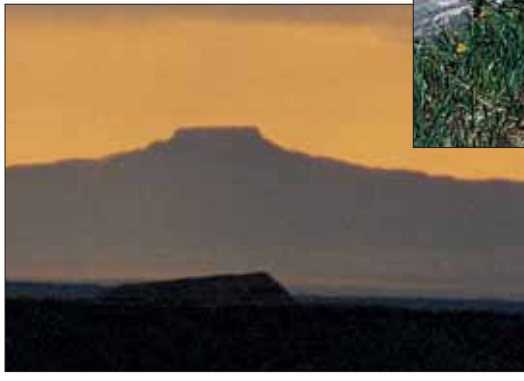
In California, many earthquakes have happened along the San Andreas fault. The San Andreas fault lies over the place where the North American plate meets the Pacific plate.

An earthquake may happen near the surface of the earth, or it may be as much as 400 miles down. Scientists use a machine called a *seismograph* to measure the force of vibrations in the earth's crust.

How Mountains are Formed

Crustal uplift
Rocky Mountains

Volcanic action
Mt. Rainier



Erosion
Buttes and mesas

Mountains have been formed over millions of years. There are three basic ways this has been done.

First, mountains are formed when the plates in the earth's crust collide. Over a very long time, the crust will fold or arch up, resulting in mountains caused by *crustal uplift.* The Rocky Mountains were formed this way.

In the Great Basin area of the western United States, which includes most of Nevada and parts of its neighboring states, the

crust was pushed upward and then pulled apart. Huge sections of the crust, called fault blocks, dropped downward, making broad valleys between mountain ranges.

Volcanic action also makes mountains, as you read on page 290. This action happens along the moving edges of the plates. Mount Rainier in Washington state is an example of a mountain made out of cooled lava and volcanic debris.

Finally, *erosion* makes mountains, usually lower ones. Softer rocks erode, or get worn away by wind and water, more quickly than harder rocks. This results in certain kinds of mountains, such as the flat-topped mesas or buttes in parts of the western and southwestern United States. Also, parts of the Ozark Mountains in Arkansas and Missouri and some mountains in the eastern United States were created by the forces of erosion.

Fossils Are Fun!

You may find fossils while you are looking for rock specimens. If you do, why not collect them, too?

A fossil is a trace of animal or plant life from millions of years ago that has hardened in rock. Sedimentary rock usually contains fossils. A fossil may be a print of a shell or the skeleton of a fish or bird. It may be a dinosaur's track or a leaf or flower print.

Would you believe that fossils from the sea can be found in a desert? It's true. And fossils have been discovered on top of mountains! This means that the spot where they were found was once an ocean floor.

Certain plants and animals live in hot climates, but their fossils have been found in cold countries. This means that these areas were not always cold. Geologists study the rock layer in which the fossils were found. Then they can tell when the country was warm and for how long.

Fossils show us what plants and trees lived millions of years ago and where. They show the changes that have happened through the years.

An unusual type of fossil is petrified wood or bone. A chemical known as silica replaced each cell of the original matter. Slowly the material turned to stone. Today it looks just as it did millions of years ago.

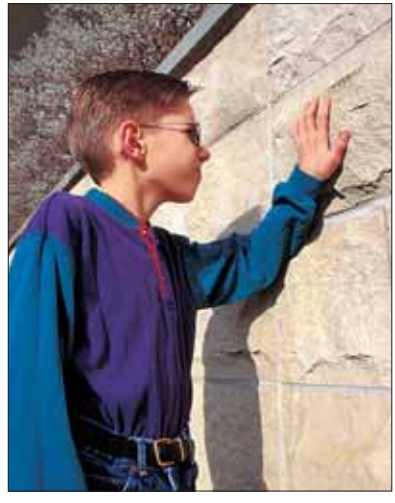
You probably can find fossils in your own neighborhood. Look in diggings, road cuts, or stream banks. Look wherever cuts have been made through layers of sedimentary rock.

If you don't know a good place to hunt for fossils, ask your teacher or write to a college geology department in your state.

Geologist in the City

Is it hard to find rocks in the heart of a huge city? They're all around you. You're walking on rock. You're looking at rock. When you go inside downtown office buildings and department stores, you're entering enclosures built of rock.

A city may have more rock samples than any plot of ground out in the countryside. You can hunt for them, even if you can't take them home.

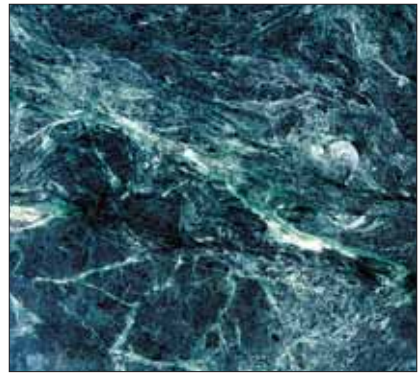


Here are a few places to look for some types of rocks in the city:

Granite. This strong igneous rock is used often in city buildings. Look for it on the outside of buildings. It can be gray, pink, or a deeper rose color. It has a speckled pattern. The darkest flecks are mica crystals, and the glasslike areas are quartz. The feldspar in it is smooth. You can find both rough and polished granite in buildings.

Sandstone. In eastern cities, many older homes, called *brownstones*, were built of brick and then covered with brown sandstone blocks.

Slate. This metamorphic rock, changed by heat and pressure, was once clay. It can be split into slabs. You might find an old sidewalk made of gray slate. Chalkboards in schools used to be made of smooth black slate. Some roofs are made of slate.



Marble. Look for marble in the lobbies of office buildings and banks. A streaky, swirling pattern of mixed color and a smooth, shiny surface will be the main clues. Marble comes in many different colors. The main color might be black, gray, green, pink, or white.

You can find marble in museums and parks, too. Pure white marble is often used for sculptures, statues, and monuments.

Cub Scout Academics Belt Loop for Geology

If you earned the Geology belt loop earlier in Cub Scouting, great! But that won't count for requirement 9 of the Geologist activity badge. You must earn the Geology belt loop again while you are a Webelos Scout for it to count toward this activity badge.

Technology Group

H

HANDYMAN

Handyman Requirements

Requirement **Approved by**

Do these:

1. With your parent, guardian, or Webelos den leader, complete the Responsibility Character Connection.

   a. **Know:** List all the tasks you can think of that are necessary in keeping a household in good shape. Name the tasks that are your responsibility. Tell what it means to be responsible for these tasks. _____

   b. **Commit:** Talk about what happens when people don't do their jobs. Tell why it is important to be helpful and to be responsible. List ways that you can be more responsible on your own. _____

   c. **Practice:** Choose one of the requirements and show how you are responsible by doing that task well for two weeks. _____

And do six of these:

2. With adult supervision, wash a car. _____
3. Help an adult change a tire on a car. _____
4. With adult supervision, replace a bulb in the taillight, turn signal, or parking light or replace a headlight on a car. _____
5. With adult supervision, show how to check the oil level and tire pressure of a car. _____
6. Make a repair to a bicycle, such as tightening the chain, fixing a flat tire, or adjusting the seat or handlebars. _____

7. Properly lubricate the chain on a bicycle. _____
8. Properly inflate the tires on a bicycle. _____
9. Change the wheels on a skateboard or pair of inline skates. _____
10. Replace a light bulb in a fixture or a lamp. _____
11. With adult supervision, arrange a storage area for household cleaners and other dangerous materials where small children cannot reach them. _____
12. Build a sawhorse or stool to be used around your home. _____
13. Help take care of the lawn. _____
14. Arrange a storage area for hand tools or lawn and garden tools. _____
15. Clean and properly store hand tools or lawn and garden tools in their storage areas. _____
16. Label hand tools or lawn and garden tools. _____
17. Put together a toolbox for common repairs around the house. Be sure the toolbox and tools are stored safely. _____

A handyman can do many different jobs. He knows how to take care of a car and a bike. He uses tools to make repairs around the house, and he takes care of the lawn.

When you work on this activity badge, you can learn a lot about keeping a car, bike, and home in good shape. You can find out how to change a flat tire. You might even build a sawhorse or a step stool.

Keep adding to this knowledge after you earn this activity badge. Your handyman skills will always be useful to you and your family. When you complete each requirement, ask an adult member of your family, your Webelos den leader, or your activity badge counselor to sign it on the previous page or this page.

Taking Care of a Car

In just a few years you'll be old enough to drive a car. Now is the time to start learning how to take care of one.

Washing a Car

Use an automatic shut-off nozzle on the hose so you don't waste water while you are washing the car.

Use products specifically designed for washing your car. Use a sponge or clean cloth for a scrubber. Check the car owner's manual for any instructions on caring for the finish.

Close the car windows so wash water won't drip inside. Rinse the car with plain water. Start washing the top of the car and work down so the suds and dirty water won't streak areas you have already washed. Do a small area—about 3 feet square—at a time. Then rinse by spraying.

You can let the car drip dry, but wiping it dry with a dry, clean cloth prevents water spots.

Changing a Tire

Don't try to change a car tire unless an adult is with you.

First, set the parking brake as tight as you can. If the car has an automatic transmission, put it in "park." If it has a manual transmission, put it in first gear. Put wedges in front and back of the wheel diagonally opposite the tire you are going to change. These steps will keep the car from moving forward or backward when you jack it up.

Before using the jack, use the sharp end of the lug wrench (found with the jack) to pry off the wheel cover (if your car has wheel covers). You'll see the nuts that hold the wheel on the axle. With the other end of the wrench, loosen the nuts one turn. If they are tight, you may need the adult's help.

You'll find instructions for using the car's jack in the instruction manual. Follow the instructions exactly. If the jack is not placed properly under the car, you could damage the car when you jack it up, or the car could fall off the jack and injure you.

Use the jack to lift the car so that the flat tire just clears the ground. Remove the nuts and pull the wheel off. Slip the spare tire wheel on over the bolts. Screw the nuts on until all of them are fairly tight. Carefully lower the jack until it is free of the car.

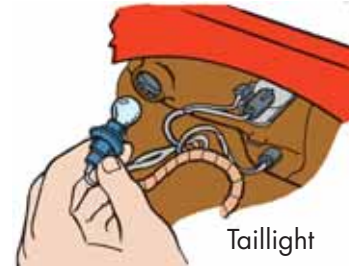
Then, with the lug wrench, tighten one nut as tight as you can make it. Next, tighten the nut opposite the first. Then tighten all the others. Finally, go around the circle again, tightening each nut as hard as you can. Ask the adult to check.

Fit the wheel cover back into its brackets and push it into place. Put the jack, lug wrench, and flat tire back in the trunk of the car.

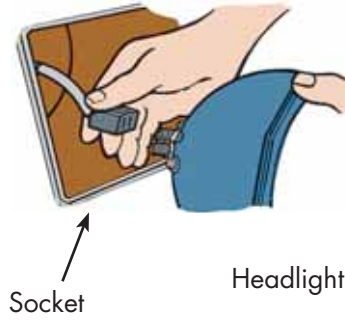
The job is done, but remind the car's owner to have the flat tire fixed!

Replacing a Taillight or Headlight

Each car model is different, so it's a good idea to have an adult advise you how to replace a taillight or headlight. On many cars the rear lights can be replaced from inside the trunk. See the owner's manual on how to change a taillight, because taillight bulbs and installation methods aren't the same for all cars.



Headlights take a little more work and may require special tools. Because headlights and headlight bulbs aren't the same for all cars, follow the directions in the owner's manual and have an adult advise you on how to change a headlight.



Checking Oil and Tire Pressure

Oil allows the parts of the car's engine to move easily and helps keep the car's engine from overheating. It is important to have enough oil in the engine at all times.

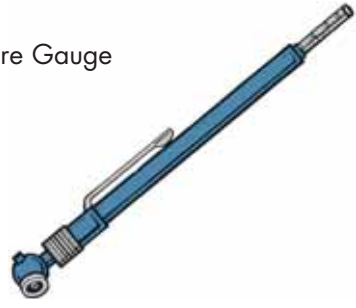
You can check the oil by using a metal rod called a *dipstick.* **Ask an adult to help you find the oil dipstick in the engine.**

Dipstick

While the engine is cool, pull out the oil dipstick and wipe it clean with a rag. Then put it back, all the way in. Pull it out again and look at the markings.

If the oil level is below the "add" line, the car needs oil. Put the dipstick back in. Tell the owner that the car needs oil.

Tire Gauge



You need a tire gauge to check tire pressure. **When the tires are cool,** take the cap off the tire's valve stem. Push the tire gauge hard against the valve. The gauge's scale will show the tire's pressure. The recommended pressure is shown on a sticker usually attached to the edge of the car door. You can also find the recommended pressure in the owner's manual. Check all tires, including the spare.

If any of the tires need more air, tell the car's owner.

Taking Care of a Bicycle

A bicycle is a lot simpler to maintain than a car. But it is a machine, too, so it needs to be taken care of just as a car does.

Adjusting a Bike Chain

If the chain needs tightening, turn the bicycle upside down. Loosen the two axle nuts on the rear wheel with a wrench. A combination or socket wrench is best so that you don't wear down the nuts over time. If the bicycle has a coaster brake, loosen the brake arm mounting nuts, too.

Now pull the wheel back until the chain has about ½ inch of play in its center. Tighten the axle nut on the chain side. Make sure that the wheel is centered between the chain stays. Then tighten the other axle nut and the coaster brake arm mounting nuts. Don't try to adjust the chain on a multispeed bike that has a derailleur.

Fixing a Flat

To fix a flat tire, you need a tire repair kit. Some kits have a scraper or sandpaper, patches, and cement. Other kits have patches that don't need cement.

Take the wheel off the bicycle, and then take off the tire and tube. Taking off the tire can be tricky. You might have to use tools called *tire levers*. Ask an adult to help you the first time if you have trouble.

If you can't see where the hole in the tube is, pump air into the tube. Dunk it into a tub of water. Bubbles will show where the air is escaping. Dry off the area around the hole.

Use the scraper or sandpaper to rough up the tube around the hole. If your repair kit has cement, put a light coating of cement around the hole and quickly wipe it off. Then put on another coat of cement and let it get tacky. If you have glueless patches, you don't need to use any cement.

Remove the coating from a patch and smooth the patch over the hole. Press the patch hard to spread the cement evenly and make a tight seal.

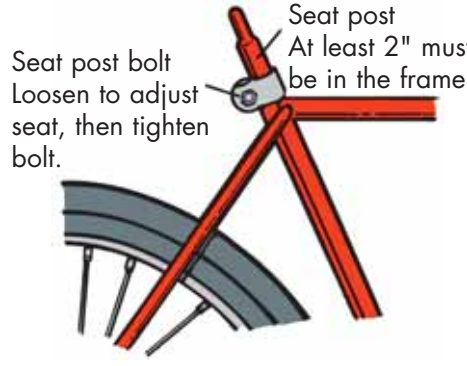
Put the tube back in the tire and position the tire carefully on the wheel before you inflate it.

Adjusting the Seat and Handlebars

To adjust the seat (also called the saddle) or handlebars of your bike, all you need is the right wrench. For some bikes, you'll need a combination wrench, and for others, an Allen wrench.

To change the height of the seat, loosen the bolt that keeps the seat post tight in the frame and then raise or lower the seat post to the height you need. Make sure that at least 2 inches of the seat post is in the frame.

You can raise and lower the handlebars on your bike and also change the position of the handlebars. Look at your bike and find the bolts that control these adjustments. Loosen the bolts to make the adjustments.



Lubricating a Bicycle

Oil prevents rust and helps to keep a bicycle running smoothly.

To lubricate the chain, turn the bicycle upside down. Use the pedals to make the crank turn, and then drip lightweight oil on the chain. The oil will spread over the chain as you turn the crank.

When all the links of the chain have a light coating of oil, the job is done. Wipe any extra oil from the chain and sprocket with a clean rag.

Inflating the Tires

A bicycle's tires should be kept at the correct pressure. The pressure may be stamped on the side of the tire. If it isn't, check the bicycle owner's manual.

Use a bicycle tire gauge to check the pressure. (Many bike tires require higher pressure than a car tire gauge can read.) You can inflate tires with a hand pump. Keep checking the pressure until it is right.

Taking Care of Skateboards and Skates

Check your equipment before skating or skateboarding. Be sure all fittings are tight and that all skates and skateboards are well maintained and in good repair consistent with the manufacturer's recommendations.

Handyman Around the House

You can make life easier for your family by helping with minor repairs and other jobs. Requirements 10 through 17 cover some ways you can help.

Replacing a Light Bulb

This is just about the simplest job there is.

But you can learn an important lesson as you do it. That lesson is: Whenever you are working on an electrical appliance, **first turn off the switch if it has one, and then pull the plug or turn off the circuit breaker.**

Wait for the old bulb to cool if it has just burned out. Then all you have to do is screw out the old bulb and screw in the new one. Use the correct wattage bulb for the fixture. Now put the plug back in the outlet or turn on the circuit breaker. Turn on the switch to test the light.

Storing Dangerous Materials

Household cleaning materials are full of poisons. Young children do not know that. If they get the chance, they will play with poisons and may even try to drink them.

So if you have a little brother or sister, check to see whether cleaning supplies are in a safe storage area. If not, you might arrange to store them out of the reach of small children.

Or you could buy a small lock and install it on the present storage area. Directions for installing the lock will be on the package.

Woodworking Jobs

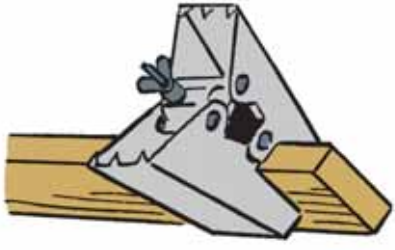
If you like working with wood, try making a sawhorse or stool. Either one will be useful around your house.

The carpenter's best friend is the sawhorse—or better, two sawhorses. Using sawhorses, a carpenter has his or her work at a comfortable height for sawing, planing, and nailing boards.

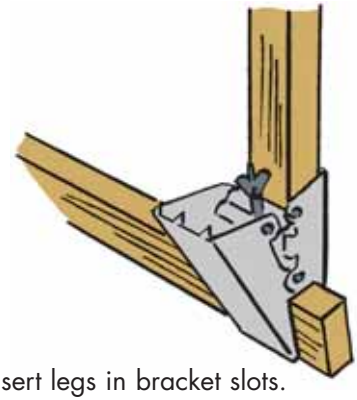
Easy-to-Make Sawhorse

The easiest sawhorse uses two steel brackets. You can buy them at a hardware store. Use two-by-four lumber for the legs and crosspiece. Cut four legs, each 2 feet long. Cut a crosspiece about 30 inches long.

Fit the legs and crosspiece into the steel brackets, and you have a strong sawhorse.

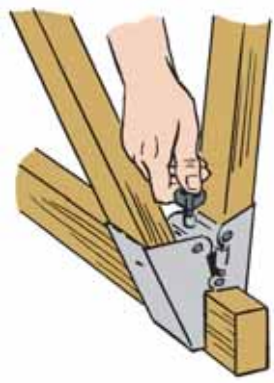


1. Clamp bracket to crosspiece.



2. Insert legs in bracket slots.

3. Spread legs, forcing bracket teeth to bite into the wood.

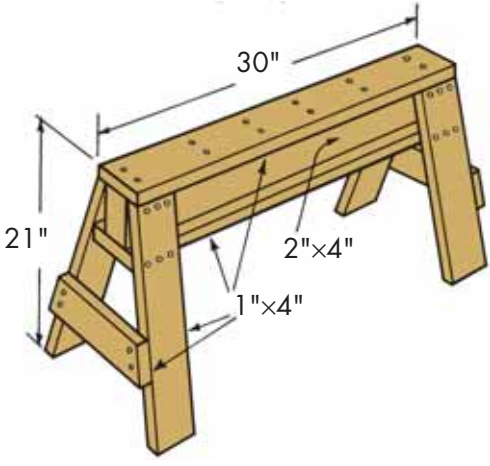


4. Tighten wing nut.

5. Ready to use.

All-Wood Sawhorse

The main crosspiece is a two-by-four, cut 30 inches long. Set it on edge and nail a 30-inch one-by-four to its top. This will be the top surface of the sawhorse. Turn it over and nail another 30-inch one-by-four to the bottom.



Cut the four legs from one-by-fours. Each should be 21 inches long. Nail the legs to the two-by-four crosspiece, just under the top, and again to the edge of the bottom one-by-four board, as shown.

Cut the braces to fit. Nail on the braces, and the job is done.

Making a Stool

To make a stool (or bench), you need about 36 inches of 1" × 12" wood (pine or ¾" plywood). See the drawing below. You will cut five pieces from this one board. Measure carefully so you don't waste any of the wood.

Cut the top of the stool: 1" × 12" × 18".

Cut two 8" × 8" pieces for the legs. Clamp the two leg pieces together, mark where you will cut the notch, and saw them out. This will make the legs exactly the same so the stool won't wobble.

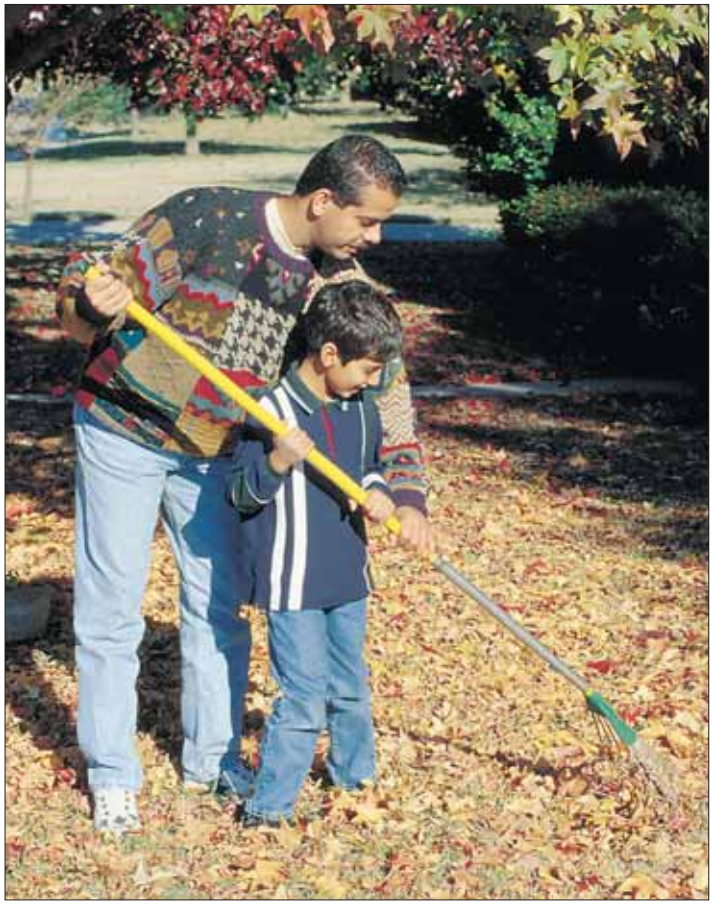
Cut two ¾" × 2" × 14" pieces for the side braces.

Nail the stool together with finishing nails. Note that the legs are set 2 inches in from the ends of the top. Measure carefully before you drive the top nails into the legs to be sure they go into the legs.

Countersink the top nails. (That is, use another nail to tap them just below the surface.) Fill the nail holes with wood putty.

Nail the side braces to the legs. Fit them just under the top of the stool. The side braces will keep your stool stable.

Sand the stool all over. Be sure to clean any grit from the stool before applying the finish. You can stain the stool to match other furniture, or you can paint it any color you like.



Outdoor Jobs

If your home has a lawn, you can help take care of it by raking the leaves and grass clippings.

If the grass isn't too long, don't rake up the clippings. They will rot and enrich the soil.

If the clippings are very long, you may have to rake them up because they could damage the grass by cutting off sunlight. Put them on a compost pile. If you don't have a compost pile, dispose of the clippings by whatever method allowed by law in your community.

Taking Care of Tools

Your family may already have a storage area for hand tools and lawn and garden tools. Perhaps you can make it neater.

For hand tools, you can build a rack from pegboard. Use special pegboard hangers to store saws, hammers, augers, and other tools.

For lawn and garden tools like rakes, hoes, and trowels, do this: Nail a length of one-by-four to a wall in a convenient place. Tap two long nails into the board to support each tool.

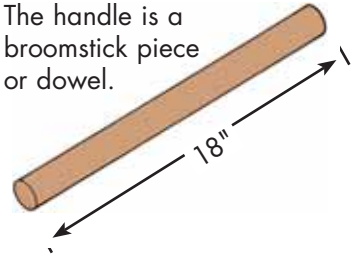
Cleaning Tools, Putting Them Away, and Marking Them

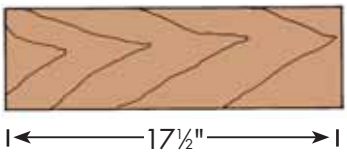
Whenever you want to use a tool, your job goes much faster if the tool is clean and in its place. After you use tools, clean them: Carefully remove sawdust from woodworking tools; clean dirt off gardening tools. If your family's tools aren't ready to use, spend a little time cleaning them and storing them for the next use. Mark tools with waterproof ink for identification. Or use a plastic tape machine to put your family's name on tools.

Put a Toolbox Together

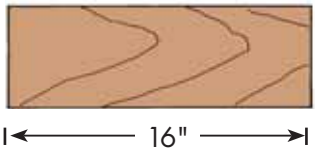
If you gather most of the hand tools you will need for jobs around the house and put them in a toolbox, you can take care of many smaller handyman jobs easily and quickly. First, gather the tools you want to put in your toolbox. A basic handyman toolbox might include small and medium slotted screwdrivers, a medium Phillips screwdriver, a shop knife, a putty knife, a pair of scissors, a pair of pliers, a pair of needle-nose pliers, a hammer, some duct tape, and a few screws and nails.

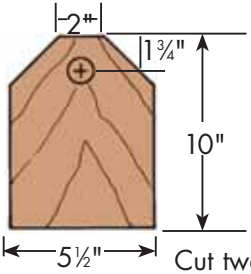
Then make or choose a box that will hold them all (with a little open space left for tools that you later find out you need in the toolbox). You may have made a toolbox when you were a Bear Cub Scout. Plans for a toolbox are in the *Bear Handbook*.



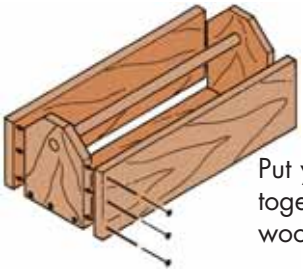


Cut two pieces 17½ inches long for the sides and one 16 inches long for the bottom.





Cut two ends.



Put your toolbox together with wood screws.

Outdoor Group

N

NATURALIST

Naturalist Requirements

Requirement **Approved by**

Do this:

1. With your parent, guardian, or Webelos den leader, complete the Respect Character Connection.

   a. **Know:** Tell what interested you most when completing the requirements for this activity badge. Tell what you learned about how you can show appreciation and respect for wildlife.

   b. **Commit:** Tell things some people have done that show a lack of respect for wildlife. Name ways you will show respect for and protect wildlife.

   c. **Practice:** Explain how completing the requirements for this activity badge gives you the opportunity to show respect.

And do five of these:

2. Keep an "insect zoo" that you have collected. You might have crickets, ants, or grasshoppers. Study them for a while and then release them. Share your experience with your Webelos den.

3. Set up an aquarium or terrarium. Keep it for at least a month. Share your experience with your Webelos den by showing them photos or drawings of your project, or having them visit to see your project.

4. Visit a museum of natural history, a nature center, or a zoo with your family, Webelos den, or pack. Tell what you saw.
5. Watch for birds in your yard, neighborhood, or town for one week. Identify the birds you see and write down where and when you saw them.
6. Learn about the bird flyways closest to your home. Find out which birds use these flyways.
7. Learn to identify poisonous plants and venomous reptiles found in your area.
8. Watch six wild animals (snakes, turtles, fish, birds, or mammals) in the wild. Describe the kind of place (forest, field, marsh, yard, or park) where you saw them. Tell what they were doing.
9. Give examples of
   - A producer, a consumer, and a decomposer in the food chain of an ecosystem
   - One way humans have changed the balance of nature
   - How you can help protect the balance of nature
10. Identify a plant, bird, or wild animal that is found only in your area of the country. Tell why it survives only in your area.
11. Learn about aquatic ecosystems and wetlands in your area. Discuss with your Webelos den leader or activity badge counselor the important role aquatic ecosystems and wetlands play in supporting lifecycles of wildlife and humans.

12. Look around your neighborhood and identify how litter might be dangerous to the birds and other animals. Clean up the litter. Identify what else you might do to make your neighborhood safer for animals. _____

13. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Wildlife Conservation. _____

If you like watching wildlife, you're already a naturalist. A naturalist studies living creatures and plants in the wild. When you visit a nature center to learn about birds, reptiles, mammals, trees, and wildflowers, your guide is a naturalist.

For this activity badge, you might keep an insect zoo, watch tadpoles change into frogs, or make a terrarium for wild plants. Perhaps your den will visit a real zoo or take a nature walk in the woods.

Naturalists have a great love for nature. They notice details that other people miss. They know that the well-being of all living things is interconnected. When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on the previous page or this page.

Your Insect Zoo

Keeping an insect allows you to study it closely and get to know what it does. Get a book from the library about the insect you keep.

It will need your care each day. Consider it a visitor and release it back to its natural outdoor habitat after a while.

Summer is the best time to keep an insect zoo because insects are most active then. Here are tips on finding and caring for different insects.

Crickets

Sink a small plastic jar or can into the ground so its rim is level with the surface. Put a sweet, gooey mixture in the jar. It might be a mixture of two parts molasses and one part water or a mashed pulp of overripe fruit.

The sweet smell will attract crickets and beetles, and they will tumble in.

Or you can look for crickets under rocks and logs. You have to be quick to catch a cricket. Crickets don't bite, but they do jump.

Cricket home

You can use a large, wide-mouthed plastic jar as a cricket home. Have an adult help you punch air holes in the jar lid, or if the lid is too hard, make a lid out of fiberglass screenwire and put a rubber band around it.

Put 1 inch of moist soil in the bottom. (Soil from the place you found the cricket should be good.) Put in a bottle cap for drinking water and a rock or small piece of wood. Crickets like to crawl underneath rocks or other objects.

Don't place the jar where it will get direct sunlight, as it will heat up inside and the cricket may die.

Food: Try lettuce, a small wedge of raw potato, or a bit of dry dog or cat food—fresh food each day. Keep the house clean by removing leftover food and droppings.

Expect some chirping! Your cricket guest may keep you awake or sing you to sleep.

Ants

To capture ants you need a 2-foot-square piece of white cloth or paper, two large-mouth bottles with lids, a piece of cardboard, and a trowel. Now find an anthill or ant nest under rocks. **Caution:** Don't try to collect fire ants or other biting ants. Stay away from them.

Stir the anthill gently with your trowel. When the ants come out to investigate, use the cardboard to guide them into one jar. Put some dirt from the anthill in with them. Some ants may be carrying white objects, which are the larvae and pupae, two stages of ant development. Collect some of these too.

Now find the colony's queen—if you can. Some ant queens live very deep in the ground, and when the nest is disturbed, the other ants carry her off to safety. That is because the queen produces all of the colony's young. She will be larger than the other ants. As you look for the queen, spread the dirt on the white cloth, and she should show up against the white background.

Put the queen into the second bottle and add some dirt.

Ant house

You can use a wide-mouthed jar with screenwire (if the holes are small enough to keep ants from climbing out) or cheesecloth on top to let in air. Put your ant colony in it, including the queen, along with the dirt from the anthill. Add ordinary soil until the jar is about two-thirds full. Keep the soil moist, but not wet, by putting in a few drops of water when it looks dry. Fill a bottle cap with water for the ants to drink.

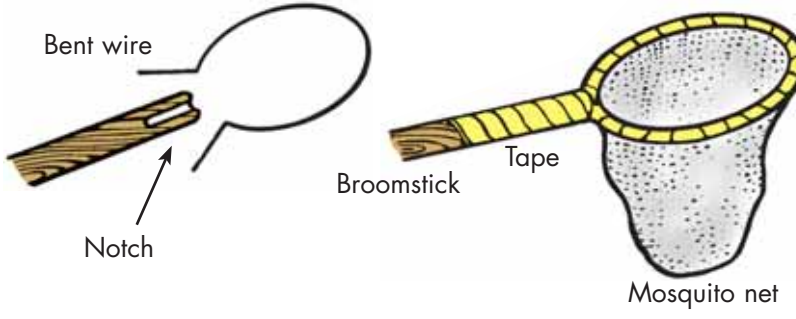
Keep the house covered when you aren't watching the ants at work. Ants like to work in the dark. You can cover it with black paper or cloth held on by rubber bands. Handle the house with care, and don't jar or jiggle it.

Food: Small bits of sugar, peanuts, apples, and bananas every few days. Remove uneaten food each time you put in new food.

Praying Mantises, Grasshoppers, and Walkingsticks

Praying mantises and grasshoppers are usually found on grass and in grain fields. Look for walkingsticks on trees. Sometimes you can pick up these insects with your fingers, but a collecting net like the one shown below is useful.

You can also catch many types of insects by using a stick to shake a bush so they will fall off. Hold an umbrella upside down under the bush or spread a large cloth on the ground to catch them. To catch night-flying moths and other insects, hang up an old sheet and shine a flashlight on it. The insects will be attracted to the light and land on the sheet.



Cage for a praying mantis

You'll need metal screening and a large round tin can with a plastic lid. The screening will be the top of the cage. Cut the screening so it is 12 inches high and long enough to go around the can and overlap 1 inch. Make a tube from the screening, to fit inside the can. Lace it together with wire.

Set the wire tube in the can. Fill the bottom of the can with plaster of paris. Push a branch into the plaster of paris before it hardens. The can's plastic lid goes on top of the screen tube.

Food: Flies, small insects, tiny bits of raw liver, chopped meat. The mantis prefers live food.

Water: Put in a bottle cap.

Note: In some states it is against the law to confine a praying mantis. Make sure that, with the help of your parent, guardian, or Webelos den leader, you check your state's laws.

Grasshoppers and walkingsticks

Cover the bottom of a plastic jar with 1 inch of soil. Cover this with grass sod. (Water the grass occasionally.) Punch air holes in the cover.

Food: Grass for grasshoppers. Walkingsticks eat the leaves of oak, locust, cherry, and walnut trees. Supply water, too.

Moths and Butterflies

These amazing insects have four stages in their lives.

1. **Egg.** Egg masses are on the undersides of leaves or grass blades.
2. **Larva.** A larva (caterpillar) emerges from the egg.
3. **Pupa.** During this stage, the larva develops into an insect with wings. There is a difference between moths and butterflies in the pupal stage:
   - A typical moth caterpillar spins a soft silky covering around itself and becomes dormant (goes to sleep). The covering is called a *cocoon.* (See page 327.) Some cocoons have twigs or leaves attached to the outside.
   - A butterfly larva doesn't spin a cocoon (except for a few kinds of butterflies, like the skippers). The butterfly's body changes, forming a firm outer case called the *chrysalis*. It is also dormant.

Monarch Butterfly

4. **Moth or butterfly.** In the spring or summer, an adult moth or butterfly emerges. Butterflies come out more quickly than moths.

Collecting moth and butterfly larvae

Many larvae blend in with their surroundings, so look closely to find a green larva on a leaf. Other larvae may have bold patterns, like the monarch butterfly larva with its black, yellow, and white stripes. Some larvae have hairs or spines sticking out. Be careful, because in some species the hairs can irritate your skin or the spines can sting.

Use a wide-mouthed jar with a screw top. Punch air holes in the top. Put in a branch or twig and some leaves of the tree or shrub on which you found the larva. Keep a fresh supply of the same leaves in the jar until the larva stops eating. Then it will enter the pupal stage (cocoon or chrysalis). Later it will emerge as a butterfly or moth. Be prepared to release it at that time.

Starting with a cocoon or chrysalis

Look for the cocoons of moths and the chrysalises of butterflies in early spring before trees and shrubs have leaves. You'll find them hanging from branches or twigs. Cut away part of the twig.

Keep the cocoon in a clean, covered jar. Punch air holes in the cover. Soon you'll see a miracle—a moth or butterfly emerging. Release the butterfly or moth very soon so that it can find the food it needs.

Moth Cocoon

Aquariums

Perhaps you already have an aquarium for tropical fish at home. Even if you do, it's fun to make one for fish or water animals you have collected from a stream or pond.

Jointed Handle, 4½' to 5½' Long

Dip Net, ½" Mesh

Bait can or jar full of pond water for collecting tadpoles.

Use a fish bowl or a square-sided aquarium. Make a dip net to catch small fish along the edge of a pond and put them in your aquarium with water from the pond.

Tadpoles

In the spring, you can catch tadpoles in ponds and watch them grow into frogs or toads in your aquarium. Prepare your aquarium by putting a layer of sand and rocks on the bottom. Plant a few aquatic plants in the sand. You can buy them at tropical fish stores. Fill the aquarium with water from a pond. Put in some rocks—they'll be needed later.

Catch two or three tadpoles and put them in. As the tadpoles grow, you'll see the first hint of legs. Feed the tadpoles soft insects, earthworms, grasshoppers, flies, and crickets.

Tadpole's Growth

Before legs appear

Hind legs developed

Frog

Watch for the legs to appear, because when your tadpoles start looking like frogs or toads, they can no longer breathe in the water. Lower the water level so they can climb out on the rocks. Feed the maturing frogs or toads mealworms, which you can buy at pet shops.

Make a support for your terrarium. Use lathing strips and nail them to a wood block.

Terrariums

One kind of terrarium is a small garden of plants in a big bottle or jar with the lid on it. You can also turn an aquarium into a terrarium.

The terrarium shown here is simple. You seal it up, and it will support plant life for two or three months.

Use a wide-mouthed gallon jar and build a base to fit it. Put in ½ inch of sand or fine gravel. Sprinkle ½ inch of charcoal chips over that. On top of the charcoal, put 2 cups of rich soil. If the soil in your area is poor, use potting soil from a garden center.

Plant small tropical plants that thrive in low light and high humidity, like aluminum plant, flame violet, and artillery plant. Ask about small tropical plants at a garden center.

Mist the plants lightly with water before screwing on the lid. You shouldn't need to water them again because the moisture will circulate in the closed jar.

Keep the terrarium where it will get indirect sunlight each day. Don't put it in direct sunlight because the container will heat up too much.

If you want a cactus terrarium, it should have a wide open top so moisture gets out instead of staying inside. (Cactus plants can't take high humidity.) Or you can plant cacti in a dish garden. Any container two or three inches deep will work. Use soil recommended for the cactus plants you choose. Handle the plants carefully so the spines don't stick your hands.

Cacti need water, but not too often. Give them bright indirect light, and turn the container so all the plants get light.

Don't fertilize any terrarium plants, or they may outgrow their containers.

Visiting Nature Centers

If your area has a museum of natural history, a nature center, or a zoo, visit it. At a natural history museum, you'll see many wonderful exhibits about nature. The museum will have displays of birds and mammals that are hard to spot in the wild.

The museum may also have skeletons and likenesses of creatures that lived thousands of years ago.

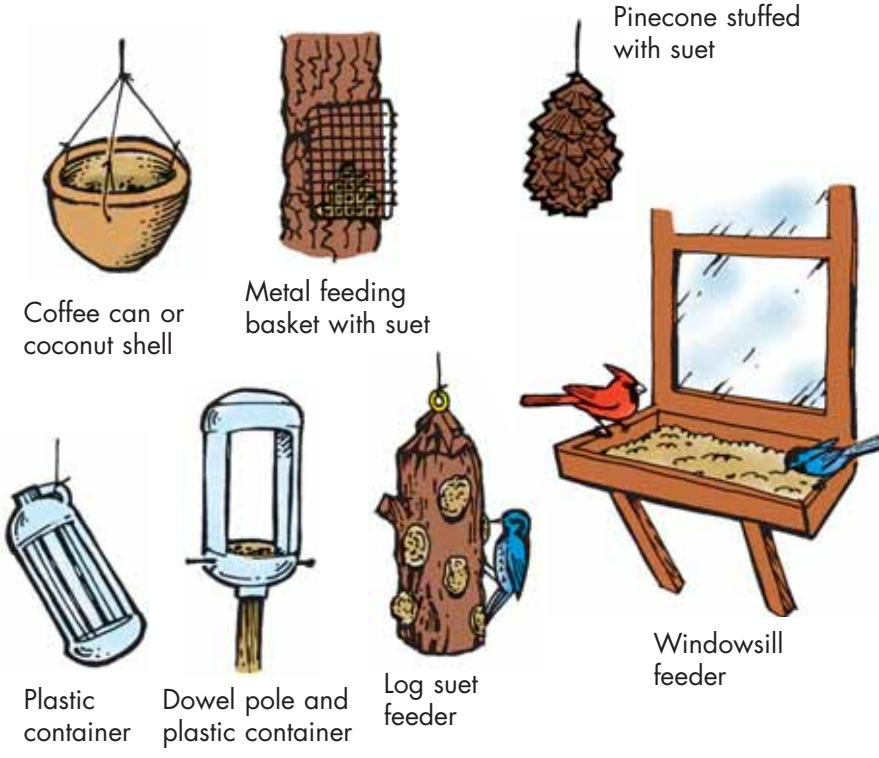
A nature center has indoor exhibits and an outdoor area where you can hike and see trees and plants that grow wild in the area.

At a zoo you can get a fairly close view of many animals and birds from all over the world, some that are rarely seen by humans. A day at a nature center or zoo is a lot of fun.

Bird Watching

An easy way to watch birds is to bring them to your yard by setting out a bird feeder. You may also build a bird nesting box and put it near your window for a close-up view of birds.

Bird Feeders



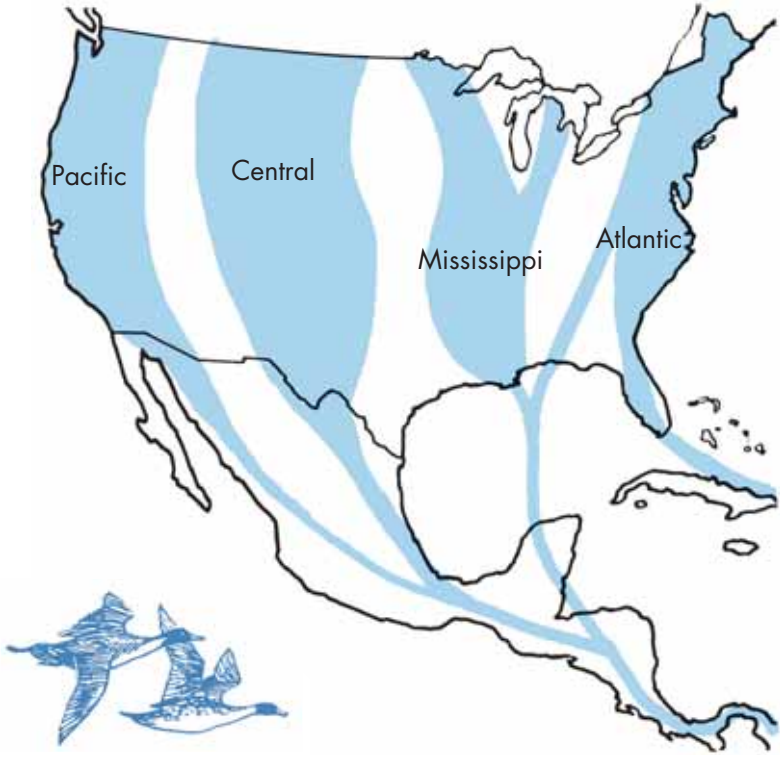
Some simple bird feeders are shown on the previous page. The log, pinecone, and basket are for feeding suet (hard fat from beef or mutton) or peanut butter.

Fill other types of feeders with seed that is sold as food for birds. Some birds may like small pieces of fruit or bread crumbs. See what kind of birds come to your feeder.

Borrow a field guide to birds from a library so you can identify the birds you see. Keep a record of the birds for at least one week.

Here are some things to notice about birds:

- **Marks.** The chickadee's black cap and bib, the downy woodpecker's red spot on the back of the head. Marks help you remember the bird.
- **Wings.** Pointed, rounded?
- **Tail.** Long or short? Rounded, square, or forked?
- **Bill.** Short bills are good for cracking seeds. Long pointed bills are good for digging in bark for insects.
- **Toes.** Most birds have four toes—three pointing forward and one back; but tree-climbing woodpeckers have two forward, two back.
- **Flight and behavior.** The starling flies straight as an arrow, but the goldfinch dips up and down. The nuthatch hops down trees headfirst.
- **Song.** In spring, the black-capped chickadee's song sounds like "Fee-bee." The song sparrow gives three sharp whistles, and then a chirp. If you can imitate the sound, it may draw a bird closer; so can kissing the back of your hand to make a chirp.



Bird Flyways

Some birds, like starlings, blue jays, sparrows, and nighthawks, stay in one area all their lives. Other kinds of birds migrate, flying south each fall to warmer places to spend the winter. They return to nest and live in their northern homes each spring.

Many birds that migrate use regular main routes. These routes are called *flyways*. The map shows the four main flyways in North America.

You don't have to live on a flyway to see birds moving in the spring and fall. Some will pass over your town. But most flocks of birds, like geese and ducks, use the flyways. These are their highways between winter and summer homes.

Poisonous Plants

As a naturalist and camper, you should know the poisonous plants in your area. Avoid them!

Three common poisonous plants are shown here. If you touch them, your skin may get red and itchy. If you think you have touched a poisonous plant, wash the spot with soap and water.

Notice that poison oak and poison ivy have three leaflets on the end of stems. They both have white or whitish fruit. That's why Scouts say, "Leaflets three, let it be; berries white, poisonous sight."

Poison Oak

Poison Ivy

Poison Sumac

The foliage of poison sumac stays green from spring through summer *(left),* then turns red in the fall *(right).*

Venomous Reptiles

Snakes and other reptiles will usually do their best to stay out of your way. But if you stumble over one, it may bite.

Most snakes and reptiles don't have poison in their bite. The few that do are listed here.

Gila monster: This lizard grows to about 2 feet long. The lighter part of the pattern is white or yellow. It is found in parts of Nevada and Utah and down into Mexico.

Eastern diamondback rattlesnake: Sometimes grows to 7 feet in length. It is found along the Atlantic coast from North Carolina to Florida and west to Louisiana. It is never more than 100 miles from the coast.

Western diamondback rattlesnake: Often grows to 7 feet in length. It lives in the southwestern United States, from Missouri and eastern Texas to southeastern California.

Timber rattlesnake: Is less than 6 feet in length. It ranges from Maine to Texas, but its numbers are now greatly reduced.

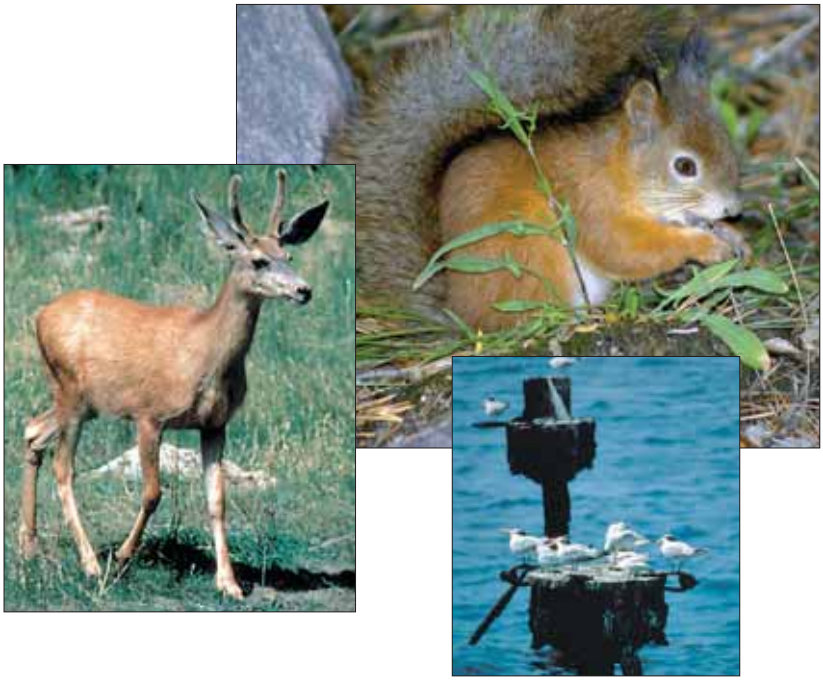
Coral snake: Grows to about 2 feet long. It is ringed with red, yellow, and black bands. (The red and yellow bands touch—remember the saying "red on yellow kill a fellow.") Most coral snake species are found in Central and South America, but two are found in the United States. The harlequin or bead coral snake is found in some southeastern states, and the Arizona coral snake is found in southern New Mexico and Arizona.

Prairie rattlesnake: About 3 feet in length. Sometimes it grows to 5 feet. It lives in the western half of the United States.

Sidewinder or horned rattlesnake: Found in the deserts of the Southwest.

Water moccasin (cottonmouth): Found in or near water from southeastern Virginia to Florida. It can be seen westward to east Texas and north as far as southwestern Illinois. It sometimes grows as long as 6 feet.

Copperhead: Not often longer than 4 feet, it lives in most southeastern states. It can be found as far north as Massachusetts and Pennsylvania and westward to Illinois and Texas.



Watching Animals in the Wild

Take a nature hike with your family or den and see how many wild creatures you can spot. Look for birds, snakes, turtles, fish, and mammals.

Be as quiet as you can. Animals will hide if they see, hear, or smell you. Here are a few tips.

Mammals: Look for rabbits, squirrels, woodchucks, mice, and other small animals. In muddy spots around streams, you may see tracks. See if you can identify the animal that made the tracks.

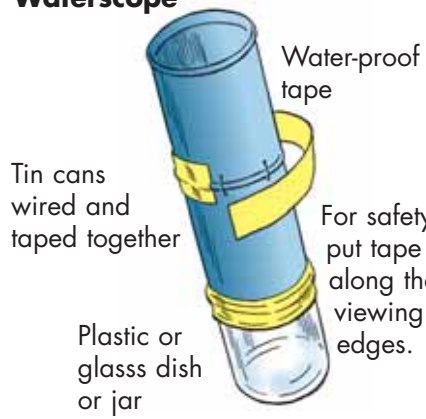
Turtles: Look around ponds and streams. Some kinds of turtles will bite, so approach them with care.

Snakes: Look under logs, leaf piles, rocks, and sawdust piles. Be careful. Don't handle the snake unless an expert tells you it is not venomous. Don't harm the snake.

Fish: It is very hard to spot fish unless they are in shallow water. That is because the light bounces off the water, making it hard to see far down.

To see better under water, make the waterscope shown here. Use it by lying on your stomach on a low dock. Put the end of the waterscope into the water and look through the top.

Waterscope



Ecosystems

An ecosystem is a community of plants and animals living in an environment that supplies what they need for life.

There are many types of ecosystems. For example, a forest, a desert, and a wetland each contain different combinations of plants, animals, soils, and water sources.

In an ecosystem, plants and animals depend on their environment and on each other. Energy and food flow through the community in a *food chain*.

The sun: Without the sun, there would be no life on earth. The sun's energy flows through a cycle in the ecosystem. Plants are the first to use this energy.

Producers: All green plants—trees, shrubs, grasses, flowers, etc.—use the sun's energy to grow. Plants also take up nutrients and minerals from the soil. The plants produce leaves, bark, fruits, nuts, and seeds that many animals eat.

Consumers: Animals that use the stored energy, nutrients, and minerals in their food to grow and to maintain their health.

- **Primary consumers:** Plant-eating animals are called herbivores. They're the primary consumers in the ecosystem because they're the first to benefit by eating the producers. Examples: Rabbits, squirrels, deer, seed-eating birds, grasshoppers. On farms, cattle are primary consumers.

- **Secondary consumers:** Animals that eat other animals are meat-eaters or *carnivores*. In an ecosystem, they're secondary consumers, because they benefit from the energy and nutrients stored in their prey (the plant-eaters). Examples: Hawks and owls eat mice and rabbits. A mountain lion hunts deer and smaller animals.
- Some consumers eat both plants and animals. They're called *omnivores*. The gray fox hunts rabbits, mice, voles, birds, and insects, but it also eats blackberries, grapes, persimmons, and grass. Humans who eat meat and plants, such as fruits, vegetables, and grain products, are omnivores too.

Decomposers: These are the fungi, lichens, bacteria, and insects that break down dead plants and animals. This returns organic matter and minerals to the soil, making them available to trees and other plants—the producers. Nature is a good recycler.

The Balance of Nature

When you figure out the food chain in an ecosystem, you can see how the animals, plants, and their habitat are connected. The ecosystem is in balance when all the necessary parts of its community are present. Animals are able to find food and have healthy young.

Nature is out of balance when there is not enough habitat and food for animals to survive. After some natural events, like a forest fire started by lightning, the original ecosystem may slowly recover. Nature eventually adjusts the balance.

The needs and plans of humans often alter the balance of nature quickly and permanently. When people clear forest and brush and turn it into agricultural land, much of the animal life may disappear from the area, except for animals that can adapt to the farming environment. When a huge shopping center is built and surrounded by a paved parking lot, animals can't adapt to that environment. Pollution of air or water can damage or wipe out an ecosystem.

Losing one link of the food chain can upset the balance, too. Because wolves were seen as a threat to livestock, people killed them. Without these predators, the population of white-tailed deer increased tremendously, but their wild habitat decreased. Deer adapt well to environments like new housing developments. Some people enjoy watching deer near their homes, but others consider deer a nuisance when they graze in flower beds and destroy young trees by eating the bark.

You and the Balance of Nature

You are part of an ecosystem too, whether you live in the wilderness or in a city. What can you do to protect the balance of nature?

You can help in small ways. When you want to see what lives under a rock, lift it carefully and replace it gently, so you don't destroy the creatures and their habitat. If you plant a garden of flowers that bees and butterflies like, you'll provide food for them. Can you think of other small ways you can help?

You can help in larger ways by joining local efforts to solve water and air pollution problems. Or your den can plant trees or clean up a stream.

Can you think of other ways to protect the balance of nature?

Your Local Environment

Your part of the country is unique. Local libraries or environmental groups could be good resources to help you learn about and observe plants, birds, and wild animals that are found only in your area. When observing wildlife, you must be with a parent, guardian, or your Webelos den leader. Be sure not to disturb or harm these precious resources.

All living things—including you—depend on water to exist. Your area's aquatic ecosystem is important, and there likely will be one or several government agencies or organizations in your area that manage local aquatic resources and keep the public informed about them. It is every citizen's responsibility to understand how our water is obtained and managed, and to help conserve this precious resource.

Whether you live in the country or the city, there are birds and other animals all around you. When people don't dispose of litter properly, it can harm animals, including humans! Some litter is poisonous. Some might be a fire hazard. Many plastic items can hurt animals; for instance, an animal could get its head stuck in the plastic rings that hold cans of food or soft drinks together, and eventually suffocate. The same thing is true of plastic containers that are more narrow at the top than at the bottom. These items should be cut open before disposal. Fishing line and string can become entangled in a bird's legs and then catch on a limb so that the bird cannot fly. These should be cut into small pieces or wound tightly before disposal. Look around your neighborhood and see what kinds of hazards you find, and do something about them.

Cub Scout Academics Belt Loop for Wildlife Conservation

If you earned the Wildlife Conservation belt loop earlier in Cub Scouting, great! But that won't count for requirement 13 of this Naturalist activity badge. You must earn the Wildlife Conservation belt loop again while you are a Webelos Scout for it to count toward this activity badge.

Cub Scout World Conservation Award

Earning the Naturalist activity badge fulfills a requirement for the World Conservation Award. See page 70 for details on earning that award.

Outdoor Group

O

OUTDOORSMAN

Outdoorsman Requirements

Requirement	Approved by
Do two of these:	
1. Present yourself to your Webelos den leader, properly dressed, as you would be for an overnight campout. Show the camping gear you will use. Show the right way to pack and carry it.	_____
2. With your family or Webelos den, help plan and take part in an evening outdoor activity that includes a campfire.	_____
3. With your parent or guardian, take part in a Webelos den overnight campout or a family campout. Sleep in a tent that you have helped pitch.	_____
4. With your parent or guardian, camp overnight with a Boy Scout troop. Sleep in a tent you have helped pitch	_____
And do five of these:	
5. During a Webelos den meeting, discuss how to follow the Leave No Trace Frontcountry Guidelines during outdoor activities. (See page 72.)	_____
6. Participate in an outdoor conservation project with your Webelos den or a Boy Scout troop.	_____
7. Discuss with your Webelos den leader the rules of outdoor fire safety. Using these rules, show how to build a safe fire and put it out.	_____

8. With your accompanying adult on a campout or outdoor activity, assist in preparing, cooking, and cleanup for one of your den's meals. Tell why it is important for each den member to share in meal preparation and cleanup, and explain the importance of eating together. _____
9. Discuss with your Webelos den leader the things that you need to take on a hike. Go on one 3-mile hike with your Webelos den or a Boy Scout troop. _____
10. Demonstrate how to whip and fuse the ends of a rope. _____
11. Demonstrate setting up a tent or dining fly using two half hitches and a taut-line hitch. Show how to tie a square knot and explain how it is used. _____
12. Visit a nearby Boy Scout camp with your Webelos den. _____

To go camping, you need skills that will help you feel at home in the outdoors. When you earn the Outdoorsman activity badge, you'll learn about building campfires, cooking, setting up tents, making outdoor beds, tying knots, and many other skills.

You'll have a chance to use your new camping skills with a friend, your family, or your Webelos den. You may visit a Boy Scout troop activity to learn how Boy Scouts use their outdoor skills.

The outdoors is calling you. Have fun! When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on the previous page or this page.

The Outdoor Code

As a Webelos Scout, you'll hike and camp out. As a Boy Scout, you'll be outdoors a lot more often. The Outdoor Code is a guide all Scouts use. Read it with your den leader and discuss what it means. See below for more about the Outdoor Code.

Outdoor Code

As an American, I will do my best to—

Be clean in my outdoor manners: I will treat the outdoors as a heritage. I will take care of it for myself and others. I will keep my trash and garbage out of lakes, streams, fields, woods, and roadways.

Be careful with fire: I will prevent wildfire. I will build my fires only where they are appropriate. When I have finished using fire, I will make sure it is cold-out. I will leave a clean fire ring or remove all evidence of my fire.

Be considerate in the outdoors: I will treat public and private property with respect. I will use low-impact methods of hiking and camping.

Be conservation-minded. I will learn how to practice good conservation of soil, waters, forests, minerals, grasslands, wildlife, and energy. I will urge others to do the same.

The Scouting way is to leave no trace of your presence in the outdoors. Always take good care of nature.

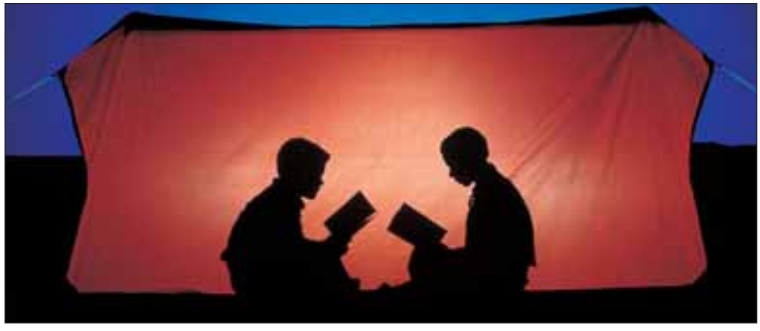
Camping Out

Camping is living outdoors. You can learn how to camp as most good campers do, by practicing skills close to home first.

With a parent's permission, practice setting up a camp in your own backyard if you have one, or in a friend's backyard, or even in a room of your home. With adult supervision, you might even spend the night in your backyard camp!

You'll make your own simple tent and a comfortable bed on the ground.

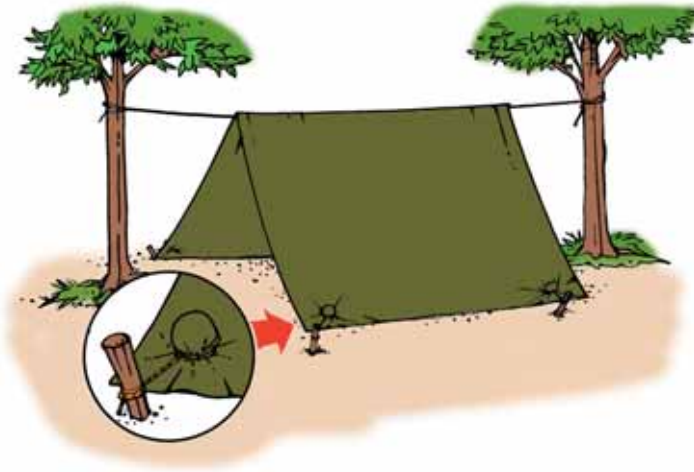
With adult supervision, and only if the laws where you live allow it, you can build a safe fire, cook your meals, and clean up afterward. (See the Outdoor Code on page 346.)



Homemade Tent

If your family doesn't own a tent, you can make one that won't cost much money. It will do for mild weather. You'll need a sheet of heavy-duty builder's plastic—about 8 by 9 feet. Tie a rope between two trees or posts, using two half hitches.

Drape the plastic over the rope and spread it like a tent. Hammer four stakes in the ground near each edge. Hold a stone under each corner of the sheet and tie a knot around it and the sheet. Then tie the rope to the stakes, and your sheet won't fly away. Be sure to leave both ends of your homemade tent open for ventilation, and make the tent wide enough for two people. This tent will be fine for an overnight campout.



Sleeping on the Ground

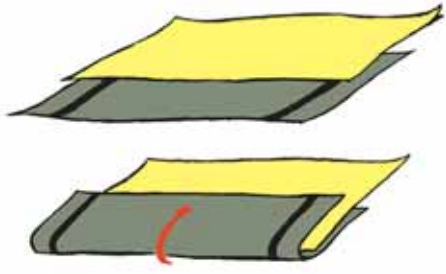
You'll sleep on the ground during campouts. Be comfortable. Feel the ground all around with your hands and remove all sticks and stones.

Spread your groundsheet—a piece of plastic that helps keep your bedding dry. An old shower curtain works fine.

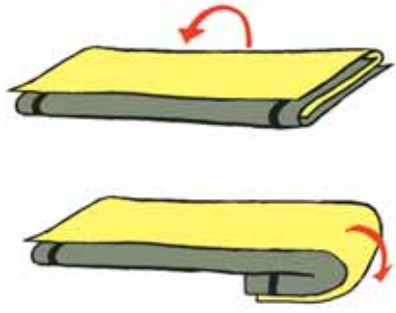
If you have an air mattress, put it on the groundsheet. If you don't, use pieces of your clothing for padding under your head, the small of your back, and your knees.

A sleeping bag is a very important piece of equipment for an outdoorsman. If you do not have a sleeping bag, you can use blankets to make a blanket bed.

To make your blanket bed, you need two blankets. Make it like this:



1. Lay the first blanket on the ground. Put the second blanket half on and half off the first one.
2. Fold the first blanket over the second. Leave half of the second showing.



3. Fold the remaining half of the second blanket over the first. This gives you two thicknesses over you and under you.

4. Fold the bottom of the blankets under the bed.

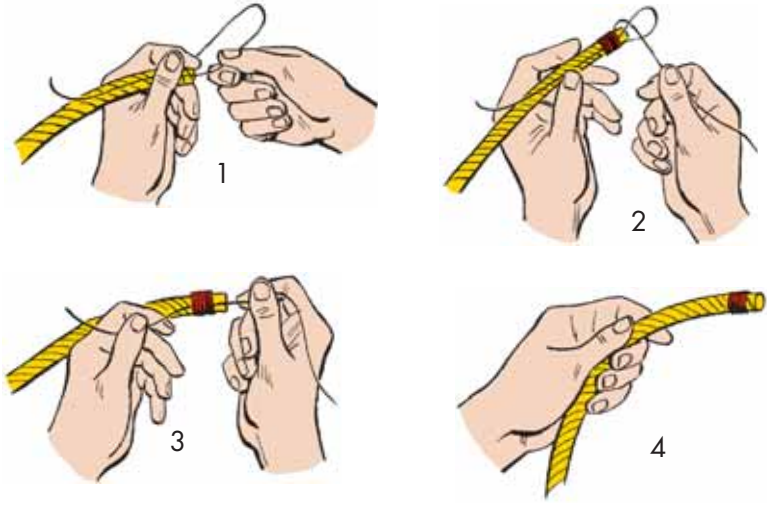
Using Rope

Whipping a Rope

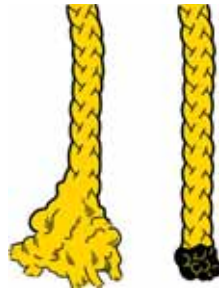
Ropes are made of twisted fibers. When a rope is cut, the fibers separate. You can whip the ends in place with string so the rope won't unravel.

Cut off the part that has already unraveled. Take a piece of strong string, dental floss, or thin twine at least 8 to 10 inches long. Make a loop and place it at one end of the rope.

Wrap the string tightly around the rope. When the whipping is as wide as the rope is thick, slip the end through the loop. (See illustration 2.) Then pull out the string ends hard and trim them off.



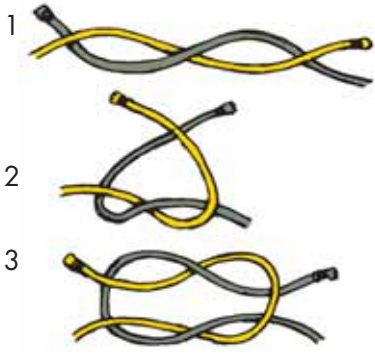
Fusing a Rope



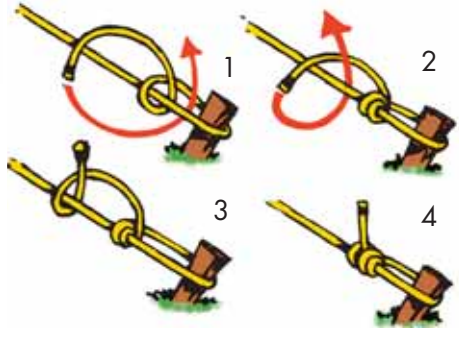
Rope and cord made of plastic or nylon will melt when exposed to high heat. Cut away the frayed part of the rope, then, working in a well-ventilated area, hold each end a few inches above a lighted match or candle to melt and fuse the strands together. Melted rope can be hot and sticky—don't touch the end until it has cooled. Do not try to fuse ropes made of manila, sisal, hemp, cotton, or other natural fibers, because they will burn rather than melt.

Knots for Camping

You'll use rope for many purposes when you go camping. Practice these knots. They'll come in handy in different situations.

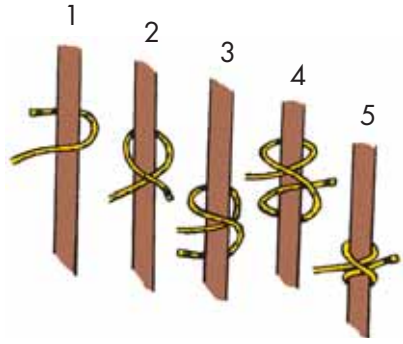


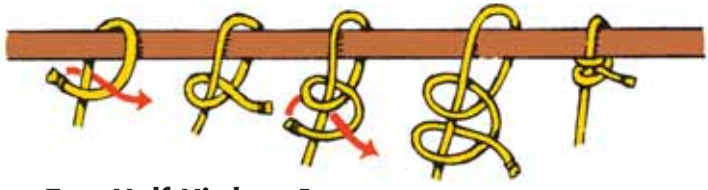
Square Knot: For tying two ropes together and for tying bandages in first aid.



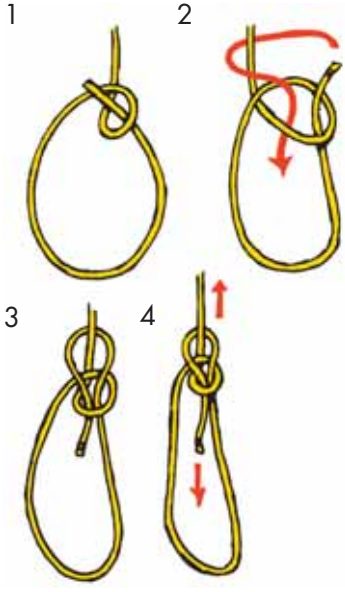
Taut-line Hitch: For tightening and loosening a rope easily and for use on tent guy lines. Tighten or loosen it by pushing the hitch up or down.

Clove Hitch: For tying a rope to a tree or post.

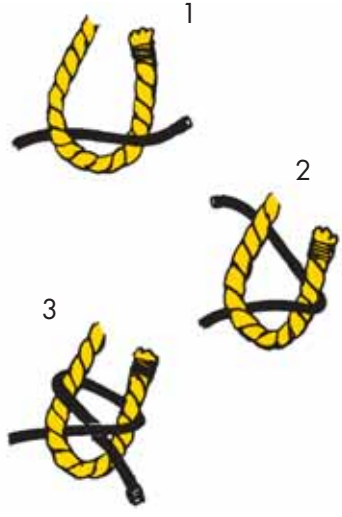




Two Half Hitches: For tying a rope to a post or ring. It is strong but is easy to loosen.



Bowline: Used when you want a loop that will not slip or close up. It is often used in rescue work.



Sheet Bend: For tying two ropes together, especially when one is thicker than the other.

Camping Away From Home

You may have Webelos den overnight campouts, where Webelos Scouts and their adult partners camp out for one or two nights.

You may also have campouts with a Boy Scout troop. Perhaps your family goes camping, too.

No matter how you camp, you'll have a great time—if you are prepared.

Packing for a Campout

If you have a backpack for camping, use that. If not, you can use a laundry bag or suitcase.

Here's what you and your adult partner will need for a Webelos den overnight campout:

- Two waterproof groundsheets
- Two sleeping bags, or two blankets each, to make blanket beds
- Changes of underwear
- Changes of socks
- Pajamas, if you use them
- Knives, forks, spoons
- Plates, bowls, cups
- Cooking pot or pan
- Pliers for dipping dishes in hot rinse water
- Plastic sheet to air-dry dishes on

- Bow saw for fuel wood
- Matches in waterproof container
- Charcoal or camp stove if not using wood fire
- Food for all camp meals
- A cooler to keep perishable foods cold
- Trash bag
- Sunscreen
- Insect repellent
- One or two flashlights with fresh batteries
- Toothbrushes and toothpaste
- Toilet paper
- Sweaters or jackets
- Ponchos or raincoats
- Bar soap
- Towels
- Extra pants and shirts, if rain is likely
- Extra pair of shoes
- Whistle
- *Webelos Handbook*
- Bible, testament, prayer book, or other book for your faith

If you use a backpack, arrange soft items in it so they will cushion your back. Keep your raingear, first-aid kit, and water bottle near the top of the pack.

You may have to bring a tent, too, unless a Boy Scout troop is letting the den use its tents.

Wear your Webelos Scout uniform in camp.

Setting Up Dining Fly or Tent

For a dining fly over your cooking area, try tying a rope between two trees with taut-line hitches and tightening the rope so it is six to eight feet above the ground. Drape the tarp over the rope, pull out the corners, and use taut-line hitches to tie *guylines* (ropes attached to the corners) to trees or stakes. (To tie a taut-line hitch, see page 350.)

Set the tarp closer to the ground if you want to sleep under it. Lowering the edges will give you extra protection from the wind.

Tents

Most tents have the shape of an A-frame or a dome, and are roomy enough for two to four campers. Many are made of breathable nylon that allows moisture to escape. A waterproof nylon fly pitched over the body of the tent shields it from rain, snow, and wind.

When you are ready to pitch your tent, first you must choose a level site. Remove stones and large sticks, but don't disturb pine needles or grasses. Spread out a ground cloth to protect the tent floor from dirt, sharp objects, and moisture.

Unfold the tent on top of the ground cloth. Pull out the corners of the floor and stake them to the ground, then assemble the poles and put them in place. Use taut-line hitches to tie the free ends of guylines around stakes you've pushed into the ground, and pull the lines tight.

Finish by putting the rain fly over the tent and staking it down.

Whenever possible, let your tent dry in the sun before you take it down. When that's not possible and you have to pack a wet

tent, set it up again as soon as you get home, or hang it indoors and be sure it dries completely before putting it away. That will prevent mildew from ruining the fabric.

No Flames in Tents

Keep *all* flames away from tents. Never use candles, matches, stoves, heaters, or lanterns in or near tents. No tent is fireproof. All of them can burn or melt when exposed to heat. *Flashlights only!*

Activities in Camp

At a den or troop overnight campout, the leaders will suggest activities, such as working on outdoor activity badges, learning Scout skills, and playing outdoor games.

In the evening you may have a campfire program, with songs, skits, and other fun. Join in with your friends.

Be Safe and Comfortable

Here are tips to keep you safe and comfortable when you camp with your den or your family.

Snakes: Snakes are not likely to bother you if you don't bother them. Stay away from them.

Insects: A good bug spray keeps most of them away. Spray on exposed skin and also around your ankles and on your socks. Don't spray inside the tent because this may destroy the waterproofing.

Poisonous plants: Learn to recognize poison ivy, poison oak, and poison sumac (see page 334) and stay away from them. Never eat anything from the woods unless you know exactly what it is.

Black Bear

Animals: Animals can be drawn to your camp by the food you throw away or leave out. Bears are the most dangerous camp raiders and roadside beggars. **You must remember that they are not tame. Never let anyone get near them.**

Mice, chipmunks, raccoons, opossums, porcupines, and skunks add to the adventure of camping. Watch them and enjoy them, but **don't try to catch or pet them.**

Swimming: Always swim with an adult and use the buddy system (see page 385). Watch for drop-offs or holes and swift currents. Don't swim in polluted water! Don't get too much sun or get too tired. Use a sunscreen lotion to protect your skin.

Weather: See pages 362 and 364 for tips on staying safe and comfortable whether it rains or the sun shines during your campout.

Getting lost: Anyone can get lost, even adults. But some things can help you to not get lost or to keep you safer if you do:

- Always stay with a buddy.
- Let people know when you leave and where you are going.

- Carry a plastic trash bag poncho in case of rain.
- Carry a whistle to signal for help.

If you think you are lost, sit down in an open area. Relax. Blow your whistle every so often. Stay put.

Cooking in Camp

You and your adult partner may be expected to bring your own food to a Webelos den overnight campout, unless the whole den cooks together. Choose foods that are easy to fix—and that you love to eat.

For most meals you'll need a fire. You may build it with wood or charcoal or your adult partner may use a camp stove. If you have a choice, use wood, because fire making is a skill you need to learn.

Building a Wood Fire

If your campsite already has a fireplace or safe fire site, use it. If it doesn't, you must make a safe fire site. Clear a circle 10 feet across, taking out anything that could burn—twigs, leaves, dry grass, pine needles. Save the groundcover so you can put it back when you are done with your fire. Your fire will be in the center of the circle. (See the illustration on the next page.) Have a pot of water nearby for emergencies and to extinguish the fire.

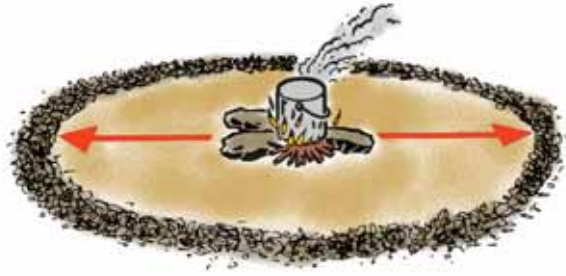
You will need three kinds of materials to make your fire:

Tinder: Stuff that flares up quickly when you touch a lighted match to it. It must be dry. Look for dead twigs on standing trees and tiny dry twigs on the ground. Dry weed tops are good, too.

Kindling: Small branches about as thick as your thumb and 6 to 10 inches long. Snap dead branches off standing trees and pick up dry branches on the ground. They will catch the flame from the tinder.

Fuel wood: Larger dead branches you find on the ground. You may need a saw to cut them into pieces about a foot long. They provide the heat for cooking.

You don't need a big fire for cooking on a campout. Five to 10 pieces of fuel wood should be plenty.



Outdoor Fire Safety Rules

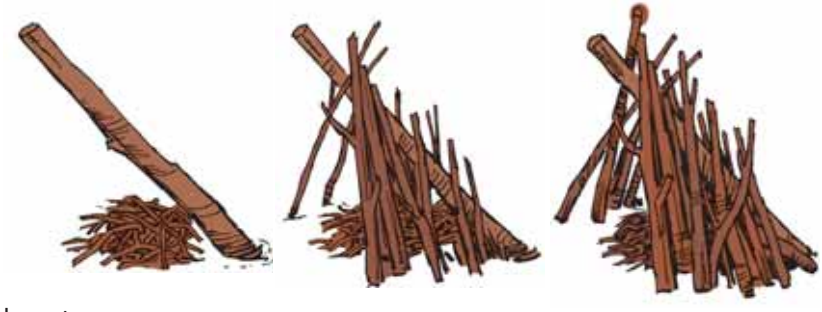
1. Follow all rules of your campsite.
2. Clear all burnable materials from your 10-foot fire circle. Don't build the fire under overhanging branches of trees or shrubs or near roots of trees.
3. Never leave your fire unattended.
4. Have a pot or bucket of water nearby in case sparks start a fire away from the fire circle.
5. When you are finished cooking, make sure the fire is **DEAD OUT**. Spread the coals and ashes and sprinkle them with water. Stir and sprinkle until the site is cold. Feel it with your hand to make sure.

Making Your Fire Lay

Put your tinder in the center of the fire circle. Then arrange kindling in one of the ways shown here, so that the flames from the tinder will catch the kindling quickly.

When the kindling is burning, add a couple of pieces of fuel wood. As the fuel wood burns down to coals, add more fuel.

Tepee



Lean-to

Fire-stick

You can use logs or big flat rocks to hold your pots and pans. Don't use sandstone or wet rocks. They may explode if they get hot.

Rock Fireplace

What to Cook

Keep meals simple on your first few campouts. Consider cooking hamburgers, hot dogs, bacon and eggs, or canned food like spaghetti, beans, and vegetables.

You might prepare a supper dish in aluminum foil at home before you go to camp. Here's how to do it:

You need an 18-by-24-inch sheet of heavy-duty aluminum foil, or two sheets of regular foil.

Use a piece of meat about the size of your hand. It could be ground beef, steak, chicken, or fish. Flatten ground beef. Lay the meat near the center of the foil. Slice a small onion and cut a small potato in thin slices and arrange them over the meat. Add peas, beans, or thinly sliced carrots.

Now fold the foil into a package. Join the edges and fold them over tightly so steam can't escape.

Take the foil dinners to camp in a cooler so the food won't spoil. About a half-hour before supper, lay the packages directly on the coals of the fire. Turn them over after 15 minutes and cook them another 10 minutes. Dinner should be ready. Eat it from the foil.

Note: To protect against food poisoning, always wash your hands before you handle food. Wash all vegetables and fruits. Make sure that food packets stay cool in the cooler and that food is thoroughly cooked before you eat it.

Cleanup

Every Scout camper learns to wash dishes and clean up after eating. Do your part in the cleanup job.

Make sure your cooking fire is **DEAD OUT.** Replace the groundcover you saved earlier. Pick up garbage and trash and put it in a garbage bag to take out of the campsite.

Put all leftover food, milk, and other drinks back in the camp cooler or food box. Keep all food and "smellables" (toothpaste, gum, candy—even toiletries and cleaning products) in closed containers, in a vehicle or building, with all windows and doors closed. They can attract all kinds of animals. You don't want to come back to your camp and find everything torn apart, or have a midnight "visitor" in your camp!

Hiking With Your Den

As a Webelos Scout you may go on nature hikes, rock hunts, and other outdoor activities.

Never go hiking alone. Go with your Webelos den leader and Webelos den chief. Start with a short hike. Take it easy and pay careful attention to your surroundings. Stop to look at trees and plants. Try to name as many kinds as you can. Look at the houses and buildings. Count the different kinds of birds you see.

When you sit down for a rest, look around. Find grasses that aren't the same. Count the different bugs you find. You'll enjoy your hike more if you notice everything. Some people hike as if they were walking through a tunnel. They never see a thing.

Watch for signs and landmarks so you can find your way back.

Your First Hike

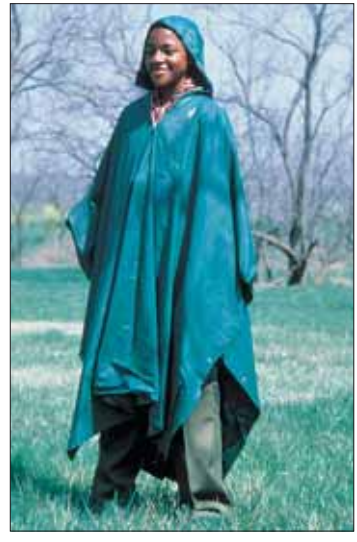
For your first hike, choose a destination about a mile from your starting place. It may be a park, high hill, pond, or lake. Perhaps a grove of trees or a picnic area is nearby. Out and back would be a 2-mile trip—a pretty good start. Set your own pace. Hike for 15 minutes. Rest for 5 minutes. Then try a 20-minute walk and a 10-minute rest. Stay together. Try different speeds until you find the pace that's best for all the hikers.

Walk a little every week. Go farther each time. This makes you stronger.

Face traffic when walking along a road. This means walking on the left side. Walk single file when the whole den goes. Don't hike at night. If for some reason you are ever out walking at night, carry a flashlight and wear white or reflective clothing.

What to Wear

The Webelos Scout uniform is ideal for hiking. Take along a raincoat or poncho in case it rains.



Shoes: You depend on your shoes to get you to your destination and back. Choose them carefully. Take good care of them. A hightop shoe or boot is best because it keeps out gravel and sand.

It's very important that your hiking shoes fit well. If they don't, you'll be sure to get blisters. The shoes should be fairly tight around your heel. There should be room to wiggle your toes.

- Never go hiking in new shoes. Break them in first by wearing them part of every day for a week or more.
- To keep leather shoes soft and partly waterproof, rub them with saddle soap. Do this before and after every hike.
- When leather shoes get wet, wipe them with paper or old socks. Dry them slowly, away from direct heat.

Socks: Socks are almost as important as shoes. They soak up moisture. They also cushion your feet. Socks made of wool, polypropylene, or a wool/nylon blend work well. Take an extra pair on a hike. Then you can put on clean socks before you start back. This dry pair will feel great. Don't use socks with holes or holes that have been darned. They start blisters.

Outdoor Essentials

1. First aid kit
2. Filled water bottle
3. Flashlight
4. Trail food
5. Sunscreen
6. Whistle
7. Map and compass
8. Rain gear
9. Pocketknife
10. Matches or fire starters

Visit a Scout Camp

One of your Webelos overnight campouts may be held at a Boy Scout camp. If not, ask your Webelos den leader to take the den to camp for a visit.

When you become a Boy Scout, you'll go to Scout camp often. Now is a good time to see what Scout camp has to offer. You'll have a great time there!

Sun Smarts

Block the sun year round. It's possible to burn all year (that includes cloudy and snowy days). So whether you're walking to school or outside playing don't forget to block the sun, to have fun year round!

Use a sunblock with an SPF of at least 15. If you have fair skin, light-colored eyes and hair, freckles, or spend a lot of time outside, use an SPF 30 or higher. Apply sunblock 15 minutes before you go out. Reapply after prolonged swimming, vigorous activity, sweating, or toweling off.

Watch the clock. Try to limit the amount of time you're in direct sun during 10 A.M. and 4 P.M.

"Waterproof" your skin. If you're spending a day at the beach or at the pool, cover up with waterproof sunblock. After swimming, toweling off, sweating, and/or vigorous activity, be sure to reapply sunblock.

Remember your ears, nose, neck and hands. They may seem small but they can burn big time. Always cover these areas with sunblock.

Make a statement with shades, hat, and a wild T-shirt. A cool pair of UVA/UVB blocking sunglasses protect your eyes like nothing else. As for your hat, if you get really hot, dunk it in water, then pull it on (but make sure it's a wide brimmed hat). Of course, a long-sleeve T-shirt is a must for summer fun.

The American Academy of Dermatology supports the use of sunscreen products with an SPF 15 rating or higher but does not endorse, guarantee, or approve any specific sun-safety products.

Community Group

R

READYMAN

Readyman Requirements

Requirement **Approved by**

Do all of these:

1. With your parent, guardian, or Webelos den leader, complete the Courage Character Connection.

   a. **Know:** Define the importance of each courage step: Be strong; Be calm; Be clear; Be careful. Explain how memorizing the courage steps helps you to be ready. _____

   b. **Commit:** Explain why it is hard to follow the courage steps in an emergency. Tell when you can use the courage steps in other situations (such as standing up to a bully, avoiding fights, being fair, not stealing or cheating when tempted, etc.) _____

   c. **Practice:** Act out one of the requirements using these courage steps: Be strong; Be calm; Be clear; Be careful. _____

2. Explain what first aid is. Tell what you should do after an accident. _____

3. Explain how you can get help quickly if there is an emergency in your home. Make a "help list" of people or agencies that can help you if you need it. Post it near a phone or in another place with easy access. _____

4. Demonstrate the Heimlich maneuver and tell when it is used. _____

_____

5. Show what to do for these "hurry cases": _____
   - Serious bleeding
   - Stopped breathing
   - Internal poisoning
   - Heart attack
6. Show how to treat shock. _____
7. Show first aid for the following: _____
   - Cuts and scratches
   - Burns and scalds
   - Choking
   - Blisters on the hand and foot
   - Tick bites
   - Bites and stings of insects other than ticks
   - Poisonous snakebite
   - Nosebleed
   - Frostbite
   - Sunburn
8. Tell what steps must be taken for a safe swim with your Webelos den, pack, family, or other group. Explain the reasons for the buddy system. _____

And do two of these:

9. Explain six safety rules you should follow when "driving" a bicycle. _____
10. Explain the importance of wearing safety equipment when participating in sports activities (skating, skateboarding, etc.) _____
11. Make a home fire escape plan for your family. _____
12. Explain how to use each item in a first aid kit. _____
13. Tell where accidents are most likely to happen inside and around your home. _____

14. Explain six safety rules you should remember when riding in a car. _____

15. Attend a first aid demonstration at a Boy Scout troop meeting, a Red Cross center, or other community event or place. _____

In emergencies, someone has to be ready to help. After you earn the Readyman activity badge, you'll know how to react quickly when someone is ill or injured.

You'll be ready to call for emergency help. When you learn first aid, you can care for a sick or injured person until help arrives.

You'll also find out how to prevent accidents and how to be safe when swimming and biking. You'll help your family be safe at home and when traveling by car.

Learning the skills that prevent accidents and help in emergencies will make you a Readyman. When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on pages 366–368.

"Be" Courageous

Courage is what you need when you face an emergency. Courage is not something you're just "born with"; it is something you can train yourself to have when you need it. Learn to say these steps to help you feel courageous and behave courageously:

Be **strong.**
Be **calm.**
Be **clear.**
Be **careful.**

What Is First Aid?

You've probably had at least a few scratches and scrapes in your lifetime, and an adult in your family or the nurse at school knew just what to do. Maybe you've taken care of a few small injuries by yourself. All of this is first aid.

First aid is also knowing exactly what to do *first* to help a person with a more serious injury or illness. **First aid is what you must do immediately.** Someone has to help right away, and you might be the only person there who can do this job. It's important to know the right ways to help.

In earning the Readyman activity badge, you'll find out how to call for emergency help and what to do for different types of illnesses and injuries until help arrives.

What to Do After an Accident

- First, stay calm and think! This may be hard to do—but try. The victim will feel better, knowing you are in control.
- If the victim seems badly hurt, send someone to call for medical help. If no one is there to do that, call for help and give what assistance you can to the victim.
- Do not move a badly hurt person unless the victim is in further danger. It may be necessary to move the person if there is a nearby fire or if the person is lying in the road. But never move an injured person unless it is absolutely necessary.
- Check the victim for "hurry cases" (see page 371).
- Treat the victim for shock (see pages 376–377).

How to Get Help

The way to get help in an emergency is not always the same in every town. Some communities may have different phone numbers for the police, fire department, ambulance, and rescue squad. In many places, the 911 number will put you in touch with all of these services.

Find out how to get help where you live and make a list of the phone numbers. Post your list near the telephone in your home so everyone can find the numbers quickly. It's also a good idea to put your list on a card and carry it with you. You should also carry coins for a pay phone.

Your "help list" should include numbers for

- Police or sheriff's department
- Fire department
- Ambulance
- Utility companies (electricity, gas, water)
- Rescue squad
- Your family doctor
- Poison control center
- A friendly neighbor who can help you

When you call for help, remember the "three W's": *Who? What?* and *Where?*

Who? Give your name.
What? Explain the situation: fire, accident, injury, etc.
Where? Give the exact location. Give the names of both streets or roads at the nearest corner.

Stay on the phone until your message is understood and you have answered all questions.

Sometimes you need to know how to get help, but it may not be an emergency. For problems with your sewer line or other housing problems, call a department of your city or county government. Your church or other religious group, a counseling agency, or friends and relatives might be able to help with a family problem. Find out who to contact in your community.

First Aid for Hurry Cases

If a person cuts a leg and blood is oozing out, he or she needs first aid but is not going to die. A broken arm is a serious injury, but it won't kill.

Hurry cases are different. Unless you act fast and give the right first aid, the victim may die within a few minutes. The four hurry cases are

- **Breathing has stopped.** It must be started quickly.
- **Blood is spurting from a wound.** The bleeding must be stopped quickly.
- **Poison has been swallowed.** The poison must be made harmless. Get help quickly.
- **Heart attack or stroke.** Get help quickly.

Protective Measures to Take When Handling Wounds and Giving CPR

Treat all blood as if it contains blood-borne viruses. Do not use bare hands to stop bleeding; always use a protective barrier (see the list below). Cover any cuts or scrapes you may have. Always wash exposed skin with hot water and soap immediately after treating the victim, and don't use a sink in a food preparation area.

The following equipment should to be included in all first aid kits and used when giving first aid to someone in need:

- Latex gloves, to be used when stopping bleeding or dressing wounds
- A mouth-barrier device, to be used when rendering rescue breathing or CPR (cardiopulmonary resuscitation)
- Plastic goggles or other eye protection, to prevent a victim's blood from getting into the rescuer's eyes in the event of serious arterial bleeding
- Antiseptic, for use in sterilization or cleaning exposed skin areas, particularly if soap and water are not available.

Stopped Breathing

In drowning cases and some other accidents, the victim's breathing may stop. It must be started again *quickly*, or the person will die.

Look at the chest. Is it moving up and down? Put your ear to the victim's mouth. Do you feel the victim's breath?

If the answer is no, start rescue breathing. This is a way of blowing air from your own lungs into the victim's lungs.

Rescue Breathing

Don't give up. Continue rescue breathing until medical help arrives and takes over.

Step 1

Note: If available, a mouth-barrier device should be used when rendering rescue breathing or CPR.

Place the victim faceup. Lift the chin with your right hand, and push the forehead down with your left hand.

This shows why it is important to tilt the head back. If the head is not tilted back, the tongue blocks the airway.

Step 2

Pinch the victim's nostrils together. Seal your mouth over the victim's mouth. (If the victim is a small child, don't pinch the nostrils. Blow into both the mouth and nose at the same time.) Blow into the victim's mouth to fill the lungs with air. Look to make sure the chest rises.

Step 3

Remove your mouth. Take a deep breath and count slowly to five—about five seconds. (Count to three if the victim is a child.) Watch to make sure the victim's chest falls as air escapes from the lungs. Then give another breath.

If the victim's chest does not rise when you blow in, the airway must be blocked. Turn the head to one side. With your fingers, feel whether something is in the mouth. If there is, pull it out.

If the airway still seems to be blocked, turn the victim's head faceup. Place the heel of your hand midway between the victim's rib cage and belly button. Push upward quickly several times.

Stopping Severe Bleeding

In a bad accident you might see blood spurting out of a wound. It doesn't ooze or flow slowly—it gushes out like a fountain. It must be stopped! **Now!**

Avoid direct contact with the blood. Use latex gloves.

Grab the wound with your gloved hand and **press hard!**

Raise a cut arm or leg above the level of the victim's heart. That will help slow the bleeding.

With your free hand, grab your neckerchief, handkerchief, or other cloth. Fold it into a pad and quickly press it on the wound. Then **press hard** again. If you can, tie the pad in place with a bandage. Don't remove the pad even if it gets soaked with blood. Put another pad and bandage over the first. Send for medical help.

Direct pressure on the wound usually stops bleeding. If it doesn't, **press hard** on one of the pressure points shown to stop bleeding in an arm or leg. The arteries that carry blood from the heart are squeezed against the bone. It's like stepping on a garden hose to stop the water.

Poisoning by Mouth

Young children will try anything! They will even drink poisons because they don't know any better.

Keep all household cleaners, medicines, weed killers, and insect poisons out of their reach. Locked cabinets are best because children are curious and learn to climb.

If a child does swallow some poison, call a hospital or poison control center immediately. Tell them what the poison is. Follow their directions. Don't give anything to drink unless they tell you to.

Save the poison container so the poison can be identified.

Heart Attack

Heart attack is the number one cause of death in the United States. Most heart attacks happen to adults, especially older people. Here are the signs of a heart attack:

- A feeling of pain or pressure in the center of the chest lasting more than a few minutes. It may come and go. Sharp, stabbing twinges of pain are rarely signals of a heart attack. If in doubt, seek medical help.
- Sweating when the room is not hot
- Feeling like throwing up
- Shortness of breath
- A feeling of weakness

If you think a person is having a heart attack, call for medical help at once.

First Aid for Shock

When a person is injured or under great stress, his circulatory system might not provide enough blood to all parts of his body. That's called *shock*. The person will feel weak. His face may get pale. His skin will feel cold and clammy. He may shiver or vomit.

Don't wait for these signals to appear. Give any badly injured person first aid for shock.

- Have him lie down.
- Raise his feet slightly, unless you think he has injuries to his head, neck, back, hips, or legs. If you don't know, have him lie flat.
- If he is not awake, turn him on his side, not on his back.
- If the weather is cool, cover him. If it's hot, don't.
- Call for emergency help immediately. He needs expert medical care as soon as possible.

Other First Aid You Should Know

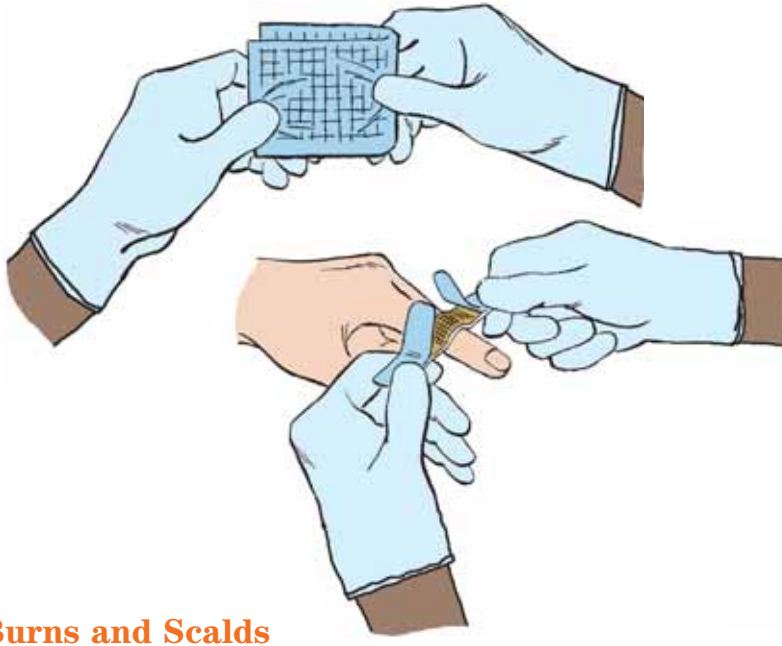
Cuts and Scratches

Cuts and scratches are wounds—openings in the skin and tissues that can allow germs to enter the body and cause infection.

First aid for small wounds: Wash scratches and minor cuts with soap and water. Applying antiseptic can help prevent infection. Keep the wound clean with an adhesive bandage. On camping trips, clean and rebandage small wounds daily.

First aid for larger cuts: Treat large cuts by using direct pressure to stop bleeding, then keep the wound as clean as you can to limit infection. Cover an open wound with a sterile gauze pad or clean cloth folded into a pad. Hold the pad in position with tape, a cravat bandage, or other binder.

Anyone suffering a serious wound should be treated for shock and seen by a physician.



Burns and Scalds

First aid for burns and scalds depends on how serious the injury is. A burn from light contact with a hot object probably is a first-degree burn. Very serious burns are called third-degree burns.

First-degree burn: The skin gets red and sore. Put the burned area in cold water until the pain stops. If you don't have any water, cover the burn with a clean, dry dressing.

Second-degree burn: Blisters form on the skin. Try to protect them from breaking open, as this could cause infection. Cover the burned area with a sterile gauze pad from a first aid kit. Hold the pad loosely in place with a bandage. **Don't** apply creams, ointments, or sprays. All second-degree burns need medical attention.

Third-degree burn: The skin may be burned away. Flesh may be charred. The victim may feel no pain. Don't try to remove clothing from around the burn. Wrap the victim in a clean sheet. Cover him with blankets if the weather is cool. Call for an ambulance to rush him to a hospital.

Treat for shock, too: People with second- or third-degree burns will be suffering from shock. So give first aid for shock as well as for the burn.

Sunburn: Most sunburns are first-degree burns. A severe sunburn is a second-degree burn and should receive prompt medical attention. Prevent sunburn by liberally applying sunscreen lotion with a high sun protection factor (SPF) about 20 minutes before you're in the sun. Reapply if you sweat heavily or swim. It's also important to wear protective clothing and a broad-brimmed hat and sunglasses as well as limit your exposure to the sun. The sun's rays are most harmful between 10:00 A.M. and 2:00 P.M. Sunburns should be treated with cool compresses or baths.

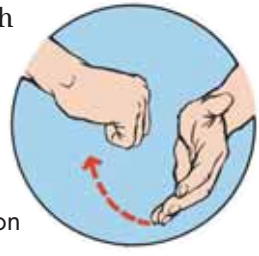
Choking

If a bit of food sticks in a person's throat, he will start choking. He may not be able to cough it up by himself. Unless the person is a baby, use the Heimlich maneuver to help him.

Heimlich Maneuver

Heimlich Maneuver

Stand behind the victim and put your arms around him. Make a fist with one hand just above his belly button. Cover the fist with your other hand. Now make four quick thrusts inward and upward to force air



Close-up of hand position for Heimlich maneuver

from his lungs. This should dislodge the food. If it doesn't, repeat until the food is dislodged.

If the person is too big for you to do the Heimlich maneuver standing up, have him lie down faceup. Put one open hand just above his belly button and put the other hand over the first. Make four quick, upward thrusts.

Note: Because of the possibility of injury, **do not practice the thrust part of the Heimlich maneuver on a person.** Thrusts should be used only for actual choking cases.

Blisters on the Hand and Foot

Blisters are pockets of fluid that form as the skin's way of protecting itself from friction. Blisters on the feet are common injuries among hikers. Avoid getting blisters by wearing shoes or boots that fit, by changing your socks if they become sweaty or wet, and by paying attention to how your feet feel.

A *hot spot* is a warning that a blister might be forming. As soon as you notice it, treat a hot spot or blister with a "doughnut bandage" to relieve the pressure on your skin.

Cut moleskin in the shape of a doughnut and fit it around the injury. Shape several more "doughnuts" and stack them on top of the first. The doughnut bandage will keep pressure off the injury.

A gel pad made of the same material used to treat burns can be applied directly over a blister to reduce friction and speed healing. Follow the instructions on the package. Used together, a gel pad and a moleskin doughnut provide maximum relief for blisters and hot spots.

Tick Bites

Ticks are small, hard-shelled arachnids that bury their heads in the skin of warm-blooded vertebrates. Protect yourself whenever you are in tick-infested woodlands and fields by wearing long pants and a long-sleeved shirt. Button your collar and tuck the cuffs of your pants into your boots or socks. Inspect

yourself daily, especially the hairy parts of your body, and immediately remove any ticks you find. If a tick has attached itself, grasp it with tweezers close to the skin and gently pull until it comes loose. Don't squeeze, twist, or jerk the tick, as that could leave its mouth parts in the skin. Wash the wound with soap and water and apply antiseptic. After dealing with a tick, thoroughly wash your hands.

Bee and Wasp Stings

Scrape away a bee or wasp stinger with the edge of a knife blade. Don't try to squeeze it out. That will force more venom into the skin from the sac attached to the stinger. An ice pack might reduce pain and swelling.

Chigger Bites

Chiggers are almost invisible. They burrow into skin pores, causing itching and small welts. Try not to scratch chigger bites. You might find some relief by covering chigger bites with calamine lotion or by dabbing them with clear fingernail polish.

When helping the victims of bites or stings, do whatever you must to avoid being stung or bitten yourself. A first-aider who becomes injured could greatly complicate any emergency situation.

Spider Bites

The bite of a female black widow spider can cause redness and sharp pain at the wound site. The victim might suffer sweating, nausea and vomiting, stomach pain and cramps, severe muscle pain and spasms, and shock. Breathing might become difficult.

The bite of a brown recluse spider doesn't always hurt right away, but within two to eight hours there can be pain, redness, and swelling at the wound. An open sore is likely to develop. The victim might suffer fever, chills, nausea, vomiting, joint pain, and a faint rash.

Victims of spider bites should be treated for shock, then seen by a physician as soon as possible.

Snakebite

Snakes are common in many parts of the country, but bites from them are rare. Snakes try to avoid humans, and normally strike only when they sense danger. Snakebites seldom result in death.

The bite of a nonpoisonous snake causes only minor puncture wounds.

The bit of a poisonous snake can cause sharp, burning pain. The area around the bite might swell and become discolored; however, a poisonous snake does not inject venom every time it bites.

Use a hiking stick to poke among stones and brush ahead of you when you walk through areas where snakes are common. Watch where you put your hands as you collect firewood or climb over rocks and logs.

1. Get the victim under medical care as soon as possible so that physicians can neutralize the venom.
2. Remove rings and other jewelry that might cause problems if the area around the bite swells.
3. If the victim must wait for medical attention to arrive, have him lie down and position the bitten part lower than the rest of his body. Encourage him to stay calm. He might be very frightened, so keep assuring him that he is being cared for.
4. Treat for shock.
5. If available within 3 minutes of the bite, apply a venom extractor such as a Sawyer Extractor® directly over the fang marks and leave in place for no more than 10 minutes. Properly used, the extractor can remove up to 30 percent of the venom. **Do not make any cuts on the bite**—that's an old-fashioned remedy that can harm the victim much more than help him.
6. **Do not apply ice to a snakebite.** Ice will not help the injury, but it can damage the skin and tissue.

Nosebleed

A nosebleed can look bad, but it will usually stop in just a few minutes. Have the victim sit up and lean forward to prevent blood from draining into his or her throat. Pinch the nostrils together to maintain pressure on the flow. Apply a cool, wet cloth to the victim's nose and face.

If bleeding is severe or if there are other injuries to the face and head, position the victim to keep blood out of his airway. Treat for shock and call for help.

Frostbite

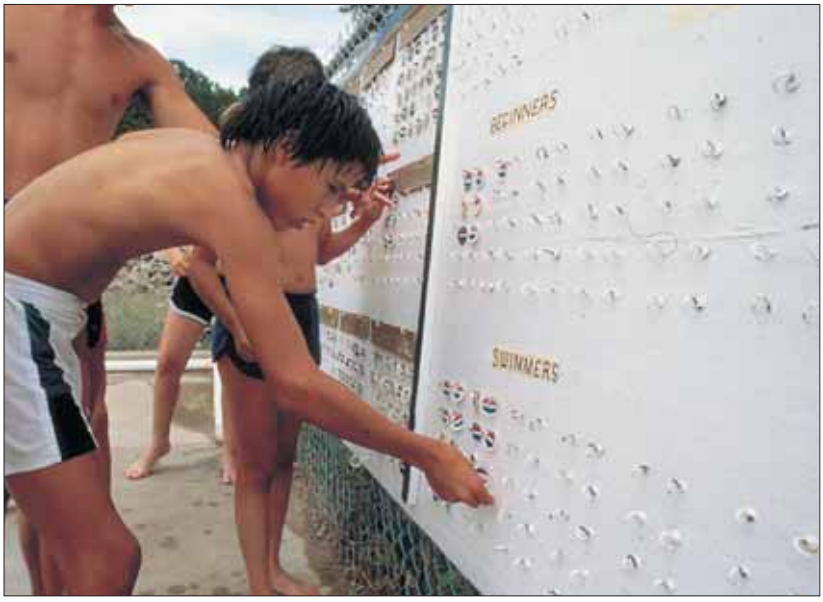
A victim of frostbite might complain that his ears, nose, fingers, or feet feel painful and then numb. Another frostbite victim won't notice anything. You might see grayish-white patches on his skin—a sure sign of frostbite.

Get into a tent or building, then warm the injury and keep it warm. If an ear or cheek is frozen, remove a glove and warm the injury with the palm of your hand. Slip a frostbitten hand under your clothing and tuck it beneath an armit. Treat frozen toes by putting the victim's bare feet against the warm skin of your belly. Avoid rubbing frostbitten flesh, as that can damage tissue and skin.

You can also warm a frozen part by holding it in warm—not hot—running water. Or wrap it in a dry blanket. Have the patient exercise injured fingers or toes, and don't let the injured area freeze again. Get the victim to a doctor.

Sunburn

Sunburn is a common injury among people who enjoy being outdoors. Repeated burns can cause long-term skin damage and the potential for skin cancer. People with lighter skin are most at risk, though others are not immune. Prevent sunburn by using plenty of sunscreen with a sun protection factor (SPF) rating of at least 15. Reapply sunscreen after swimming or if you are perspiring. A broad-brimmed hat, long-sleeved shirt, and long pants provide even more protection.



Safe Swimming

Swimming is a lot of fun, but the water can be a dangerous place if you aren't prepared.

Scouting has a checklist called the Safe Swim Defense plan to make sure you are prepared. The plan has eight points.

Safe Swim Defense

1. **An adult is in charge.** Follow the adult's orders.
2. **Physical fitness.** Each swimmer must provide a current health history from his parent, guardian, or doctor.
3. **Safe swim area.** The area is checked for underwater dangers. One area not more than 3½ feet deep is marked off for nonswimmers. Another area is marked for beginners; it can be a little deeper. A third area of deep water is marked for good swimmers.

4. **Lifeguards.** Trained lifeguards are on shore, watching everybody who is in the water.
5. **Lookout.** A lookout is also on shore to direct the lifeguards if a person needs help.
6. **Ability groups.** The leaders divide the swimmers into three groups: (1) *nonswimmers*; (2) *beginners*, who can swim at least 50 feet; and (3) *swimmers*, who can swim 100 yards and float. Each group stays in its own area.
7. **Buddy system.** Each person is paired with another person who has the same swimming ability. They go into the water together, stay together, and come out together.
8. **Discipline.** Everyone agrees to follow water safety rules. Everyone obeys the lifeguards or other supervisors.

The Buddy System

Your Webelos den leader or another adult will take care of most of the steps of the Safe Swim Defense plan. But the buddy system depends on YOU!

When you go swimming, you'll have a buddy. If you're a beginner, he'll be a beginner. If you're a swimmer, he'll be a swimmer.

At Scout camp, you and your buddy will check in at the waterfront together. You'll stay together until you check out. When the lifeguard calls "Buddy check!" or "Buddies!" you and your buddy will grasp hands and raise them overhead. Then the lifeguard can make sure all the people in the water are safe.

Left Turn

Right Turn

Slow

Bicycle Safety

Did you notice that requirement 9 talks about "driving" a bicycle? When you are on a bike, you are a driver, just like an adult driving a car.

So you should act like a driver and obey traffic safety rules. Here are the safe bicycle driving rules.

1. **Always** wear a safety helmet.
2. **Obey all traffic laws.** Stop at all "Stop" signs. Give signals for turns. Avoid busy streets, if you can.
3. **Observe local laws.** Your community may have rules for registration of bicycles and driving on sidewalks. Learn them and obey them.
4. **Drive with traffic,** not against it. Stay close to the curb.
5. **Watch out** for hazards like potholes and drain grates.
6. **Watch out** for car doors opening or cars pulling into traffic.
7. **Don't carry passengers.** You will have less control of your bike if you have a passenger.

8. **Never hitch a ride** by holding onto a truck, car, or other vehicle.
9. **Be extra careful at intersections.** If traffic is heavy, get off your bike and walk it across the intersection.
10. **Use hand signals** for turning and stopping.
11. **Drive a safe bike.** Keep it in good repair. Don't ride after dark, but have reflectors and lights on your bike in case you have to ride for an emergency reason. In that case, also wear reflective clothing.
12. **Drive "defensively."** That means: Watch out for the other guy. Keep a safe distance from traffic ahead of you. Stay alert. Be ready to stop suddenly.

Safety Equipment

For all sports, it is important to wear equipment that will help prevent injury. For example, during all street or pavement skating activities, participants should wear properly fitted helmets that meet American National Standards Institute (ANSI) standards, padded gloves, wrist supports, and elbow and knee pads. Your parent, guardian, or Webelos den leader can help you learn what safety equipment is needed for each sport you want to learn.

Home Fire Escape Plan

Suppose you wake up some night and hear your smoke detector or smell smoke. What would you do?

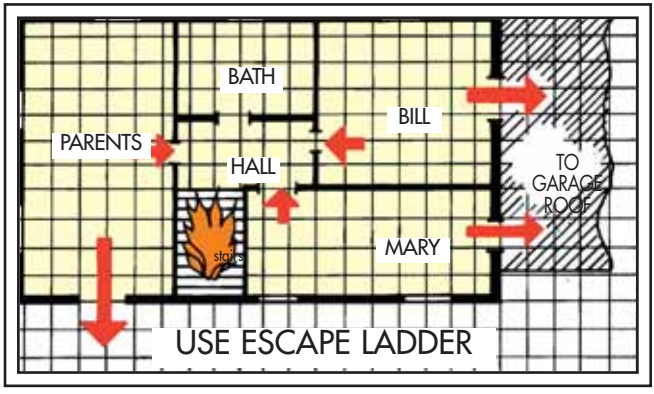
That's easy. Wake the other members of your family and get them out of the house! Then call the fire department.

But what if your family sleeps on the second floor and the fire is coming up the stairway? How would the family get out?

Make a plan now. Discuss it with the adult members of your family.

Figure out two possible escape routes for each bedroom. If there is a two-story drop from some bedroom windows, the family may have to buy escape ladders. But that's a lot better than having a family member trapped in a fire because the only way out is blocked by flames.

Make sure your family has a place to meet once they are outside. Then everyone will know when all family members are out and safe.



FIRE-ESCAPE PLAN for second floor. Short arrows show usual exits from bedrooms. Long arrows show emergency exits.

ESCAPE LADDER. Folding ladder that is stored under a window.

First Aid Kits

Every home and car should have a first aid kit. Then first aid supplies will be there if they are needed.

Check your family's home or car first aid kit. For requirement 12, you'll explain how the items should be used. If you don't know, ask your Webelos den leader or den chief to show you.

Things that should be in a first aid kit are listed below.

First Aid Kit

- Tweezers
- Box of adhesive bandages (different sizes)
- Twelve each of 3-by-3-inch and 4-by-4-inch sterile pads
- Roll of 1-inch and roll of 2-inch adhesive tape
- Scissors

- Safety pins
- Two 1-inch roller bandages
- Two 2-inch roller bandages
- Three triangular bandages
- Three cravat bandages (a cravat bandage is made by folding a triangular bandage or Scout neckerchief)
- Two 17-inch splints of thin board
- Two 30-inch splints
- Calamine lotion
- Latex gloves
- Mouth-barrier device

For a first aid kit in a car, also include a small flashlight and spare batteries, hand cleaner in packets, a white handkerchief (to attach to the car so you can attract attention if the car is disabled), a blanket, and a large red and white sign that can be placed in the front or rear window that reads "Send Help!"

Danger Spots at Home

Some homes are safer than others. In safe homes, toys are not left lying around. Matches and poisons are kept away from small children. Electrical cords are placed such that they don't trip people.

In other words, the family thinks about safety.

You can help your family think about safety.

Are there danger areas in and around your home? Use the "Home Safety Checklist" on page 233 to find out.

Look around outside, too. Are garden tools stored neatly and safely? Are ladders strong and not wobbly? Are stairs and sidewalks kept free of ice and snow in the winter?

See what you can do to make your home safer.

Safety in a Car

You may say, "What can I do about safety in a car? I'm not old enough to drive."

That's true. But you *can* do something about car safety. Here are ideas:

- Always use your seat belt. You are much less likely to get hurt in an accident if you are wearing a seat belt. In some states, wearing a seat belt is the law. What is the law in your state?
- Don't talk to the driver in heavy traffic. He or she must concentrate on driving.
- Do talk to the driver when he or she is tired. It will help keep the driver alert. But also remind the driver to stop for a rest and perhaps something re-freshing to drink. When a driver dozes off even for a second, an accident can happen.

- Suggest to the driver that you stop every two hours on a long trip. The driver needs to stretch and relax. Maybe you can take a ball along and play catch at a rest area to help the driver relax.
- Keep younger children from quarreling or jumping around in the car. Be sure they keep their seat belts fastened or are in their car seats with the harness fastened.
- Lock the doors. Then younger children won't be able to open them accidentally.
- Keep hands, head, and feet inside the car—even when it is parked.
- Don't ride or carry passengers in the bed of a pickup truck.

Mental Skills Group

S

SCHOLAR

Scholar Requirements

Requirement **Approved by**

Do this:

1. With your parent, guardian, or Webelos den leader, complete the Positive Attitude Character Connection.

   a. **Know:** Discuss with your parent or guardian, or your Webelos den leader, what it means to have a positive attitude and the "BEST" steps you can take to have a positive attitude. (**B**elieve it can happen, **E**xpect success, **S**et your mind, and **T**ry, try, try. _____

   b. **Commit:** Plan with your parent or guardian, or your Webelos den leader, how you will apply the "BEST" steps for a positive attitude in doing your schoolwork and in other areas of your life. _____

   c. **Practice:** "Do your 'BEST'-" to have a cheerful and positive attitude while doing the requirements for this activity badge. _____

And do three of these:

2. Have a good record in attendance, behavior, and grades at school. _____
3. Take an active part in a school activity or service. _____
4. Discuss with your teacher or principal the value of getting an education. _____

5. List in writing some important things you can do now because of what you've learned in school. _____
6. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Language. _____
7. While you are a Webelos Scout, and if you have not earned it for another activity badge, earn the Cub Scout Academics belt loop for Mathematics. _____
8. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Chess. _____

And do three of these:

9. Trace through history the different kinds of schools. Tell how our present public school system grew out of these early schools. _____
10. Make a chart showing how your school system is run. _____
11. Ask a parent and five other grown-ups these questions:
    - What do you think are the best things about my school?
    - What could be done to improve it?

    Tell what you think were the best answers and why. _____
12. List and explain some of the full-time positions in the field of education. _____
13. Help another student with schoolwork. Tell what you did to help. _____

School is a big part of your life. You study math, science, language, and other subjects, but you also learn about yourself—what subjects you like best, what areas you want to explore further.

You learn how to concentrate and how to find out what you want to know. To be a good scholar, you have to be curious and determined to gain everything you possibly can from your education.

You're probably already doing some things that will help you earn this activity badge: going to school, earning the best grades you can, and behaving well in school. When you complete each requirement, ask your teacher, principal, Webelos den leader, or activity badge counselor to sign it on pages 392–393.

Do Your Best in School

As a Webelos Scout you have promised to "do your best." That is the Cub Scout motto, and you should follow it in everything—work, play, and school.

Are you doing your best in school? Do you always go to school, except when you are sick? Do you behave well in school? Do you try hard to get good grades? These are things you need to do for requirement 2.

Do you take part in school activities, like clubs and sports? Do you do a Good Turn for the school now and then? If you do, you may be earning requirement 3 right now. If you need ideas for ways you can become involved in activities and in helping your school, ask your teacher or principal.

When you do requirement 2 or 3, or both, ask your teacher or principal to initial those Scholar requirements.

"BEST" Steps to a Positive Attitude

To be a good scholar, you need to have a positive attitude. If you'll follow these steps when you face a learning task, you will have that positive attitude:

Believe it can happen.

Expect success.

Set your mind.

Try, try, try!

The Value of an Education

Why go to school? There are lots of reasons. Requirement 4 asks you to think about them.

From kindergarten on, your studies help you make your way in the world. You're gaining knowledge that helps you right now, and it will help you later as you continue your education and when you begin your adult career.

In school, you can explore many subjects on your own, too. If you want to find out about dinosaurs or volcanoes or tropical fish, your school library or media center may have just what you're seeking.

What are your ideas about the value of an education? If you're doing requirement 4, discuss this with your teacher or principal. Then ask him or her to initial it.

What You've Learned So Far

This list will help you start thinking about requirement 5 and the things you can do now because you are going to school:

- Reading
- Writing
- Math
- History of your state and country
- Geography
- Science
- New games and songs
- Arts and crafts

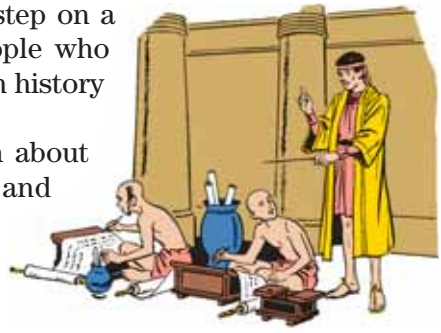
Can you think of other knowledge and skills you have acquired in school? If you're doing requirement 5, write these down in a list. Show it to your teacher or principal and ask him or her to initial the requirement.

Cub Scout Academics Belt Loops for Language, Mathematics, and Chess

If you earned the Language, Mathematics, or Chess belt loop earlier in Cub Scouting, great! But that won't count for requirement 6, 7, or 8 of this Scholar activity badge. You must earn the Language (requirement 6), Mathematics (requirement 7), or Chess (requirement 8) belt loop again while you are a Webelos

Scout for it to count toward this activity badge. (And if you already earned it for another activity badge, that cannot count for Scholar; you should choose another requirement, instead.)

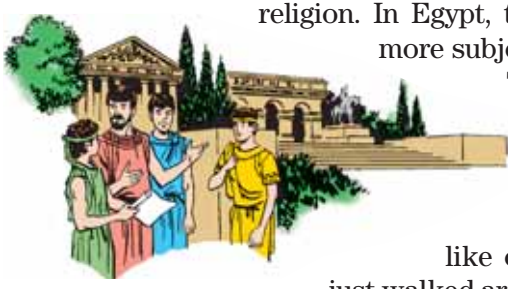
The History of Schools



Your school is the latest step on a long trail going back to people who lived long ago, before written history began.

Everyone needed to learn about food, shelter, clothing, and safety. When they were old enough, children learned skills like hunting and fishing from their parents and other adults. Their school was life itself and the daily activities that helped them survive.

The earliest written records of ancient civilizations have stories of schools. These schools were in the temples where people worshiped their gods, and the schools taught mostly about religion. In Egypt, the temple schools taught more subjects as the years went on.

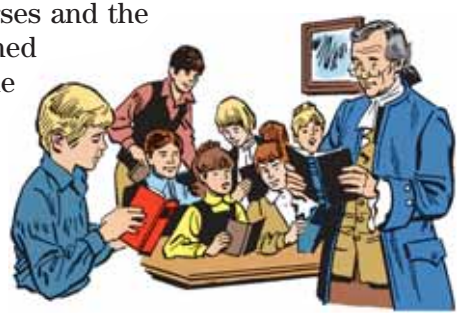


The ancient Greek and the Roman civilizations believed schools and teachers were important. Their schools were not like ours. Sometimes teachers just walked around the streets with their pupils and talked with them.

A great Greek teacher named Plato met his students in a garden in Athens called the Academy. That's where the word *academy*, meaning school, came from.

Early schools in America. America's early colonists soon set up schools. The Pilgrims landed in 1620, and by 1647 Massachusetts Colony had a law providing for free public schools. Few were started, though. Most schools were still private.

The New England Colonies had schools in homes, where children learned Bible verses and the alphabet. Academies trained students for college. The Middle Colonies had both public and church-run private schools. In the Southern Colonies, each plantation had its own teacher.



But by the early 1800s, schools still were not free. There were charity schools, but many parents didn't like them. If they could afford it, parents sent their children to private academies. The main subjects were "The Three Rs"—**R**eading, w**R**iting, and a**R**ithmetic.

Usually there was just one room for school. Boys sat on one side and girls on the other. Sometimes, children—especially those from farms—came only when there was no work at home. Often, everyone studied aloud at the same time in the classroom! This was called a "Blab School."

The common school movement in America. People were demanding free schools, paid for by taxes. The first "common schools" (public schools) were opened in New York and Pennsylvania.

Horace Mann and the state of Massachusetts led in changing the system of education. Mann campaigned successfully for better teachers and buildings. In his state, children between the ages of 8 and 14 had to attend school. Schools were divided into grades.

These ideas spread, and by 1855, America had 81,000 common schools.

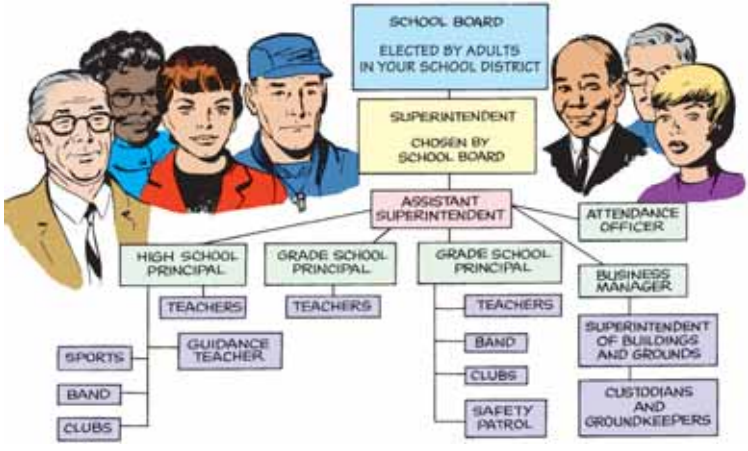
Since then, schools have continued to change. You learn about many more subjects than "The Three Rs." New ideas about the best ways to learn are constantly being brought into schools. Families have choices of public schools, private schools, schools run by churches and other religious groups, and home schooling, where a parent teaches his or her child.

Who Runs Your School?

You may answer this question by saying "the principal."

But there is more to it than that. In a public school, the principal works with teachers. He or she also works with the school superintendent, who is in charge of all the schools in the district. See if you can make a chart showing how your school system is run. Ask your principal about it.

This is how a chart of a school system might look:



Your School's Strengths and Weaknesses

You may think there are good things and bad things about your school. If you have attended more than one school, you may have an idea how your present school compares with another school. But to get a good idea of what people in your community think about your school, you need to ask them. This will help you earn requirement 11.

Ask your Webelos den leader to invite the den's parents to a den meeting. Ask them: What are the best things about the schools? What are the problems?

What are your own answers to these questions? What can be done to improve your school?

Careers in Education

If you're interested in a career in education, you should know about teaching jobs plus all the other jobs connected with schools.

You can think of jobs right in your school. Who works there besides teachers and a principal? Start a list of careers in your school. This will get you started on requirement 12.

Also, ask your teacher about the types of careers in your school system. You may be surprised at the different kinds of skills that are needed to run it. Add these careers to your list and be ready to explain what these people do in their jobs.

Technology Group

S

SCIENTIST

Scientist Requirements

Requirement	Approved by
Do these:	
1. Read Bernoulli's principle. Show how it works.	_____
2. Read Pascal's law. Tell about some inventions that use Pascal's law.	_____
3. Read Newton's first law of motion. Show in three different ways how inertia works.	_____
4. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Science.	_____
And do six of these:	
5. Show the effects of atmospheric pressure.	_____
6. Show the effects of air pressure.	_____
7. Show the effects of water pressure. This may be combined with atmospheric pressure or with air pressure.	_____
8. With adult supervision, build and launch a model rocket. Describe how Newton's third law of motion explains how the rocket is propelled into the sky.	_____
9. Explain what causes fog. Show how this works.	_____
10. Explain how crystals are formed. Make some.	_____
11. Explain how you use your center of gravity to keep your balance. Show three different balancing tricks.	_____

12. Show in three different ways how your eyes work together and show what is meant by an optical illusion. _____
13. While you are a Webelos Scout, earn the Academics belt loop for Weather. _____
14. While you are a Webelos Scout, earn the Academics belt loop for Astronomy. _____

Scientists know about laws of nature that explain much about the world and the universe. They continue to learn by experimenting, and they make discoveries.

They take nothing for granted. They may think an idea is true, but they test it over and over to prove it.

When you earn the Scientist activity badge, you'll do scientific experiments and test some famous scientific laws. You'll explore ideas about how airplanes fly and the way changes in atmospheric pressure can move objects. You'll also experience the strange tricks your eyes and your brain can play on you. When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on the previous page or this page.

Physics

Until the beginning of the 20th century, the science of physics was divided into the studies of sound, light, heat, electricity and magnetism, and mechanics (the study of motion and the forces that cause it).

Since then, physicists have explored many new and exciting areas. Some of these fields are called quantum mechanics, nuclear physics, and astrophysics. These terms may sound complicated, but the basic ideas in physics explain everyday events you may take for granted—like why you can ride a bike without tipping over and why an airplane can fly.

Keep reading to learn about several laws of physics and experiments you can do to demonstrate those laws.

Bernoulli's Principle

In 1738 a Swiss scientist named Daniel Bernoulli discovered a fact known as Bernoulli's principle, which is:

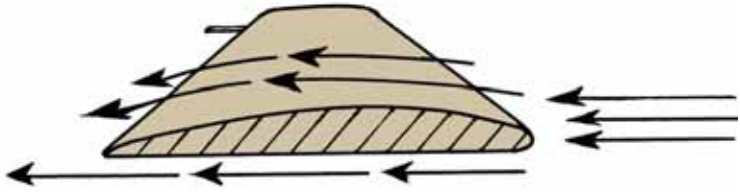
The pressure of a moving gas decreases as its speed increases.

Bernoulli's principle is used to explain how an airplane is able to fly.

Air is a gas. Air moves over and underneath the wings of an airplane as it travels. An airplane wing is curved on top and flat on the bottom. Because of that, air travels a longer distance *over* the wing in the same amount of time that air moves *under* the wing, which is a shorter distance.

This means that the air over the wing travels at a greater speed, causing a lower pressure (Bernoulli's principle at work). The air under the wing travels in a straight line, more slowly, so its pressure stays high. The plane is lifted because of this difference in pressure: Having lower pressure over the wing and higher pressure under the wing causes *lift*.

Air moves quickly, so pressure is reduced.



Air moves more slowly, so pressure stays high.

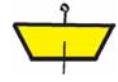
Another way to explain it is that the molecules of the faster air spread out, so they put less pressure on the top of the wing.

A *molecule* is the smallest possible quantity of a substance that still shows the characteristics of that substance. Molecules are usually composed of two or more atoms, although some substances are made of single-atom molecules. For instance, a molecule of water is made up of two atoms of hydrogen and one atom of oxygen.

Testing Bernoulli's Principle

These two fascinating experiments demonstrate Bernoulli's principle.

1. Push a short pin through the middle of a 3-inch cardboard square.



2. Put the pin into the hole in a thread spool or toy spool, making sure the pin doesn't stick out the open end.

3. Put the spool to your mouth and blow steadily. The cardboard will stay on the spool. The harder you blow, the tighter it will hold.

The air stream (your breath) is moving. It makes a low-pressure area between the cardboard and the bottom of the spool. The air on the other side of the cardboard has more pressure, so it pushes the cardboard against the spool.

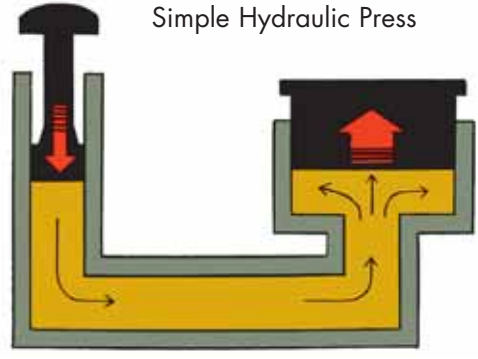
Hold a lighted match be-hind a business card and blow hard against the card. The flame will move toward you. Why?

Pascal's Law

A French physicist named Blaise Pascal discovered a fact about liquids in 1647. If a liquid is in a closed container, pressure in every direction will be the same. When pressure is added to the top, pressure will increase equally throughout the container.

Pascal's discovery led to the invention of the *hydraulic press*, which is used in manufacturing to form three-dimensional objects from sheets of metal or plastic. This is the way a hydraulic press works: It has two connected cylinders filled with oil—a smaller cylinder and a larger one. Each cylinder has a movable piston. When pressure is applied to the smaller piston, it creates extra pressure throughout the oil in both cylinders. This causes the piston in the larger cylinder to move, operating the press. A small amount of force on the small

Simple Hydraulic Press



piston leads to a stronger force on the large piston, because it has a larger area.

Pascal's law is used today in the large hydraulic jack a mechanic slides under a car when a tire needs to be changed. When the mechanic presses down on the jack handle, he's putting pressure on the fluid in the jack. That creates enough force to lift the car.

Pascal's law is also at work in a car's hydraulic brakes. A small amount of pressure on the brake pedal puts increased pressure on the brake fluid. This in turn activates the car's brakes, slowing or stopping the car.

Other examples of devices that use hydraulics are a fork lift, wing flaps on a plane, and a barber's chair.

Inertia

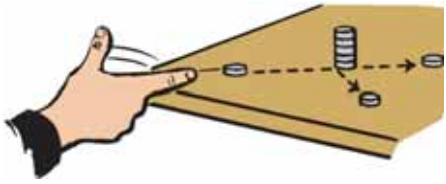
Sir Isaac Newton, an English mathematician and physicist, discovered many laws of physics. In 1687, his book *Mathematical Principles of Natural Philosophy* included his three laws of motion.

The first law of motion says that a thing at rest tends to remain at rest until an outside force moves it. The law also says that a thing in motion continues to move at a constant speed in a straight line, unless an outside force acts on it.

The law describes *inertia*. Inertia is what causes an object to resist any change in motion.

These experiments may seem like magic tricks, but they demonstrate inertia.

Set a coin on a card on the top of a jar. Snap the edge of the card. The card will fly out because of the force you are using to move it, and the coin will drop into the jar because of inertia.



Make a stack of nickels. Try to snap a penny along the table at the bottom coin. If you hit the target just right, the bottom nickel will fly out; the others remain in a stack. Why?

Set a glass of water on the end of a long strip of paper. (Use a plastic glass, just in case. Or you can use a book instead of a glass of water.) Pull the paper slowly. The glass moves with it. Give the paper a sudden jerk. The glass stands still.

Spin a fresh egg on its side. It will stop soon. Spin a hard-boiled egg. It will spin for a much longer time. When you spin a fresh egg, you spin the outside. The white and yolk inside are loose and tend to remain at rest, slowing down the fresh egg. When you spin the hard-boiled egg, you spin the whole egg, because cooking has made the yolk and white solid. They move right along with the shell.

Swing a pail of water back and forth at arm's length. (Don't fill the pail so full that it's too heavy for you.) After a few times, swing it over your head in a full circle. Tell what happens. Do you know why?

Remember, a moving object tends to travel in a straight line unless an outside force acts on it. You're the outside force. Your hold on the bucket and your arm action provide *centripetal force*. You're constantly changing the direction of the bucket, away from straight line travel, and making it go in a circle. Centripetal force makes an object travel a circular route.

Some road curves are banked (tilted toward the inside of the curve) to help cars stay on the road. You'll also see banked curves on bobsled tracks, velodromes (bicycle tracks), and roller coasters. That tilt provides centripetal force that causes circular travel.

Atmospheric Pressure

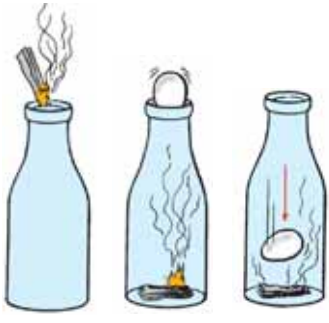
We live under a blanket of air called the earth's atmosphere. It is many miles deep.

At sea level the atmosphere exerts a pressure of almost 15 pounds per square inch on every surface. A mile above sea level, the blanket of air is thinner, so the atmospheric pressure is less.

Experiments With Atmospheric Pressure

More magic tricks? There's a scientific explanation behind each one.

Here's one you can do with an egg and a glass bottle with an opening slightly smaller than the egg.



1. Cook the egg in boiling water for 10 minutes.
2. Put it in cold water. Take off the shell.
3. Fold a small piece of newspaper three times in the same direction.
4. Light it. Drop it into the bottle. Quickly put the egg in the top of the bottle.
5. The egg will bounce up and down. Then it will slip neatly into the bottle.

Air molecules are constantly moving, but heat makes them move faster and spread even farther apart. The burning paper heats the air in the bottle and expands it, pushing much of it out. The expanding air coming out of the bottle makes the egg bounce. As the air left in the bottle cools, the inside air pressure drops. The outside atmospheric pressure pushes the egg into the bottle.

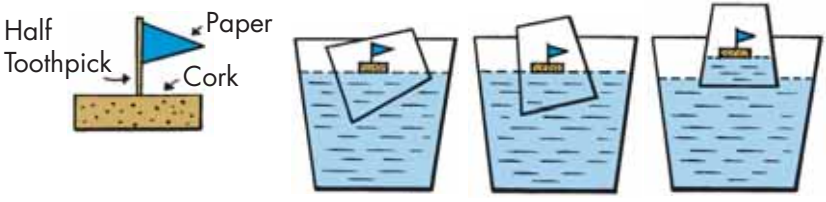
Here's another experiment with atmospheric pressure. You need a glass bottle, a shallow pan, and a candle.

1. Pour the water from a half-filled bottle into a pan. Set a 2-inch-high candle in the pan and light it.
2. Hold the empty bottle over the candle with the top a little below the water. The water will bubble. Hold the bottle until the bubbling stops.
3. Lower the bottle. The candle and water will rise up in the bottle.

The candle flame heats the air in the bottle and expands it, pushing part of it out and making the water bubble. The air pressure inside the bottle drops. Outside the bottle, the higher atmospheric pressure on the water's surface pushes the water and the candle up into the bottle. The flame goes out when it burns up all of the oxygen in the bottle.

For the next experiment, you'll need a cork, a toothpick, a small piece of paper for a sail, and glue to make a small cork boat. You'll also need a glass that will fit over the boat and a larger container for the water. (You can do this experiment with or without the cork boat. The boat makes it more fun and easier to see the water line inside the small glass.)

1. Make a cork boat as shown. Float it.
2. Put a glass over it, putting one edge in the water first, and slowly turn the glass bottom up.
3. Raise the glass, but keep the top under water.



When you lift the glass, the pressure of the air inside it becomes less than the atmospheric pressure acting on the surface of the water outside. This difference in air pressure supports the water column.

Have an adult supervise this next experiment. You'll need a very *clean*, empty screw-top metal gallon can and a metal pail larger than the can.

To be sure the can is clean, rinse it at least three times and let it stand open for 24 hours.

1. Fill the pail with cold water.
2. Pour a glass of water into the can. Leave the top off. Put the open can on a stove. Boil the water. Let it steam for a minute or more, but don't let it boil dry.
3. Use a hot pad to take the can off the stove. Screw on the cap. Turn the can over and place it, top down, into the pail of water. The can will be crushed.

The steam drives nearly all the air out. The water cools the steam, leaving the can almost empty of air and creating a partial vacuum (a space in which there is very low pressure). The higher outside atmospheric pressure crushes the can.

Air Pressure

If we compress air (put pressure on it), it becomes denser and more forceful and we can use it in machines. For example, a jackhammer that is used to break up pavement uses compressed air. A tire pump compresses air, and bicycle tires use compressed air to give you a smooth ride.

Experiments With Air Pressure

Air pressure can do amazing things! For the first experiment, you'll need a pop bottle and a small piece of newspaper.

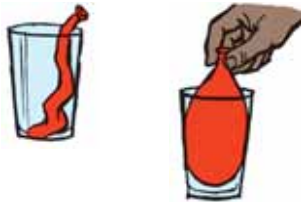
1. Make a ball of a 1-inch-square piece of newspaper.
2. Lay the pop bottle on its side on a table. Put the ball in the neck of the bottle.
3. Blow into the bottle. The ball will come *out* of the bottle.

You might expect that blowing on the ball will make it move to the back of the bottle. But what really happens is this: The air you blow into the bottle increases the air pressure, which drives the ball outward.

For the next experiment, you need books and a hot water bottle.

1. On the edge of a table, place several heavy books on top of an empty hot-water bottle.
2. Hold the opening of the bottle tightly against your mouth. Blow hard into the bottle. Your breath will lift the books.

All you need is a balloon and a glass for the next experiment.

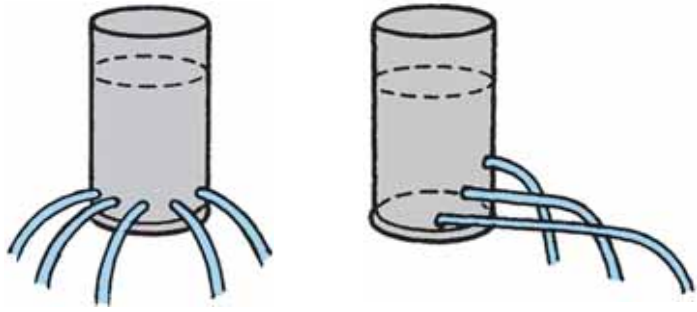


1. Put a balloon into a glass. Have the bottom of the balloon touching the bottom of the glass.
2. Blow up the balloon. Hold it shut. You can lift the glass by the neck of the balloon.

The air pressure inside the balloon holds the balloon against the glass.

Water Pressure

This experiment shows how water pressure works. You'll need two large juice cans and something to punch holes in them. The tops of the cans should be open.



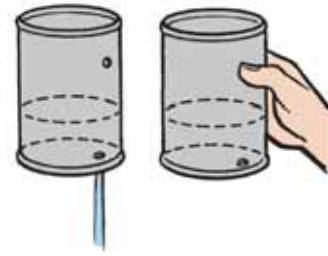
1. Punch five holes near the bottom of a tall juice can. Make the holes about ½ to ¾ inch apart.
2. Fill the can with water. Notice that all the water streams are the same length.
3. Take the other can and punch three holes at different levels (but not one above the other). Fill the can with water. Now notice that the water streams are different lengths.

The amount of water pressure depends on the depth below the surface of the water. In the first can, the water pressure on the holes was equal, since they all were at the same level. The streams of water looked the same. In the second can, the top hole had the least water pressure, and the lowest hole had the most. The lowest stream, with the most pressure, went farthest.

When a dam is built on a river, it is thickest at the bottom, because that's where the water pressure is greatest.

Water Pressure and Atmospheric Pressure

When you read about the water pressure experiment, did you wonder if atmospheric pressure was at work too? It was, because the surface of the water was open to the air. Now try this. You'll need another can, this one with a tight-fitting lid.



1. Use a can with a lid that can be taken off. Punch a nail hole in the lid. Make another hole near the bottom of the can on the side.
2. Fill the can with water. Put the lid on.
3. Turn the can upside down. Water runs out the hole in the lid. Why? The weight of the water plus atmospheric pressure (air coming in the hole in the can's side, above the water) causes water to run out.
4. Put your finger over the hole in the side and the water stops. Remove your finger and it starts.

Your finger stops the air coming in, so the atmosphere cannot maintain pressure above the water. The upward force of the atmosphere on the water in the bottom hole keeps the water from running out.

Here's another experiment that shows how atmospheric pressure works against water pressure:

1. Slip a balloon onto a faucet. Fill it, supporting the weight with your hand.
2. Hold the neck of the balloon tightly and remove it from the faucet. Set the balloon in a bucket of water or in a sink with water in it. Let go of the neck of the balloon. Atmospheric pressure pushing on the surface of the water around the balloon forces a fountain of water out.

Water Pressure and Air Pressure

Because of a scientific invention, divers can work on the bottom of a river, lake, or sea. They use a *diving bell.* Diving bells are used today to help with the underwater work needed in building things such as bridges, piers, and jetties.

Air is fed into the bell through a hose. Even though the bottom of the diving bell is open, air pressure keeps the water out. For an idea of how a diving bell works, you'll need a bottle cap, a bucket, a glass, and water. The glass is your diving bell.

1. Float a bottle cap in a bucket full of water.
2. Place a dry glass straight down over the cap. Push the glass down halfway. The cap floats. Where is the water level inside the glass?
3. Push the diving bell (glass) to the bottom. The cap rests on the bottom.
4. Raise the glass carefully. The cap will float again. Watch the water level inside the glass as you bring it slowly up.

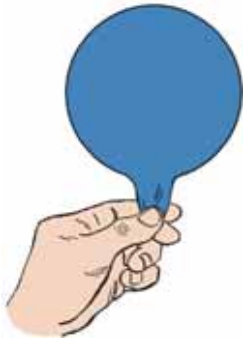
Though you are not feeding more air into the glass, the amount of air in it when you touch it to the water remains the same. When you push the glass down, you are compressing the air in it and providing the pressure to push the water out of the way.

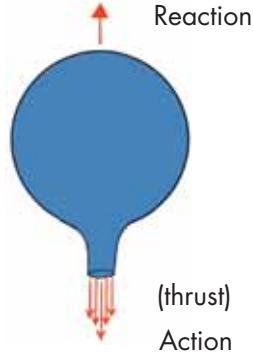
Action/Reaction

You've read about Isaac Newton and his first law of motion early in this chapter. Newton made many other discoveries. His third law of motion says that every action has an equal and opposite reaction. This principle explains how a rocket is propelled skyward.

Try this simple demonstration for yourself.

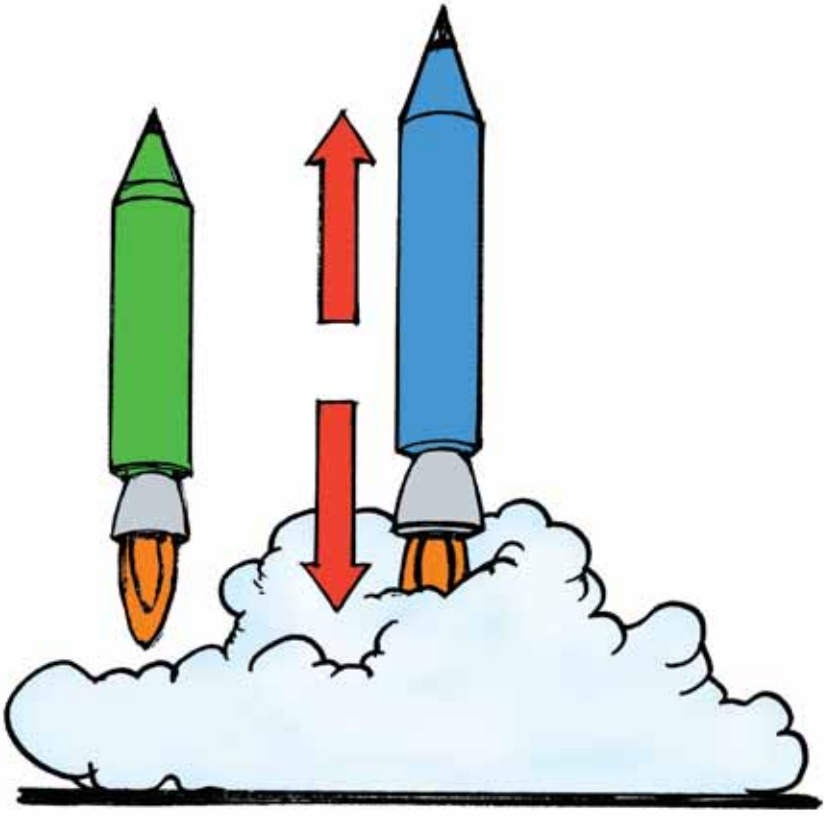
If you want to buy and build a model rocket kit, you must be at least 10 years old and have an adult helping you during construction and launching. Follow the kit directions and observe all safety rules.





Blow up a balloon and hold the opening closed. This is like a rocket that hasn't been ignited yet. The energy is stored in the form of compressed air in the balloon.

Release the balloon, and the stored air rushes out of the opening. This is the action. The *reaction* is a force called *thrust*. Thrust causes the balloon to move in the opposite direction from the rushing air.



As the rocket's fuel is burned, hot exhaust gases are pushed out of the exhaust nozzle at very high speed. The escaping exhaust gases are the action.

That action causes an equal but opposite reaction. The thrust propels the rocket through the air. If the rocket burned fuel even more quickly, both the action and the reaction would be greater.

Hot exhaust gases escape through the exhaust nozzle.

More Fun With Science

Fog, crystals, gravity, optical illusions—there's just no end to the experiments you could do in all the scientific fields. Here are a few more ideas that will help you complete your Scientist activity badge.

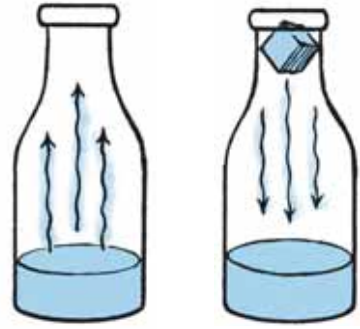
Fog

Did you know that air has water in it? The water is in the form of molecules so small you can't see them.

If cool air moves in after a warm day, the invisible molecules are drawn together into tiny droplets of water. Billions of these condensed droplets make up fog.

Making Fog

1. Fill a bottle with hot water. Then pour out most of the water. Leave about 1 inch in the bottom.
2. Hold the bottle to the light. Notice the streams of vapor rising from it.
3. Hold an ice cube in the bottle opening. Hold the bottle toward the light. Notice the thin streams of vapor moving down into the bottle. This is fog.



1. Put about 1 inch of cold water in a quart-sized bottle.
2. Cover the opening with your hand. Shake hard to soak the air in the bottle. Pour out the water. Hold the bottle upside down.
3. Light a wooden match. Quickly blow it out. Put the smoking head into the opening of the bottle. The smoke will help the water vapor change into water droplets.
4. Set the bottle in a good light. Place your mouth on the bottle opening. Press down and blow hard—you'll then see clear air in the bottle.
5. Raise your head. The fog forms again.

Blowing helps compress and heat the air. This evaporates the fog. When you raise your head, the compressed air expands and cools. Cooling condenses water vapor into tiny water drops you can see, so the fog forms in the bottle again.

Crystals

When some liquids become solid, they form tiny shapes called crystals. Each crystal formed by one liquid is the same shape. Many minerals are made up of crystals.

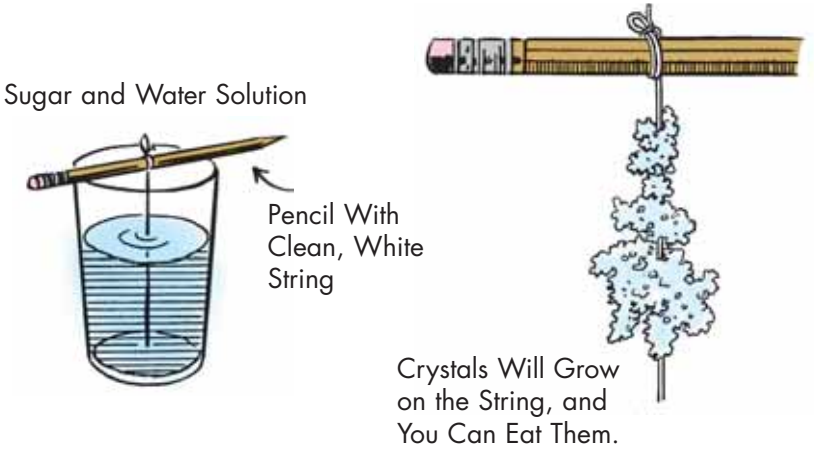
Quartz Crystal

Crystal Candy

Here's a great experiment—you can eat it when it's finished! You'll need sugar, water, a saucepan, a spoon for stirring, clean white string, a pencil, and a glass or jar.

Bring 1 cup of water to boil in a saucepan. Turn off the heat and add 2 cups of sugar. Stir until the sugar is dissolved. Let it cool. Then pour the solution into a tall glass or a glass jar.

Tie a clean white string to a pencil. Moisten the string in water and drag it through dry sugar so some sugar crystals stick to it. Hang the string in the glass. Store it in a cool place. In a few days you'll see crystals forming on the sides of the glass. By your next den meeting, big hard crystals will have formed on the string. Look at them through a magnifying glass. Then—enjoy!



Center of Gravity

Gravity is the force that holds objects to the earth. The same force holds the moon and planets in their orbits. Sir Isaac Newton's law of universal gravitation explained this in 1687.

Did you ever sit still on a bike with your feet on the pedals and try to keep your balance? You had to keep shifting your weight, right?

Why? Because each time you moved, your **center of gravity**—the point in your body where your weight is concentrated—shifted a little. (A person's center of gravity is usually somewhere behind the navel.)

Normally, when you stand or walk, you unconsciously keep your center of gravity over your feet, which are your base. But if you try to walk along a straight line on the floor, you'll find yourself moving your arms to adjust your center of gravity and keep your balance.

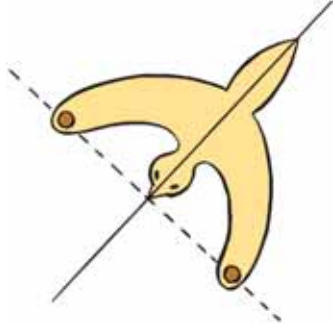
Try these experiments to see what happens when your center of gravity is a bit beyond your control.

Sit in a chair with your feet on the floor and keep your arms folded across your chest. See if you can stand up, but obey this rule: You may not lean forward. Your center of gravity remains too far back to allow you to stand. Now try to stand up by leaning forward first. This allows you to adjust your center of gravity and move it over your feet.

Place a chair against the wall. Bend over it with your head touching the wall. Move your feet back. Your legs, from ankles to hips, should slant toward the wall. Lift the chair. Try to stand straight without moving your feet.

Stand with one shoulder, arm, leg, and foot close against a wall. Try to bring your outside foot up to touch the one next to the wall. Stop at the point where you feel yourself losing your balance. The wall is in your way, so you can't move your body that direction to adjust your center of gravity and keep your balance.

Cut a bird out of a 6-by-6-inch piece of light cardboard. Glue or tape a penny at the front end of each wing. The middle of each penny should be just in front of the bird's beak. Set the beak on the end of your finger or put it on the corner of a table or a book. It won't fall. Where do you think its center of gravity is?



Optical Illusions

How Your Eyes Work Together

Your eyes are wonderful instruments. They are like amazing cameras that can work together.

Each of your eyes focuses a picture of what you are seeing on the retina that lines the eye. The optic nerve carries these two pictures to the brain. Then your brain makes one image out of the two.

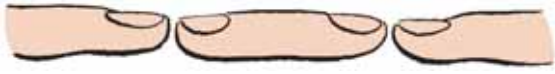
Sometimes your eyes and brain can trick you. Using what it already understands about the world, your brain does the best it can with the images it receives. It might make you believe you're seeing something impossible! Try these easy experiments that show how the eyes work.

Our eyes and the lens of a camera are similar. Both focus light rays to produce images.

Roll a sheet of paper into a tube. Hold the edge of your hand against the side of the tube. With one eye, look at a distant object through the tube. Look at your hand with the other eye. There seems to be a hole in your hand. What do you think is happening?

One eye sees the distant object through the paper tube, and the other eye sees your hand. Your brain combines the two images in one view.

Hold two pencils, as shown, at arm's length. Look past the pencils at the far corner of the room. You'll see two sets of pencils. Do this again with the pencils held about 1 inch apart. You'll see four pencils.



Place the tips of two fingers together about 6 inches from your eyes. Look past them at the far corner of the room and you'll see a small sausage. Pull the fingers apart slowly. The sausage will seem to hang in the air.

Light and Dark

The pupils of your eyes adjust for the level of light that is available.

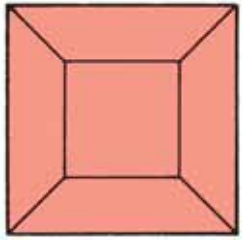
Stand in a corner of the room, facing the corner, with your back to the light. Look in a mirror. Notice the size of the opening in the pupil of each eye. The openings will be large.

Turn around with your face toward the light. Look in the mirror again. The pupils will be smaller.

Look at something far away. Cup your hands into tubes. Look through them as you would through field glasses. You see more clearly because your pupils get bigger. They receive more light from the faraway objects when they are protected from other light.

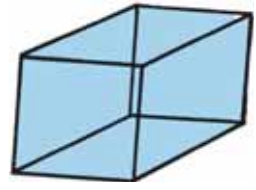
Brain Teasers

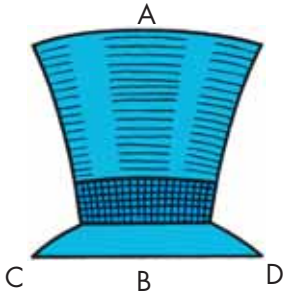
In some of the optical illusions below, you might be fooled about measurements, sizes, and distance. When your brain tries to make sense out of what your eyes are seeing, it uses what it has already learned about how things usually look. That doesn't mean it's always right!



Draw a ½-inch square inside a 1-inch square. Connect the corners. Look at it steadily. The inside square seems to move closer, then farther away.

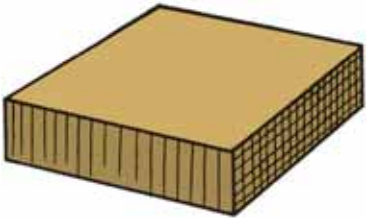
Draw a box as shown. Look at it steadily. Sometimes it seems you're looking at the top of the box. Sometimes it seems to be the bottom.

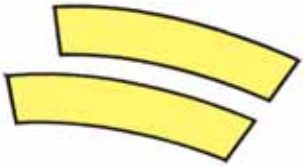




Is the high silk hat longer or shorter from A to B than from C to D? Measure it.

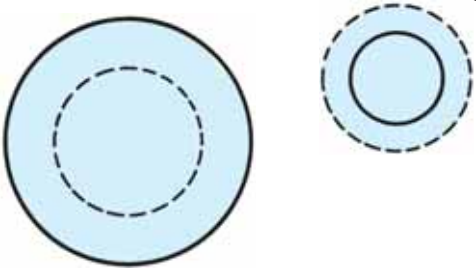
Does it look like you could put a dime on top of this box so the coin won't touch the edges? Try it.





Which of the two designs at left is longer? Better get your ruler.

Which of the dotted circles is larger?



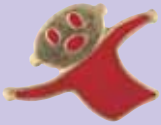
Cub Scout Academics Belt Loops for Science, Weather, and Astronomy

If you earned the Science, Weather, or Astronomy belt loop earlier in Cub Scouting, great! But that won't count for requirement 4, 13, or 14 of this Scientist activity badge. You must earn the Science (requirement 4), Weather (requirement 13), or Astronomy (requirement 14) belt loop again while you are a Webelos Scout for it to count toward this activity badge.

Mental Skill Group

S

SHOWMAN



Showman Requirements

Requirement **Approved by**

Do this:

1. Complete six activities of your choice; these can be from any area (puppetry, music, and or drama). _____

   Webelos den leader or activity badge counselor: Be sure to sign approval both here and for each of the activities below that are completed to fulfill requirement 1.

Puppetry

And do one of these not already done for requirement 1:

2. Write a puppet play about one of your Webelos den activities or a subject of your choice. _____
3. Make a set of puppets or marionettes for the play you have written or for another play. _____
4. Build a simple stage for marionettes or puppets. _____
5. Alone or with the help of others, put on a puppet show for your den or pack. _____
6. Make a set of four paper bag puppets for a singing group. With the help of three other den members, sing a song with the puppets as the performers. _____
7. There are sock, stick, and finger puppets. There are paper bag puppets and marionettes. Explain their differences and show any puppets you have made for this badge. _____

Music

And do one of these not already done for requirement 1:

8. Play four tunes on any band or orchestra instrument. Read these from music. _____
9. Sing one song indoors and one song outdoors, either alone or with a group. Tell what you need to do differently when singing outdoors. _____
10. Make a collection of three or more records, tapes, or music CDs. Tell what you like about each one. _____
11. Tell what folk music is. Hum, sing, or play a folk tune on a musical instrument. _____
12. Name three American composers. Name a famous work by each. _____
13. Draw a staff. Draw on it a clef, a sharp, flat, natural, note, and rest. Tell what each is used for. _____
14. Show the difference between 2/4, 3/4, and 4/4 time by beating time or playing an instrument. _____
15. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Music. _____

Drama

And do one of these not already done for requirement 1:

16. Give a monologue (a talk) on a patriotic, humorous, or holiday subject or another subject of your choice. _____
17. Attend a play. Describe the story. Tell what you liked about it. _____
18. Read a play. Make a model stage setting for one of the acts. _____
19. Write, put on, and take part in a one-act play. _____

20. Make a list of stage directions. Tell what they mean. _____
21. Describe a theater-in-the-round. What are its good and bad points? _____
22. Explain the difference between grand opera and light opera. Explain the difference between a musical and a play. _____
23. Read about William Shakespeare. Draw a picture of his Globe Theater. _____

Everybody loves to see a show. And it's fun to be on stage. Behind the scenes are people who enjoyed creating the script, songs, and scenery.

For requirement 1 of the Showman activity badge, you'll choose six activities from puppetry, music, or drama. Then later you'll do one additional activity in each of these areas, for a total of nine activities.

For puppetry, you might decide to write a play for puppets, make the puppets, and put on the play.

For music, you can learn a folk song, play a musical instrument, or tell about music you like.

For drama, you can be an actor in a play for your den. Or you can attend a play or read one.

You have a lot of choices! On with the show!

Puppetry

When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on page 430. Be sure your Webelos den leader or activity badge counselor signs all the requirements you do for requirement 1.

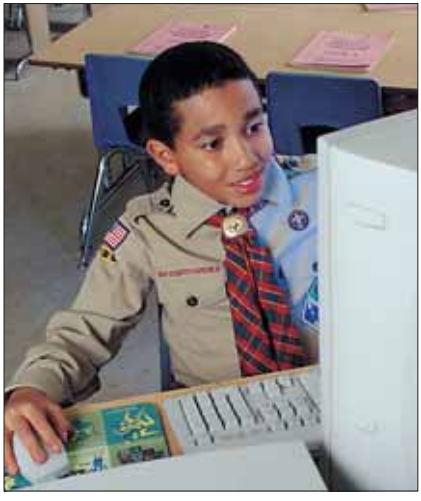
Writing a Puppet Play

A puppet play is just like a play with live actors. It can be funny or sad.

Your play could have a plot like a television show. The hero overcomes obstacles and defeats the bad guys, or he or she finds a way to get out of a comical situation.

Or your play might be a joke with a surprise ending. You would act out the joke with puppets instead of just telling the joke.

As you write your puppet play, think about how you'll perform it. Remember, you only have two hands. You can have several characters, but you can only have two puppets on stage at once, unless you ask someone to be a puppeteer with you.



A Play With a Plot

What do you need? A story that will hold the audience's attention. One event in it leads to another, and puppet characters have to make decisions and take action. It doesn't have to be something that has actually happened. You can make it up. In most plays, the action builds up through the play.

This is an example of an idea for a play about a den

activity. Notice how the plot starts out with an easy task for two Webelos Scouts, but then they deal with one challenge after another.

Title: "The Adventures of the Pebble Pups"

Characters: Two Webelos Scouts, Jason and Brian; their Webelos den leader, Mr. Mason; a bull

Props (things you need): Poison ivy plants (made of paper), a huge outcropping of granite (made of something lightweight), a small piece of granite a puppet can hold

Plot idea: Jason and Brian are looking for samples of granite to complete their rock collections for the Geologist activity badge. Mr. Mason tells them he is sure there is a granite outcrop on a hill not far away.

Jason and Brian start out. They climb a steep hill. They cross a pasture and are chased by a bull. They walk through poison ivy and start itching.

Finally they get to the granite outcrop on a hill. Suddenly they realize they forgot to bring a hammer and chisel. As they start back, Jason stumbles over a rock. It's a piece of granite!

They hike back to Mr. Mason. He says, "Well boys, how did it go?"

Jason shows him the rock and says, "It was easy. Here's the stone, Mr. Mason."

How to put your play on paper: Put down what each character says and does. Here's an example of the way the middle part of the above play could be written:

Brian: Let's cut through this pasture. (They walk along.)

Jason: Hey, Brian, what's really big and runs fast?

Brian: I don't know. What?

Jason: That! (He points offstage right.)

Brian: A bull! Come on, run! *(They run offstage left and the bull follows them across.)*

The characters have to talk about where they're going and what they're seeing so the audience understands what is happening. They have to show how they feel—happy, excited, scared.

Make your play a different idea from the example. If you work with another puppeteer, give him a copy of your play script to study so he is familiar with his lines and the action. Have a rehearsal before you present your play to the den.

A Joke You Act Out

Just as in writing a play, you need to write out your actors' lines for the joke.

Title: "Matching Pairs"

Characters: Webelos Scout Jonathan, Webelos den chief, two other Webelos Scouts (who don't have lines to say)

The joke: The den chief is inspecting the den's uniforms. He comes to Jonathan and looks him over carefully. Then he notices that Jonathan is wearing one red sock and one blue sock and calls his attention to them. The end of the script for the joke would go like this:

Jonathan: That's funny.

Den chief: What's funny?

Jonathan: I have another pair just like them at home!

Making Puppets

Simple Puppets

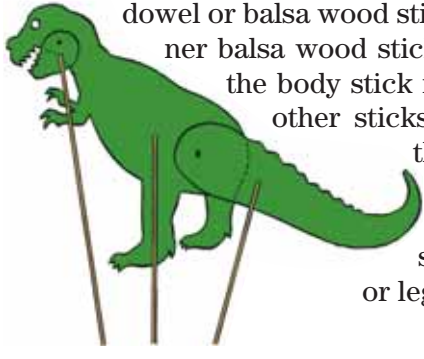
Paper Bag Puppet. Use a small paper bag. Use crepe paper or yarn for hair and mustaches. Mark features with felt-tip pens. Look at the picture: Draw the upper lip on the edge of the sack's bottom and the lower lip on the side of the sack so you can make the mouth open and close.

Finger Puppet. Draw a puppet without legs on heavy paper. Make it 2 or 3 inches high. Cut holes for your first two fingers where the legs should go. You may want to wear a glove as a "costume" for your fingers.

Stick Puppet. This is the simplest kind of puppet. Draw the figure on cardboard and cut it out. Glue on a handle of heavy cardboard or use a craft stick.

Puppets in Motion

Moving stick puppet. May be cut from cardboard or light wood. Join with paper fasteners so parts can be moved. Use a dowel or balsa wood stick for the body stick and thinner balsa wood sticks for the moving parts. Hold the body stick in one hand while moving the other sticks to make the legs walk, tail thrash, or jaws bite (depending on your puppet). You can make a stick puppet of a person with only one moving arm or leg, which is easier to work.



Sock Puppet. Cut the foot off the sock as shown. Take the ankle part and stuff it into the toe to make the puppet's head. Fasten it in with a strong rubber band or ribbon.

Use felt-tip marking pens to draw features. Cut holes on each side of the body for the arms (your thumb and middle finger). You can put on a glove first, if you want to cover your fingers. Your forefinger moves the head.

Marionettes. Traditional marionettes are jointed, which means their necks, wrists, knees, and ankles can bend. Their strings are attached to a crosspiece made of two wooden sticks. The puppeteer holds the crosspiece and tilts it to make the marionette move in different ways.

You can make marionettes from simpler materials, as shown here. The football player is cut from cardboard. The parts are connected by paper fasteners. Attach threads or string to the head and hands. Tie the threads to a wooden dowel or a balsa wood stick. Hold the stick in one hand and use your other hand to pull strings and make the arms move.

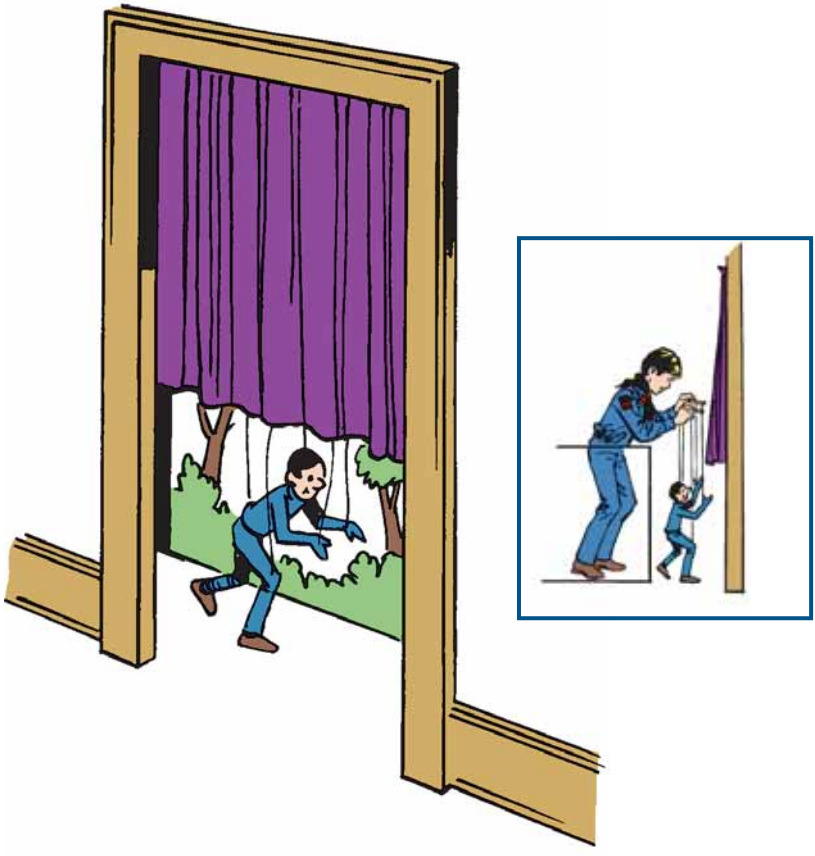
Puppet Stages

Caretully turn table on its side. Kneel behind it and hold puppets over edge of table.

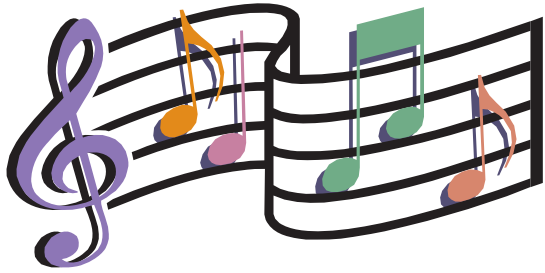
Hang a cloth across a doorway. Keep the room behind the stage dark. Light the front.

Take the top off a heavy cardboard carton that is not too deep. Cut the stage opening out of the bottom and decorate it. Put it on a table with cloth draped around the legs.

A Marionette Stage



Drape a cloth or old sheet behind a doorway. The performer is hidden behind the backdrop, which is a folding table on its side or a large carton. Tape paper scenery to the backdrop.



Music

When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on page 431. Be sure your Webelos den leader or activity badge counselor initials all the requirements you do for requirement 1.

If you are taking music lessons, the music requirements will be easy for you.

Why not form a den band or singing group and perform at a pack meeting? You will have fun, and so will the other boys and their parents.

Folk Music

The folk music tradition is based on tunes that have been handed down from generation to generation, with no known composer. People heard them, learned to play them, and sang them, often in different versions. Many years later, someone wrote down the music and words.

Many folk tunes we hear today came from other countries. Other tunes and songs were made up by people in America. The songs tell of the joys and sorrows of the people living then. Some songs are humorous, and some music is for dancing. The fiddle, guitar, banjo, and dulcimer are often used to play folk music or accompany folk singers.

Songwriters have continued to compose in the folk style, so you may know newer songs that fit in with the folk tradition. An example is "This Land Is Your Land," written by Woody Guthrie, in the 1930s. In the late 1950s and early 1960s, folk singing became especially popular. Folk artists such as Pete Seeger, Joan Baez, Judy Collins, and Peter, Paul, and Mary rose to fame. Arlo Guthrie followed in his father's footsteps and writes folk songs, some about social issues, as does Bob Dylan. In the 21st century, Pete Seeger's grandson, Tao Rodriguez, and Woody Guthrie's grandchildren (and Arlo's children), Abe and Sarah Lee Guthrie, are rising folk singers and songwriters.

If you don't know much folk music, you have fun ahead of you. Look for a folk song book at your library and learn a few folk songs. Some libraries might have recordings of folk music and videos of performers, so you can hear the music. The Internet is a good resource, too.

American Composers

Ragtime, blues, jazz, classical, and popular music—American composers have created wonderful music in many styles. Here are just a few titles from six composers:

Stevie Wonder (1950–)

Singer and writer of popular songs. Some of his songs:

"You Are the Sunshine of My Life"
"Superstition"
"Isn't She Lovely"

John Williams (1932–)

Conductor and composer, has scored and composed music for many major films, including

The *Harry Potter* movies
The *Star Wars* movies
The *Home Alone* movies
The *Indiana Jones* movies
E. T.: The Extra-Terrestrial

W. C. Handy (1873–1958)

Composer of the blues; wrote a book called, and came to be known as, "Father of the Blues." Some of his songs:

"Memphis Blues"
"Beale Street Blues"
"St. Louis Blues"

George Gershwin (1898–1937)

Composer of popular songs, folk opera, and jazz compositions. Some of his works and songs:

Porgy and Bess
Rhapsody in Blue
Piano Concerto in F
An American in Paris
"Swanee"
"I Got Rhythm"

Woody Guthrie (1912–1967)

Folk singer and composer. Some of his songs:

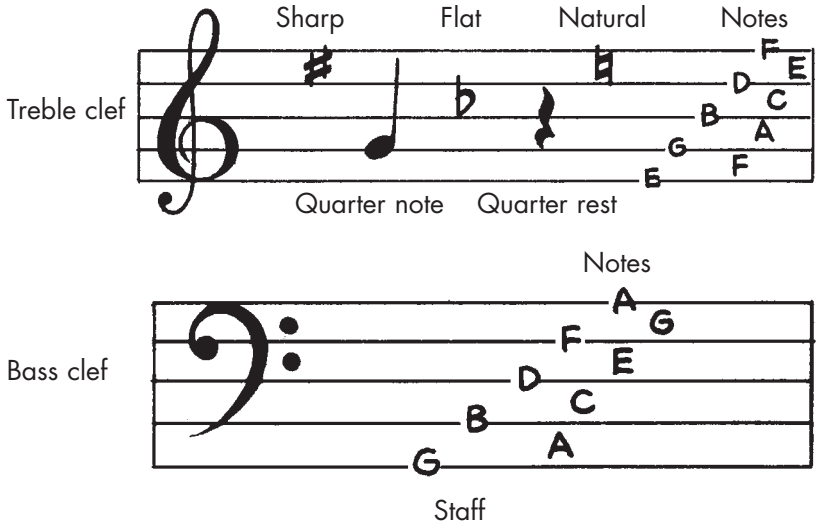
"This Land Is Your Land"
"So Long, It's Been Good to Know You"
"This Train Is Bound for Glory"

His son, Arlo, is a composer, too.

Leonard Bernstein (1918–1990)

Composer of musicals and symphonies. Some of his works:

West Side Story
Wonderful Town
Fancy Free
Jeremiah
Mass



Written Music

Written music is how composers communicate their music to musicians and singers. They draw notes and other symbols on a staff. The horizontal and vertical lines above make up a treble staff (for higher notes) and a bass staff (for lower notes). Each line and each space on the staff stands for a particular pitch (sound), and they are named A through G. The sharp and flat symbols tell you to raise or lower the pitch a little from its natural pitch.

Notes can be drawn as whole notes, half notes (held for half as long), quarter notes, and so on. When a note is drawn on a certain line or a space, it tells you what pitch to play or sing, and how long to hold it. You read music just like you read words: from left to right, top to bottom. Once you learn to read the language of music, you can play or sing a tune or song just like you read a favorite book!

Cub Scout Academics Belt Loop for Music

If you earned the Music belt loop earlier in Cub Scouting, great! But that won't count for requirement 15 of the Showman activity badge. You must earn that belt loop again while you are a Webelos Scout for it to count toward this activity badge.

Drama

When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on pages 431–432. Be sure your Webelos den leader or activity badge counselor signs all the requirements you do for requirement 1.

Performing a Monologue

A single actor recites or acts out a *monologue*. It can be a poem, a story, or an essay. It may be on a serious subject, such as patriotism. Or it may be a funny story.

Choose a short story or long poem that you like. Try to memorize it. Practice often and show all the humor, sadness, or excitement that is in it. Then perform your monologue for the den.

Attending Plays

Have you ever been to a play in a theater? It's different from watching a comedy or drama on television. It's almost as if the actors are living their roles right before your eyes.

Stage actors have demanding jobs. They must become the character, remember the lines and actions exactly, and portray every emotion so it is believable. The cast does this again and again, for every performance.

Actors in television and movies also have demanding roles, but they often have many chances to get it right. A scene can be filmed many times until no one makes a mistake and the director is satisfied. You see the best of their work on the screen.

Ask an adult to take you to a play staged by a local high school drama club, college drama department, or theater group. Some groups put on plays just for children.

Reading and Writing Plays

You can find books of plays in your school or public library.

As you read, picture the characters on stage. What would the actors be doing as they speak the lines? How would they show humor or fear or anger? Say the lines out loud, as if you are acting in the play.

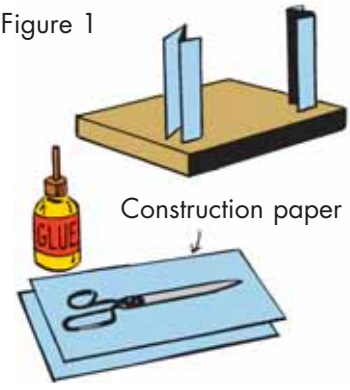
The plays you read may be divided into three acts, or they may be shorter, one-act plays. If you decide to do requirement 19 and

write your own one-act play, you can get some tips from the section above on writing a play for puppets (pages 433–435).

Stage Setting

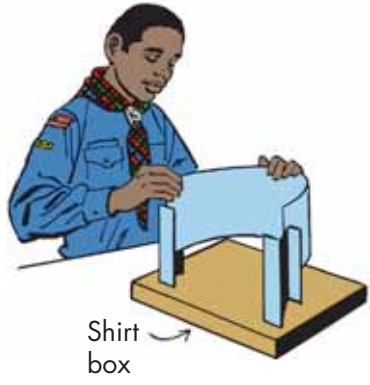
A play director often makes a model of the stage setting for a play to help him or her plan the action. Set designers also make models. You can make one, too. Read a play and then make a model stage setting for it.

Figure 1



- First, sketch your idea on paper. Draw it as the audience would see it. Then draw it as a floor plan of the stage, as if you were looking down at the stage. Show where furniture or other large objects will go. Use these sketches as a guide. (You can change your mind about your design at any time.)

Figure 2



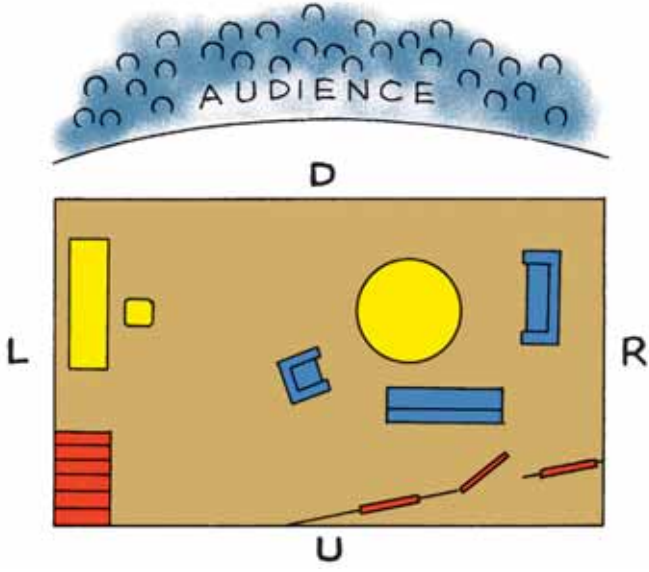
- Cut two strips of light cardboard about 10 inches long and 3 inches wide. Make two lengthwise folds, so the ends look like a "Z" shape. Glue them to a box as shown in figure 1. These represent the curtains at the side of the stage.
- For the backdrop, curve a sheet of construction paper and slide it into place (figure 2). Or fold it to make two corners of a room. This is the backdrop.
- If it is an indoor scene, mark lightly in pencil the places where you want doors and windows on the backdrop. Then remove the backdrop and use crayons or paints to add line and color.

If it's outdoors, paint trees and other features. Glue or tape the backdrop in place when it's ready.

- Keep it simple. The audience comes to the theater ready to use imagination, so you don't have to fill in every detail.
- Make simple furniture from cardboard or use dollhouse miniatures. Don't clutter the scene with things that won't be used. The action in the play will tell you what must be there.

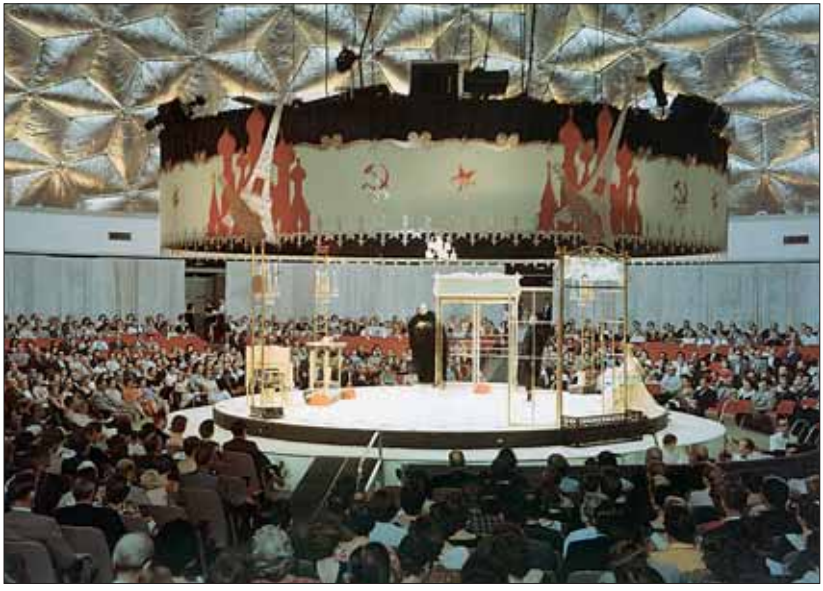
Stage Directions

As the director of the play you write, you will have to give stage directions to the actors. Read your play and think about what each character does. Make notes in your script where you want each actor to stand, sit, and move on the stage. Here's a way to note the locations:



D—Down (toward audience); **U**—Up (toward back of stage); **L**—Left (your left as you face audience); **R**—Right (your right as you face audience); **C**—Center; **DC**—Down center; **UC**—Up center; **LC**—Left center; **RC**—Right center

For the play you write, your stage may be an area of your den meeting place. Keep the setting simple. Use the furniture that is available and movable. Let the audience imagine a sofa when you line up three folding chairs.



Theater Styles

Three main kinds of stages are used today. One is the kind of stage you usually think of when you hear the word "stage." It's a raised platform at one end of the room, with a curtain between it and the audience that can be opened and closed.

Another kind of stage is called *theater-in-the-round*. The stage is in the center of the room. The audience sits around all sides of it. There is no curtain. Instead of a curtain closing, the theater is darkened between scenes or acts.

Theater-in-the-round works well for plays with small casts and action that needs to be seen close up. The actors enter and leave the stage along aisles through the audience.

There's no backdrop or solid scenery that would block anyone's view of the actors. A window frame hanging from the ceiling might be the only suggestion of a wall of a house.

If the theater is small, everyone in the audience is fairly close to the stage—much closer than most people would be in a traditional theater. Watching a play this way can make the audience feel very involved in it.

For a director, staging the play can be challenging. Actors' moves must be planned so they don't have their backs to one part of the audience for too long a time.

For plays with a large cast or a lot of action, theater-in-the-round is not a good choice. The audience is too close to the stage to see everything clearly when many actors are moving about. A great deal of fast action can be confusing.

A third kind of stage, the *thrust* stage, starts at one end of the room like the most common kind of stage, but it thrusts out into the audience area so that three sides of it are surrounded by the audience. It has some of the advantages of theater-in-the-round but the actors can still enter and exit using the wings and don't have to use the aisles. The thrust stage is not as widely used as the other two kinds of stage.

Opera and Musicals

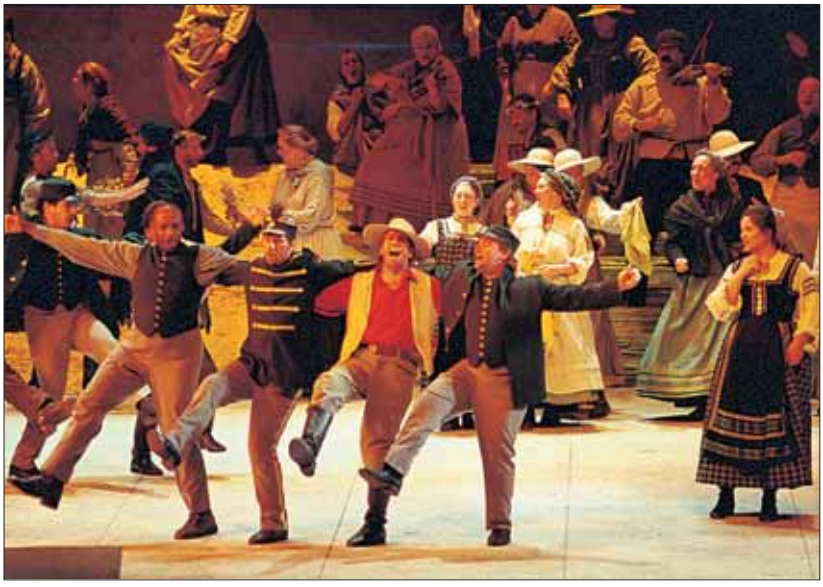
Opera and musicals are alike in this way: Both are plays with music and singing.

Opera

There are different kinds of opera:

- **Grand opera** has a serious theme. Every word in it is sung by the actor-singers. An example of a grand opera written in English is *Amahl and the Night Visitors*, by Gian-Carlo Menotti.
- **Light opera** has a humorous, romantic plot. It can have a combination of musical numbers and spoken lines. Other names for light opera are *comic opera* and *operetta*. An example of an operetta is *The Pirates of Penzance*, by Sir William Gilbert and Sir Arthur Sullivan.

Grand operas are sometimes shown on television. Watch one if you can. It might be sung in Italian, German, or French. Usually English subtitles are shown so you can follow the story.



Musicals

A musical can be serious or funny. Much of the plot unfolds in the spoken lines. There may be a great deal of variety, with solo singers and choruses, a lot of action, and exciting dance numbers. Actors in musicals are talented in acting, singing, and dancing.

Some examples of musicals:

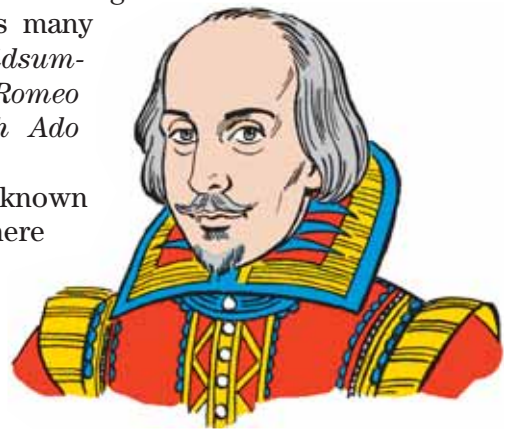
- *Oklahoma!*, with music by Richard Rodgers and lyrics (words) by Oscar Hammerstein II
- *My Fair Lady*, with music by Frederick Loewe and lyrics by Alan Jay Lerner
- *West Side Story*, with music by Leonard Bernstein and lyrics by Stephen Sondheim
- *Cats* and *Phantom of the Opera*, with music by Andrew Lloyd Webber

You may have a chance to see an opera or a musical on stage. That will be quite an experience. If you can view videos at home, find out if your public library loans out videos of musicals and operas.

Shakespeare and His Theater

William Shakespeare (1564–1616), who lived in England, has been called the greatest playwright in history. Indeed, he is considered to be one of the greatest writers of any kind.

His plays are still popular today, centuries after his death. He wrote both comedies and tragedies. Examples of his many plays are *Hamlet*, *A Midsummer Night's Dream*, *Romeo and Juliet*, and *Much Ado About Nothing*.



Not very much is known about his life, and there is even an argument among scholars as to whether he really wrote all the plays that bear his name.

During much of his career, he was an actor as well as a playwright. He performed at the Globe Theater in London.

Watch for announcements of productions of Shakespeare's plays by local colleges or theater groups. Many of the plays may be available on video, as well as movie versions of them.

Look for books about Shakespeare and his plays in the library. If you can't find books, read about him in an encyclopedia or on the Internet.

Physical Skills Group

S

SPORTSMAN

Sportsman Requirements

Requirement	Approved by
Do these:	
1. Show the signals used by officials in one of these sports: football, basketball, baseball, soccer, or hockey.	_____
2. Explain what good sportsmanship means.	_____
3. While you are a Webelos Scout, earn Cub Scout Sports belt loops for two individual sports (badminton, bicycling, bowling, fishing, golf, gymnastics, marbles, physical fitness, ice skating, roller skating, snow ski and board sports, swimming, table tennis, or tennis).	_____
4. While you are a Webelos Scout, earn Cub Scouting Sports belt loops for two team sports (baseball, basketball, soccer, softball, volleyball, flag football, or ultimate).	_____

America is a sports-loving country. We cheer our school teams. College and professional games draw crowds, and we watch all kinds of sports on television.

These games are great fun to watch, but too many Americans are spectators. Be a player!

In the Sportsman activity badge, you'll play team sports like basketball, baseball, and soccer. You'll go out for individual sports like bicycling, swimming, and tennis. You may try a sport you'll play all your life.

Sports build your body and improve your skills. Some sports sharpen your eye and your accuracy. Some require you to move carefully and deliberately, while others demand quick thinking, speed, and endurance. Choose your sports and play! When you complete a requirement, ask your Webelos den leader or activity badge counselor to sign it on page 456.

Learning Officials' Signals

You'll find pictures of officials' signals starting on page 459. You may already know many of them from watching sports events. For requirement 1, you'll learn the signals for one sport, but look at the others. You'll enjoy watching games even more when you know instantly the decisions officials make on exciting plays.

Good Sportsmanship

What is good sportsmanship?

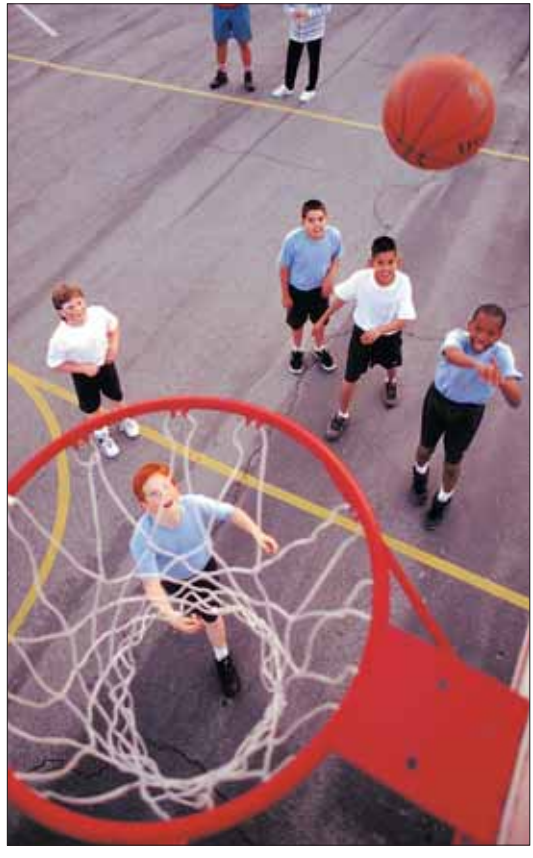
You may say, "It's being a good loser."

That's part of it. If you lose, try to take the loss bravely. Don't gripe about bad luck or blame the officials or your teammates. Practice, do your best, and see what happens the next time you compete.

Good sportsmanship also means being a good winner. You'll be happy, but don't put the other team down. Take time to tell your opponent he played a good game.

A good sport plays by the rules and never cheats. Playing fairly is a matter of honor and self-respect, as well as respect for opponents. Play hard and play to win—but to win *fairly*.

Playing Sports



For requirements 3 and 4, you'll earn the belt loops for two individual sports and two team sports in the Cub Scout Academics and Sports program.

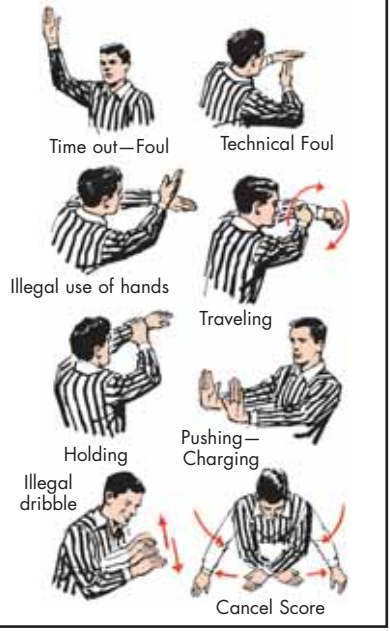
If you earned some of those awards when you were in a Cub Scout den, they won't count toward these requirements. You could choose different sports this time, or you could earn a second belt loop in any sport you want to repeat for this badge.

The book called *Cub Scout Academics and Sports Program Guide* tells you what you need to do to earn a belt loop for each of the sports listed in requirements 3 and 4. Generally, you need to understand the rules of the sport, practice some of the skills, and then play a game of the sport itself.

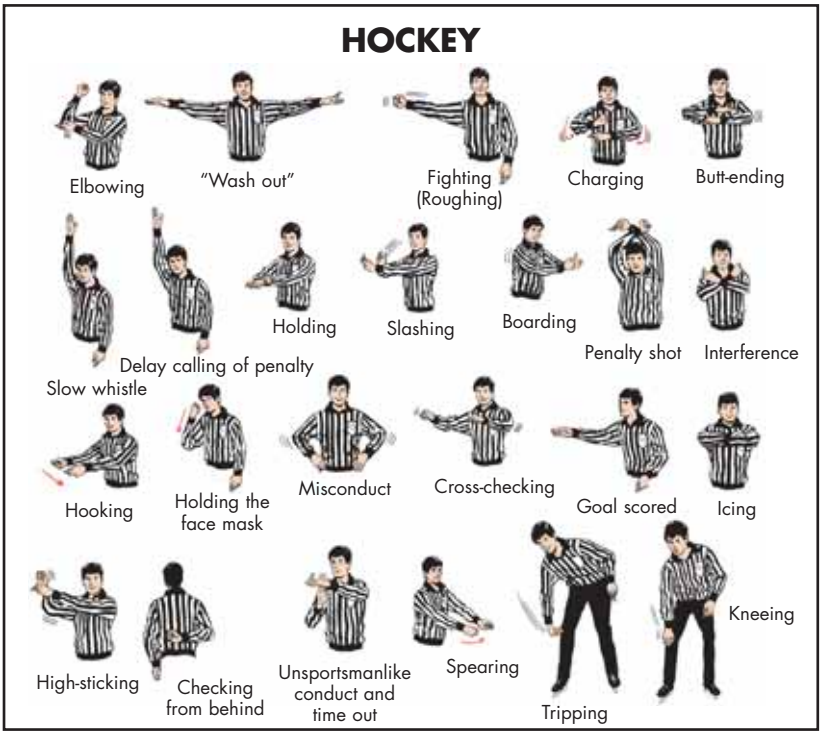
OFFICIALS' SIGNALS

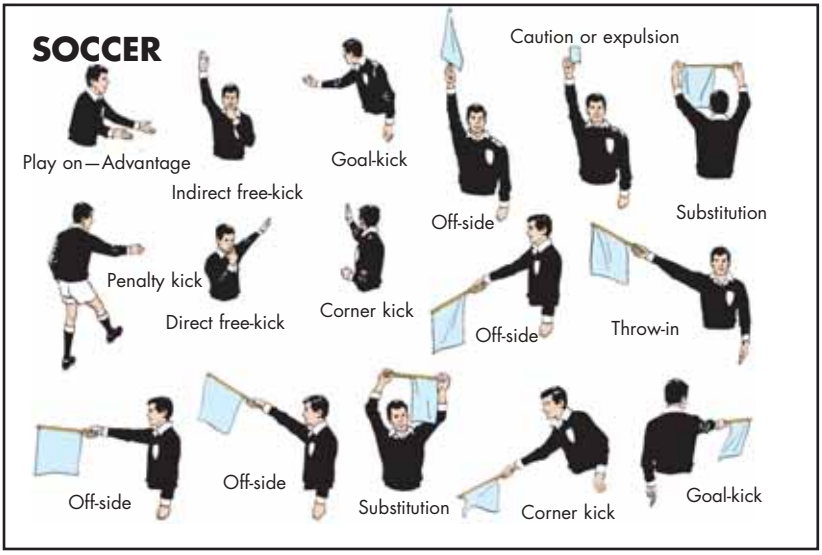
FOOTBALL

BASKETBALL



BASEBALL


HOCKEY
Elbowing
"Wash out"
Fighting (Roughing)
Charging
Butt-ending
Slow whistle
Delay calling of penalty
Holding
Slashing
Boarding
Penalty shot
Interference
Hooking
Holding the face mask
Misconduct
Cross-checking
Goal scored
Icing
High-sticking
Checking from behind
Unsportsmanlike conduct and time out
Spearing
Tripping
Kneeing


SOCCER
Play on—Advantage
Indirect free-kick
Goal-kick
Caution or expulsion
Off-side
Substitution
Penalty kick
Direct free-kick
Corner kick
Off-side
Throw-in
Off-side
Off-side
Substitution
Corner kick
Goal-kick

Mental Skills Group

T

TRAVELER

Traveler Requirements

Requirement	Approved by
Do five of these:	
1. Get a map or timetable from a railroad, bus line, airline, subway, or light rail. The line should serve the place where you live or near where you live. Look up some places it goes.	_____
2. Use a timetable to plan a trip from your home to a city in another state by railroad, bus, airline, or ferry.	_____
3. With the help of your parent, guardian, teacher, or librarian, use a map site on the Internet to plan a trip from your home to a nearby place of interest. Download and/or print the directions and a street map showing how to go from your home to the place you chose.	_____
4. With your parent or guardian, take a trip to a place that interests you. Go by car, bus, boat, train, or plane.	_____
5. Figure out what it costs per mile for the trip you took or planned to fulfill requirement 2, 4, 6, or 7. (Don't forget to include getting back to your starting point!)	_____
6. Decide on four nearby trips you would like to take with your parents or guardian. Draw the route of each trip on a highway map. Using the map, act as navigator on one of these trips. It should start at your home, be at least 25 miles long, and have six or more turns.	_____

7. Decide on a trip you would like to take that lasts at least two days. Pack everything you would need for that trip. _____
8. Check the first aid kit in the family car to see if it contains what is needed. Explain what you found. _____
9. Look at the map legend on a road map of your area. Learn what the symbols mean. Show your den members what you have learned. _____
10. On a road map of your area, find a place of interest and draw two different routes between it and your home. Use the map legend to determine which route is shorter in miles. _____
11. Make a list of safety precautions you, as a traveler, should take for travel by each of the following: car, bus, plane, boat, train. _____
12. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Geography. _____
13. While you are a Webelos Scout, earn the Cub Scout Academics belt loop for Map and Compass. _____

Traveling is one of humankind's greatest adventures. Early explorers sailed across vast oceans, floated down mighty rivers, and journeyed through high mountain country to see what they could find.

You can be an explorer, too. You won't be traveling in unknown territory, but it will be new to you. You'll enjoy the thrill of discovery wherever you travel.

Be curious, ask questions, read signs about points of interest, notice the sights and sounds.

In earning the Traveler activity badge, you'll learn how to help plan family trips. You'll also learn how to use public transportation—buses, planes, and trains. Let's go! When you complete each requirement, ask your Webelos den leader or activity badge counselor to sign it on page 462–463.

All Aboard!

Has most of your traveling been by car? It's fun to find out about other kinds of travel—by bus, ship, train, or plane. Then when you do take a trip, you'll know how to read schedules and plan.

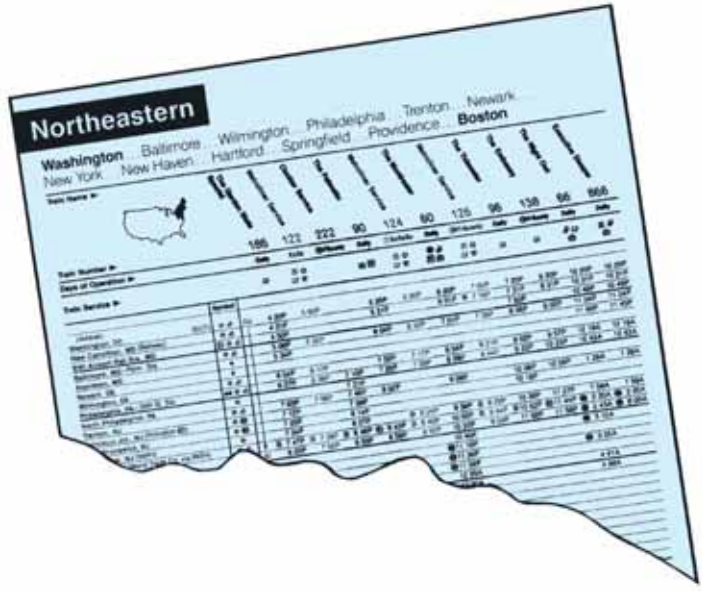
Each kind of travel has advantages and disadvantages. Buses go to more places, like small towns, than planes and passenger

trains do. Usually the bus is the least expensive of these three, but not always. Airlines sometimes have special low fares.

Many people choose a long train trip mainly to enjoy seeing the country. Long-distance trains have more room for moving about than other forms of transportation, and everything a passenger needs is on the train.

These trains usually have lounge cars and dining cars. Some even have observation cars, where you sit up high for an even better view of the countryside. You may have your own room, called a compartment. It is a tiny living room, bedroom, and washroom, all in one.

A plane is the fastest way of traveling on long trips. The view of the earth from high in the sky is breathtaking. You have a bird's-eye view of mountains, rivers, and cities far below. Flying through and above clouds gives you a feeling of being in another world.



Your Schedule

Railroads, buses, airlines, and ship lines have schedules called *timetables*. These list the places they go and show the times they leave and arrive at each place.

Timetables look hard to read. But they're not, when you learn how. For instance, some timetables use arrows to show the direction of travel. Noon to midnight hours (P.M.) are usually shown in heavy type. Look at the beginning of the timetable for instructions on how to use it.

Read your timetable with care when you are planning a trip. Be sure the train, bus, airplane, or ferry goes on the day you want. Check with a ticket agent for any recent changes in the departure and arrival times.

You can get a timetable at a railroad or bus station, ferry line, airline terminal, or travel agency.

Internet Travel Resources

The Internet has map resources that may be helpful in planning a trip. Using a search engine, you can enter the phrase "maps & directions." The search result should provide links to several sites. Most will have you enter your starting and destination addresses, then will provide both map and directions. (Be sure to compare the results with a printed map; sometimes the directions are close but not exactly correct.) When using the Internet, be sure to have the help or supervision of an adult.

You can also use the Internet to find out what transportation, hotels, and restaurants are available and how much they cost. Adults can make reservations on the Internet for travel and lodging.

How Much Does It Cost?

Requirement 5 asks you to figure out how much it costs to go on a trip. If you travel by bus, rail, or plane, you can find out the cost per mile if you know two things: the fare and the distance.

Here is the formula to use:
Fare ÷ Distance = Cost Per Mile

Suppose you plan to take a bus trip to a city 180 miles from your town. The fare is $37.50. Then:

$37.50 ÷ 180 Miles = $0.208 Cost Per Mile

It would cost a little more than 20 cents per mile to travel by bus.

But because you are younger than 12 years old, you might be able to go for about two thirds of the adult fare. That means your cost would be about 13 cents a mile.

Many airlines, bus lines, and railroads have special fares. Fares may be lower on weekends or at certain times of the year. It's a good idea to check for special fares before you plan a trip.

How much it costs to take a trip by car may be harder to figure. There are many "hidden" costs when traveling by car, such as the cost of the car insurance, the cost of wear and tear on the car and tires, and the cost of engine oil. But you can easily figure out the cost of the gasoline used per mile of your trip by dividing the total fuel cost by the total miles you travel.

Packing

- Make a list of things you'll need. Check it with an adult member of your family.
- Select the suitcase, duffel bag, backpack, etc., that you will need.
- Fold your clothes and press down on them as you pack so you can take as many as you need.
- If you're using a suitcase, pack shoes so that when the suitcase is standing up, the shoes will be on the bottom.
- Tuck socks into shoes to save room.

- Put things that might break and spread throughout your clothes, such as toothbrush, toothpaste, and shampoo, in a plastic jar or resealable plastic bag. (A jar won't crush easily.)

- If you're using public transportation, you should have name tags on all your luggage. Some tag holders have a cover that opens so the name and address aren't visible to everyone who passes by. The tag helps if your luggage is lost or if several passengers have similar bags. Some people also tie a piece of brightly colored yarn to the handle so they can find their luggage quickly when they arrive at their destination.

A Family Trip by Car

When traveling by train, bus, or airplane, you really don't have much to do. You just pack your bag and get to the train station, bus station, or airport ahead of time. But when you go by car, you have to do more planning.

Adult family members have to get the car ready. That means making sure the brakes, lights, and steering are okay. The oil level in the engine and the air pressure in the tires must be checked. The gas tank should be full. Before a long trip, a mechanic should take care of any regular maintenance that is due.

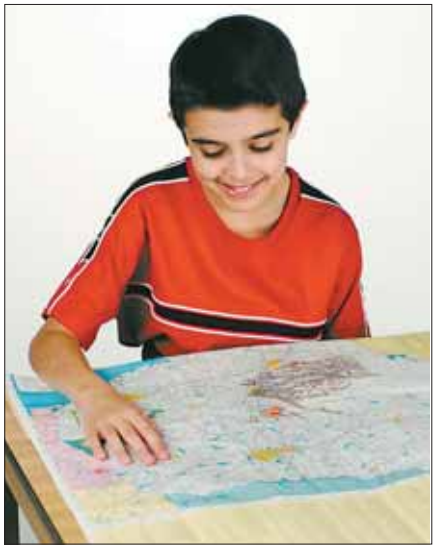
Planning a Car Trip

You can help plan the trip. How do you find the best way to get where you want to go? How do you know the best roads? By using road maps.

Look for maps of your own state and neighboring ones at state tourism offices, the highway department, or a gas station. Some families use a road atlas, which is a book of state maps.

If an adult family member belongs to an automobile club, it can provide maps of states and street maps of large cities. A club may also plan your route for you.

See Internet Travel Resources on page 466 for more information.



Study the maps. For a long trip, decide how far you'll travel each day. Where will you stop? At a hotel, a motel, or a camping ground? An adult family member may need to phone and make reservations. Find out whether your library has recent travel guides that list places to stay. Automobile clubs may have these, too.

Family Camping Trips

Many American families take vacation trips by camping along the way at public or private campgrounds. They may stay a day or two and then move on again. If they especially like a campground and the recreation the area offers, they may spend most of their trip there. This can be an inexpensive and enjoyable vacation.

There are four main kinds of public campgrounds.

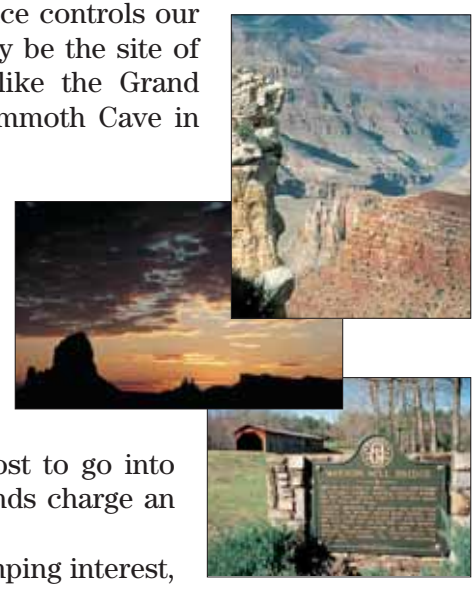
National Forests

The United States has more than 150 national forests. National forests cover one-tenth of the whole area of our country. The U.S. Department of Agriculture controls them.

The national forests have more than 2,000 campgrounds. Most have tables, benches, rock fireplaces, a water supply, and toilets. Many are free. They don't accept reservations.

National Parks

The National Park Service controls our national parks. A park may be the site of a great natural wonder, like the Grand Canyon in Arizona or Mammoth Cave in Kentucky.



Most of the national parks have campgrounds. (Look for a campground symbol on the map.) These have a water supply, tables, fireplaces, and restrooms. Some have laundry rooms, showers, and stores. Besides the cost to go into the park, some campgrounds charge an extra fee.

With the increase in camping interest, most campgrounds in national parks are heavily used. In the summer they are often full by noon. Some take reservations. Plan ahead and write for information.

National Monuments

National monuments are places that preserve

- Prehistoric sites, such as Petroglyph National Monument in New Mexico
- Historic sites, such as Fort McHenry National Monument in Maryland
- Places of scientific interest, such as Agate Fossil Beds National Monument in Nebraska

A national monument could be almost anywhere—in the heart of a city or in the wilderness. Some have camping places, or there might be a campground nearby.

Check the map for national monuments along your route. They are worth a visit.

State Parks

Each state has state parks. Some of them are for day use only, for picnics and other recreation. Others may have campgrounds ranging from basic campsites to those with showers and laundry facilities. Most have a small daily charge.

Finding Places to Camp

Perhaps your family would like to know more about campsites. Check some current guidebooks on camping. Find out where to write for more information about camps in each state you plan to visit.

Before you go on a camping vacation, try to earn your Outdoorsman activity badge. Everything you learn about outdoor living will be helpful on your trip.

Car First Aid Kit

Be sure to have a first aid kit in the car. Naturally, you hope you will not need it, but a Scout should be prepared. Check the first aid kit in the car before you go. The things that should be in the kit are listed on pages 388–389.

Safety First!

As a Webelos Scout, you need to be aware of safety precautions that seasoned travelers use when traveling by car or other types of transportation.

Car Travel Safety Rules

- Always wear a seatbelt.
- Do not distract the driver.
- Be aware of your surroundings.
- Be sure the vehicle is in good repair before starting out.
- Do not exit the car on the traffic side.

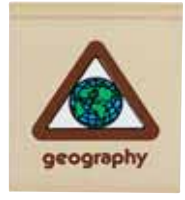
Train, Boat, and Plane Travel Safety Rules

- Stay with your traveling partners.
- Secure your luggage in the proper places.
- Listen to all safety precautions when they are explained. Afterward, ask questions if you do not understand any of them.
- Keep your valuables out of sight.

- Do not take with you any toy or other object that could look like a weapon.
- Be aware of your surroundings.
- Do not speak to strangers unless an adult you know and trust is present.

Cub Scout Academics Belt Loops for Geography and Map and Compass

If you earned the Geography or Map and Compass belt loop earlier in Cub Scouting, great! But that won't count for requirements 12 and 13 of this Traveler activity badge. You must earn those belt loops again while you are a Webelos Scout for them to count toward this activity badge.



Index and Credits

WEBLOGS

Index

D

E

F

S

T

U

V

W

Y

Credits

Courtesy of American Airlines—pages 404, 464

Courtesy of AMTRAK—page 464

Steve Anderson—page 470

Courtesy of Linda Blasé, Dallas Theater Center—page 447

Jack Brown—pages 3, 28, 35, 83, 101, 121, 143, 156, 157, 176, 177, 214, 223, 227, 231, 237, 238, 241, 242, 259, 296, 299, 303, 306, 308, 310, 315, 330, 365, 370, 391, 396, 401, 428, 440, 445, 466, 473

Dan Bryant—page 352

Courtesy of Casa Manana, Fort Worth, Texas—page 450

Jack Kelly Clark, courtesy of University of California Statewide IPM Project—page 327

Tina Collins—page 220

Courtesy of Dallas Area Rapid Transit—page 464

Courtesy of Dallas Opera, Dallas, Texas—page 452

Philip Greenspun—pages 263, 356

Philip Greenspun/Roy Jansen—page 165

Roy Jansen—pages 26, 27, 86, 99, 104, 105, 108, 109, 111, 131, 159, 178, 187, 190, 197, 211, 215, 230, 234, 239, 240, 241, 243, 269, 276, 281, 295, 297, 321, 343, 352, 357, 361, 386, 429, 433, 446, 458, 468, 469,

Roy Jansen/KFWB-News 98—page 177

Kitty Kohout, The Morton Arboretum, Lisle, Illinois—page 334

Courtesy of Carl S. Lieb, University of Texas at El Paso—pages 335, 336

Chris Michaels—pages 121, 155

Courtesy of NASA—page 417

Randy Piland—page 279

Joe Schwartz—page 409

Courtesy of U.S. Department of the Interior, U.S. Geological Survey, David A. Johnston Cascades Volcano Observatory, Vancouver, Washington—page 290

Courtesy of Pat Vanecek, University of Texas Health Science Center, Dallas Department of Ophthalmology—page 424

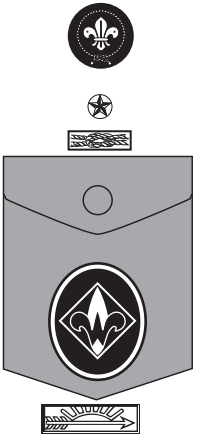
Official Placement of Insignia

SHOULDER SEAM

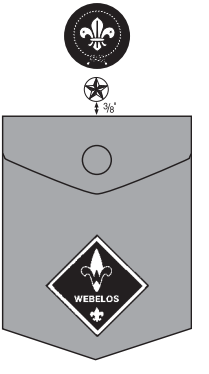
LEFT SLEEVE

RIGHT SLEEVE

Left Pocket Options



(TAN SHIRT)



(BLUE OR TAN SHIRT)

(BLUE OR TAN SHIRT)

- **The Webelos Scout experience is packed full of fun!**
- **You'll have a lot of opportunities to learn and try new and exciting things as you work on the 20 activity badges.**
- **Sports, games, projects, and community service make your time in the Webelos den a great time.**
- **Webelos Scouts can earn Cub Scouting's highest rank: the Arrow of Light Award.**
- **The Webelos den helps prepare you for the adventures you'll have as a Boy Scout.**

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