

BE A T R U E BOATMAN: Skill with oars or paddles is just one part of boating fun. A true boatman never leaves shore in a small boat without an armload of equipment and head full of important facts. Here's an easy way to keep these facts in order:

- T - trim the boat
- R - remember equipment
- U - understand the rules
- E - easy does it

TRIM - A boat in trim is evenly balanced side to side. The stern is slightly lower than the bow. Passengers sit near the center line. Equipment is stored low, on the bottom of the boat. Know how many passengers your boat can carry safely. To figure the weight that can be carried, multiply the length of your boat by 7.5 times the width, times the depth at the lowest point where water could enter the boat. This is a good rule of thumb for rowboats, but it doesn't work for canoes.

REMEMBER EQUIPMENT - Make a checklist of equipment you will need. Be sure everything is in the boat before you leave the dock. A missing piece of equipment can put you in danger.

| | |
|---|---------------|
| One U.S. Coast Guard approved life vest(per person) | |
| Anchor | Mooring lines |
| Anchor line | Flashlight |
| Bailing scoop | Whistle |
| Spare oar or paddle | First Aid Kit |

UNDERSTAND THE RULES - Once you have made sure your own boat is safe, you must know how to watch out for the other guy. Learn the 'rules of the road' for the area where you boat.

1. When approaching another boat head on, pass port-to-port. Both boats move to the right.
2. Stay away from large boats, tows and sailboats. You may have the right of way, but they cannot stop or turn as quickly as you can.
3. Anchor out of main channels.
4. Do not tie up to channel markers.
5. At anchor in the dark, show a white light on the stern of your boat.

EASY DOES IT - A steady pace and a straight line are the best way to travel one place to another. Use a comfortable, steady stroke; line up an object across the stern and hold your course. Avoid bad weather. Thunderstorms can be dangerous. Watch the sky and, when in doubt, head for shore. Never clown around or stand up in a small boat. If an accident happens, keep your head. Use your life jacket and stay with the boat. Signal for help, and try to paddle toward the shore.



FORESTER ACTIVITY BADGE

A forester deals with the care and growing of trees, and a Webelos Scout, working on the Forester Activity Badge will learn how to recognize different species of trees by their shape, foliage, bark, and types of wood, as well as how they live and grow.

America is a land of trees; they grow almost everywhere in our country. We sometimes forget just how important trees are in our lives. Thousands of products come from trees - our wood houses and furniture, the rayon clothing we wear, the film in our cameras, the newspapers and books we read, the paper we write on, and many of the fruit we eat. One very important value of trees is aesthetic - think what beauty we would be missing without trees!

A forester does a great variety of things - tree inventories, estimating the lumber content in standing timber, surveying, logging, tree planting, insect control, recreational planning, and mapping and marking of trees for harvesting. He is interested in woodlands conservation and learns how to preserve and protect them from fire and disease.

Den Activities:

1. Bring a log to den meeting or find a nearby tree stump and have the boys count the annual rings to determine the age of tree. See if they can tell something about the kind of weather - dry or wet spells- through which the tree lived by looking at the rings.
2. Visit a lumber yard or sawmill. Discuss the different kinds of wood and their uses. Collect different types of wood.
3. Plant a tree.
4. Collect leaves for identification.
5. Invite a forest ranger to den meeting to talk to the boys about wildfire, it's prevention and control. Contact the naturalist at Oak Mountail State Park for assistance.
6. Make a tree survey in the area around your meeting place.
7. Make a tree identification kit for den from strips of bark , leaves or needles, and cones or seeds.

Related Boy Scout Merit Badge Books:

Firemanship - Chemistry of fire, wildfires.

Forestry - Tree growth and anatomy, Leaf identification, forest products, forest management and harvesting, wildfire and other forest enemies.

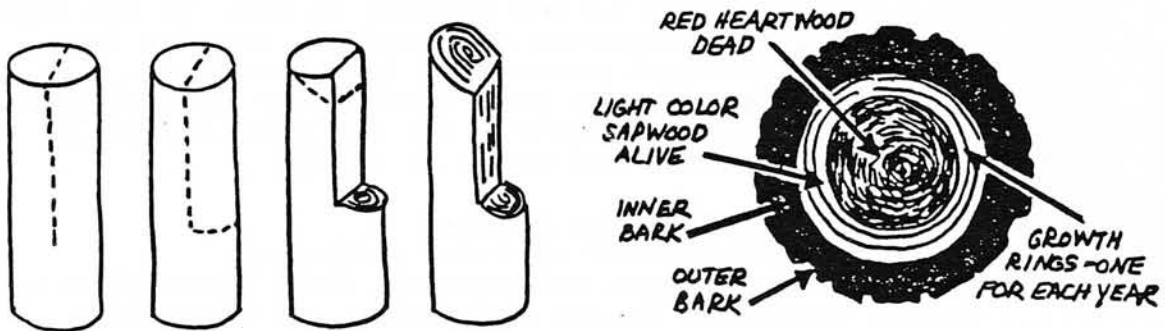
Pulp and Paper - Wood products, paper manufacture, forest management and harvesting.

Boy Scout Environment Skill Book

Trees from the Inside Out

With a little work, small round fireplace logs or tree branches will show what a tree looks like from the inside out. A cut-away view will show the pith, heartwood, spring growth, cambium layer, and bark. Annual rings can be seen on cross section; knots show where branches start; rough sawed wood can be compared with a finished and varnished section.

1. Obtain small sections of various local trees. If green, allow to dry in a warm place for several weeks. (Note: get permission before cutting trees, and be sure you know how to make cuts so trees won't be damaged.)
2. Sections should be about 3 - 5" in diameter and 12" long. Saw the ends squarely.
3. Retain the bark. Saw sections lengthwise half way down center. Remove one piece by sawing crosswise to end of lengthwise cut. Finally saw a small diagonal piece off top of remaining half.
4. Sandpaper the top half of cut-away sections and apply a thin coat of varnish or shellac. Leave bottom half as rough sawed wood.
5. Insert small screw eye at end of each block. Hang on a board of native lumber. Add a brief description on each part of log section, name of tree, its range, fruit, leaves, and what its wood is used for.

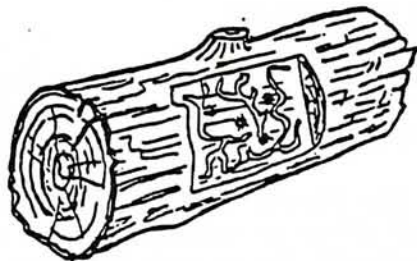


Window on the Insect World

More than 180 million Americans depend on 489 million acres of forest land for their wood supplies. By the year 2000 there may be more than 300 million Americans. They will look to this same (or perhaps less) amount of land for forest products.

Every minute of the day and night billions of insects are busily chewing, biting, sucking, and boring away at our trees, gardens, homes, livestock, and agricultural crops. They destroy 10 percent of everything man attempts to grow. You can watch them at work, see what and how they eat, by putting a window on the insect world.

1. With a forester's or entomologist's guidance, obtain a section of insect-infested tree bark, leaf buds, leaves, or termite-infested wood can also be used.
2. Without disturbing the feeding insects, cover the bark, leaves, buds, or wood with a thin sheet of plastic. Punch several small air holes. Leave enough space under the plastic so the insects can move freely.
3. Label to tell the story of each kind of insect - the kind of trees it attacks, how much timber it kills or damages yearly, and what is being done to control it.



TREE INSECT ZOO

At little cost, an interesting and educational tree insect zoo can be had just for the fun of making it. Studying tree insects and what damage they do is an education in itself. Have a local forester or entomologist or landscape artist help identify local tree insects.

Collect live specimens, placing each kind in separate glass jars. Carefully label each jar to identify the insect, the kind of trees it attacks, the amount of damage it may do locally if uncontrolled, and the methods of control used. This makes an attractive exhibit for public display.



FOREST FIRES

Life is short. Forest animals don't need us to make it shorter. Their lives are in our hands. When the trees and grass grow dry as tinder, don't be the one to leave burning embers at the campground.

Even "contained" fires can get out of hand and grow like fury. A few smoldering twigs can become a rampaging blaze. A single careless toss can turn the forest world into wholesale horror. Fire destroys burrows, nests, seeds, roots, hunting territories, mating grounds and Life.

It takes no more than one fool to start a fire. It often takes an army of cool heads to put one out. Man is responsible for 58% of all forest fires, and about one-third of that number are set on purpose. People who use the woods for recreation are responsible for one-third of all forest fires each year. So learn how to use fires safely - or stay at home!

Lightning causes many forest fires too, but when it strikes - whamo! - it often happens on top of a hill, where the temperature is cooler, the fuel supply is sparse, and the flames are more easily spotted.

Animals caught in a forest fire can't outrun the flames. Think about them on your next trip, and rake the ashes of your camp fire extra carefully. You'll be glad. So will they.

Three kinds of fires can destroy the forest:

A surface fire burns along the floor of the forest. It is usually slow-moving and close to the ground, but it can spread fast. It kills small trees and either kills or permanently damages larger trees. Most fires are of this type.

A ground fire burns on or below the forest floor. These fires are often started by lightning. They move slowly, and often go undetected for weeks. They are hard to put out. The heat they create beneath the ground destroys the tree's roots and any chance for life.

A crown fire moves faster than most people can run. These often start as surface fires, and are blown by winds into the tree crowns. Fir forests are especially vulnerable. The needles and cones catch fire easily and quickly. A grove of trees "topping out" in this way is doomed.

A fire has to be fed, or it dies. If you want to kill one fast, cut off its supplies; 1. HEAT 2. FUEL 3. AIR The main elements which influence the spread of fire are fuel (such as dry grass, dead leaves, brush, small trees, logs, top soil) weather (wind, moisture and temperature) and slope.

Webelos Scouts should learn basic fire prevention rules. "Lady bug, lady bug, fly away home - your house is on fire and your children....." Only caring - the simple human variety of caring - can prevent such broken homes and burnt-out hope.



LEAF COLLECTIONS -

1. Dry Leaf Collection - Put each leaf between a separate sheet of newspaper. Put several folds of newspaper on top of and underneath the sheets you are using to press the leaves, and put something heavy on top until the leaves are pressed out and dry.
2. Crayon Print - Lay a leaf on the table with vein side up. Put a clean sheet of paper on top of it. Hold the leaf in place with your hand and make parallel strokes back and forth over the leaf with your crayon until the print shows on your paper.
3. Ink-Pad Leaf Prints - Put a leaf, vein side down, on your ink pad. Cover it with a piece of newspaper and rub your hand back and forth over it. Then put the leaf, ink side down, on a clean sheet of paper. Put a newspaper over it again and rub.
4. Paraffin-Coated Leaves - Melt paraffin in a double boiler. When it is melted, turn off the heat. Dip one leaf at a time into the melted wax. Shake off the extra drops of wax into the pan. Hold the leaf until the wax hardens, then lay it on waxed paper. Using this method, you can get the leaves in their green color, or in the brilliant colors of Autumn.



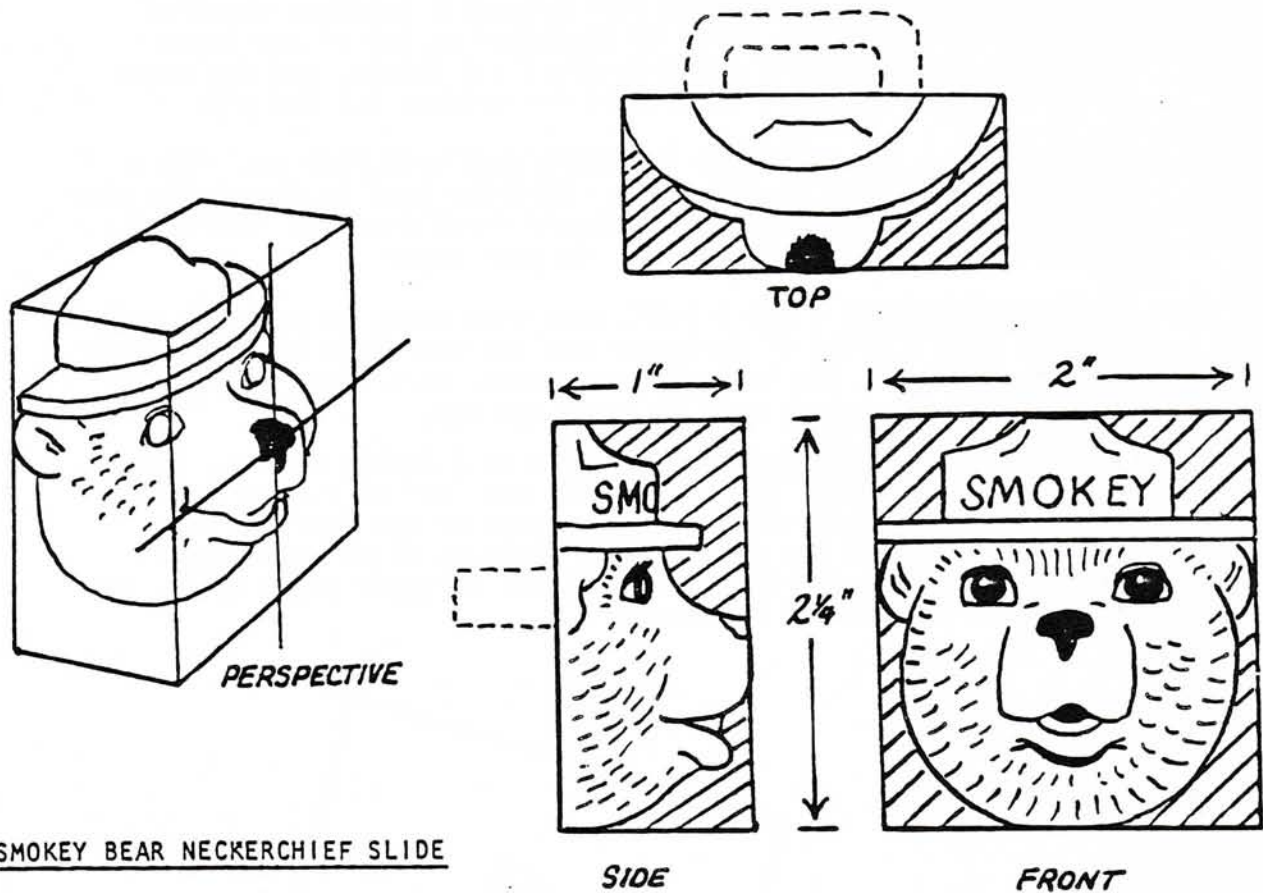
Ink Pad



leaf



Leaf Print

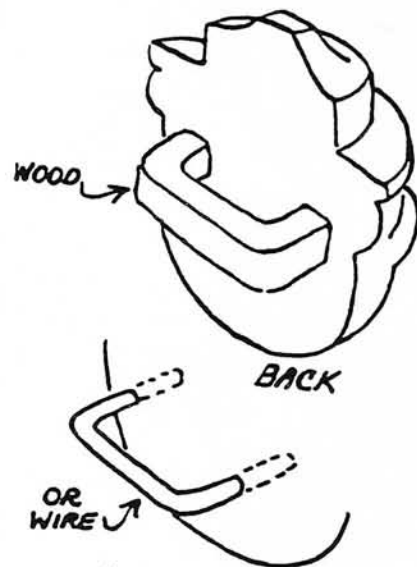


SMOKEY BEAR NECKERCHIEF SLIDE

Trace the outline of Smokey on the end of a 6" piece of clear grained wood, 1" thick and 2" wide. Using the extra length of wood for holding in your hand, cut out roughly the shaded part with carving tools or pocket knife. After details of eyes, nose and hair have been added, cut off carving 2 1/4" from end.

A loop to hold the neckerchief corners may be carved from another piece of wood and glued to back or made from heavy wire bent into a U-shape and inserted by drilling two small holes in back.

After figure has been carved and sanded smooth, enamel paints may be used to add color. Hat is yellow; nose, lower lip, and area around eyes is cream; fur is brown; tongue is red; teeth are white; eyeballs are white with black pupils.



Smokey Bear is the national symbol of the Forest Fire Prevention Program.



TRAVELER ACTIVITY BADGE

Almost everyone loves to travel. Webelos are no exception. But not everyone has the opportunity for extensive travel. Obviously you can't give your boys that opportunity while working on the Traveler Activity Badge. But you can introduce them to some of the joys of travel and perhaps to a means of travel new to them. Through the badge requirements, the boys will learn to read maps and timetables of railroads, buses, or airlines serving the area. They will use this information in planning trips. They will learn the comparative costs of various types of transportation. They may take some trips with their parents. They will learn to pack suitcases and check to see if family cars have adequate first aid kits.

Earning the Traveler Activity Badge will not only help the boys prepare for travel experiences, but it will also enable them to get the most out of any trip they take and to learn more about our country. Remember that to earn this badge, the boys must be involved in trip planning. The fun is really in the traveling, but with advance planning, you can make the planning periods fun too.

Den Activities:

1. Visit county, state, or national park.
2. Take a bus or train trip.
3. Visit a historic site nearby.
4. Visit a travel agency or automobile club office and learn what they do. You may want to invite a travel agent to visit your den meeting.
5. Calculate cost and speed of a plane trip.
6. Make car first aid kits.
7. Visit a train depot bus terminal, or airport, to see inside operations.
8. Discuss timetables and how to read them.
9. Have a speed contest of locating specific destinations and how to get there, using maps and timetables.
10. Teach proper suitcase packing. Afterward, have a speed contest, stressing neatness as well as speed.
11. Locate points of interest on city and highway maps.
12. Prepare a list of travel agencies and transportation media available in your area.

Related Boy Scout Merit Badge Books:

Aviation - Aeronautical principles, safety, timetables
Railroading - Railroad safety, timetables, history.
Safety - Travel safety in various types of vehicles.
Traffic Safety - Car maintenance and safety.

NATIONAL PARK TOUR GAME

- Preparation:
1. Glue a map of the USA to a piece of cardboard.
 2. Make six cardboard cars using the pattern or use N-Gauge model cars.
 3. Cut out spinner top and glue to a piece of soft wood. Cut out arrow from a piece of posterboard. Pierce the center of the arrow with a needle, then pin the arrow to the center of the spinner top with a straight pin. The spinner should move freely.

Object: Starting from your home state, to visit all the National Parks and return to your home state first.

- Rules:
1. Players choose cars, and spin the arrow. Highest number starts; ties spin again. Players take turns, going to the starting player's left.
 2. Parks must be visited in the order listed. Start with the park nearest your home and go up or down the list to make a complete circle trip.
 3. First player spins. Then starting from his home state, he moves his car toward the nearest park by the shortest route, passing through as many states as the arrow indicates. For example: If the arrow stops on 4, he moves four states.
 4. As he visits each state, each player checks off all the parks in that state, in his column of the chart.
 5. Players travel from the mainland to Alaska, Hawaii, or the Virgin Islands in one jump and return in one more jump just as if these states joined the mainland. Come back to the mainland state you left from, and count it both coming and going.
 6. The first player to visit all the National Parks and return to his home state wins the game.

| PARKS VISITED ON YOUR TOUR | PLAYER | | | | | |
|-------------------------------|--------|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| ACADIA, MAINE | | | | | | |
| ISLE ROYALE, MICH. | | | | | | |
| WIND CAVE, S. DAK. | | | | | | |
| GRAND TETON, WYO. | | | | | | |
| YELLOWSTONE, WYO. | | | | | | |
| GLACIER, MONT. | | | | | | |
| NORTH CASCADES, WASH. | | | | | | |
| MT. RAINIER, WASH. | | | | | | |
| OLYMPIC, WASH. | | | | | | |
| MT. MCKINLEY, ALASKA | | | | | | |
| CRATER LAKE, OREG. | | | | | | |
| HALEAKALA, HAWAII | | | | | | |
| HAWAII VOLCANOES, HAWAII | | | | | | |
| REDWOOD, CALIF. | | | | | | |
| LASSEN VOLCANIC, CALIF. | | | | | | |
| YOSEMITE, CALIF. | | | | | | |
| KINGS CANYON, CALIF. | | | | | | |
| SEQUOIA, CALIF. | | | | | | |
| GRAND CANYON, ARIZ. | | | | | | |
| PETRIFIED FOREST, ARIZ. | | | | | | |
| ZION, UTAH | | | | | | |
| BRYCE CANYON, UTAH | | | | | | |
| CANYONLANDS, UTAH | | | | | | |
| MESA VERDE, COLO. | | | | | | |
| ROCKY MOUNTAIN, COLO. | | | | | | |
| CARLSBAD CAVERNS, N. MEX. | | | | | | |
| GUADALUPE MOUNTAINS, TEX. | | | | | | |
| BIG BEND, TEX. | | | | | | |
| PLATT, OKLA. | | | | | | |
| HOT SPRINGS, ARK. | | | | | | |
| EVERGLADES, FLA. | | | | | | |
| VIRGIN ISLANDS, ST. JOHN | | | | | | |
| GREAT SMOKY MOUNTAINS, N.C. | | | | | | |
| MAMMOTH CAVE, KY. | | | | | | |
| SHENANDOAH, VA. | | | | | | |

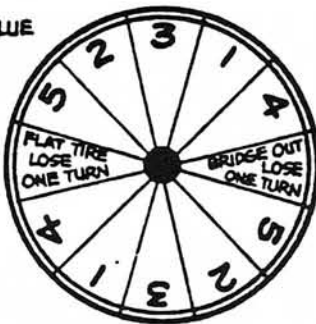
MAKE SIX CARDBOARD CARS THIS SIZE. COLOR THEM. N-GAUGE MODEL CARS CAN BE SUBSTITUTED.



MAKE A CARDBOARD OR PLASTIC ARROW THIS SIZE.



CUT OUT DIAL. GLUE ON A PIECE OF SOFT WOOD. MOUNT ARROW IN CENTER. USE A COMMON PIN FOR A SHAFT. ARROW SHOULD SPIN FREELY.



GUIDE TO EMERGENCY ACTION

AUTO ACCIDENT -

Move vehicles off road if possible. Turn off the ignitions. Help the injured, but don't move them unless they are threatened by bleeding, fire, or traffic. Administer first aid if you are qualified.

Place a warning flare 10 feet back of the rear vehicle, another 300 feet behind the rear vehicle and one 100 feet ahead of the scene. If other people are there, station them with the flares to alert traffic.

WARNING -DO NOT LIGHT FLARES NEAR SPILLED GASOLINE!

Send for police and an ambulance if necessary.

Write down the license number of the other car and the name and address of the driver. Get names and addresses of witnesses.

If you're first on the scene of an auto crash, park well away from the accident, ahead of the scene. Account for all occupants of the vehicles and aid the injured to the extent that you are qualified. Set up flares and call the police.

CAR FIRES

Most fires are the result of a short circuit in the car's electrical system. Don't waste time trying to disconnect the battery. If you don't have a fire extinguisher, rip loose any burning wires with a jack handle and smother with a blanket or coat. Don't grab wires with your bare hand. If the fire burns out of control, and endangers the gas tank, get away from the car immediately.

HEADLIGHT FAILURE

Brake as quickly as possible without throwing the car into a skid. Ease onto the shoulder well away from any traffic. Set out warning flares. Check battery terminals for loose connection. If this is not the trouble, send for help. NEVER drive at night without lights.

CAR SUBMERSION

Don't panic. Tests have proven that a car with doors and windows closed will float from 3 to 10 minutes - enough time to escape if you keep your head. If the car does sink before you can get out, an air bubble will form in that section of the passenger compartment closest to the surface. You can get a breath of air from this bubble before making your exit.

Depending on the amount of water in the car, water pressure against the doors may make them difficult to open, but a window can be rolled down easily. If you are forced to break a window, give it a blow with a hard, sharp object.

CAR PASSENGER CODE

This code tells how car passengers can help make each trip a safe and pleasant one.

1. Help yourself by:
 - * always wearing your seat belt
 - * sitting down, so you won't be hurt if there is a sudden stop
 - * keeping your hands away from doorhandles, gear stick, ignition key, and driver
2. Help the driver by:
 - * sitting down, so you don't distract him
 - * looking out for road signs
 - * keeping the noise down
3. Help other passengers by:
 - * not teasing younger passengers
 - * not putting anything dangerous on the back ledge
 - * saving all litter until you can dispose properly, use litter bags
4. Help others on the road by:
 - * keeping arms and legs in the car while it is moving
 - * not throwing things out the window
 - * getting out of car on the side away from traffic

CAR GAMES

LICENSE LISTING - make a list of license plates spotted while on trip. See if anyone can name the state capitals.

SIGNS - players take turns looking for specific signs, such as railroad crossing sign, arrow on sign, no parking sign, church sign, ice cream sign, no vacancy sign, etc.

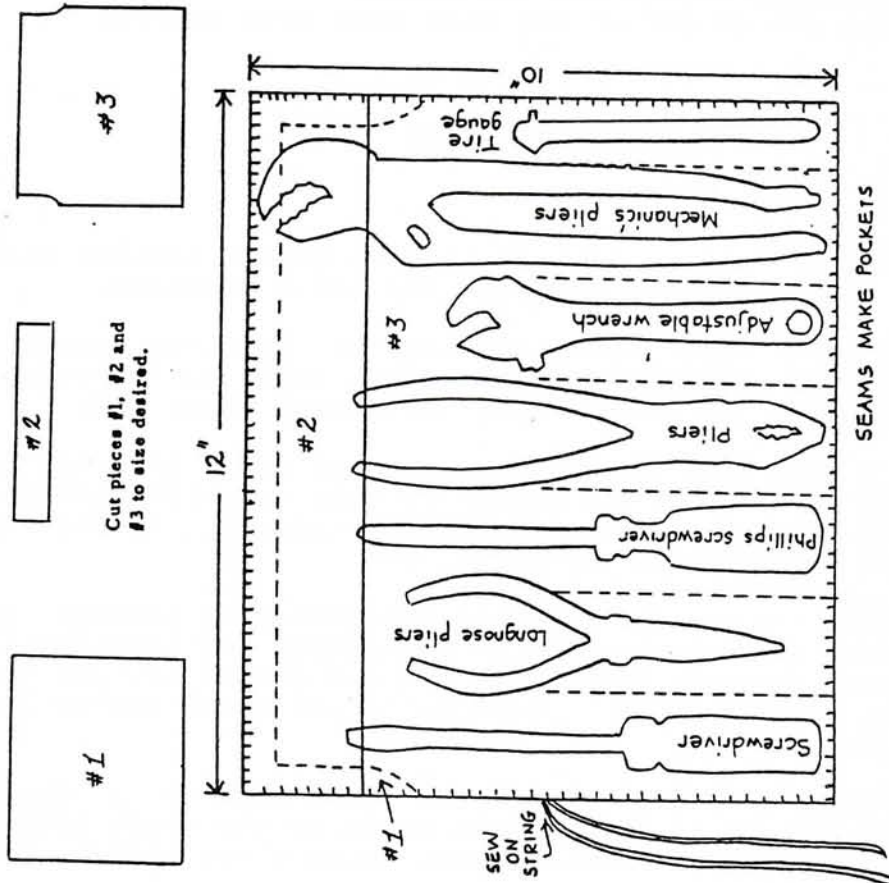
MAP GAME - give each player an identical map, see who is the fastest at finding the answer to such questions as: distance between cities, historic site locations, populations of cities, locations of airports, etc.

ALPHABET GAME - see who can find the different letters of the alphabet both frontwards or backwards, by locating letters on signs, license tags, etc. No two people may use the same letter on the signs. Each calls out their letter as they find it.

SPORTS WORDS - give each player the front page of a newspaper. The object is to find sports words on the front page. Ex: end, base, tackle, guard, pass, foul, kick, center, etc.

TRAVELER TOOL KIT

This handy carrier will fold up small but still carry a great many things useful for any kind of trip. This is an auto repair tool kit, but you can change the tools to make a bicycle kit or boat kit. Make from denim or canvas.



1. Sew #2 to #1
2. Sew #3 to #1
3. Make seams as desired

SAFE DRIVING TIPS FOR FAMILIES

Allow enough time so you don't feel rushed. On long trips allow time for frequent stops.

Have your car checked, tires, brakes, lights, turn signals, wipers, to insure proper functioning.

Use seat belts - they save lives.

Be alert to hazards - adjust driving speed accordingly.

Use courtesy abundantly - every where - at intersections, while being passed or passing, and at night with headlights.

Follow the rules of the road - signs, signals, and road markings for a safe enjoyable trip.

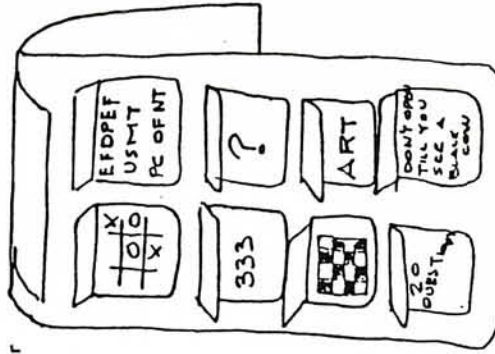
Have something for children to do while riding on a long trip. (see below)

SHOE BAG GAME KIT

Webelos Scouts can help prepare a shoe bag game kit to keep smaller children entertained in the back seat of a car. The bag is made from a piece of cloth long enough to hang over the front seat and provide 6 or more pockets containing surprises.

SUGGESTIONS:

- * Paper and pencil
- * crayons
- * color books, or activity books
- * magnetic checkerboard
- * tic-tac-toe game
- * blunt scissors
- * Small cars/dolls/toys/etc.
- * 20 questions game, car bingo,
- * A special one marked "Don't open till"



One important rule to follow is that players must put away the contents of one pocket before opening the next.



COMMUNICATOR ACTIVITY BADGE

All boys are communicating all day every day. This activity badge explores various methods of communication and the various ways we have of communicating.

We are all different. And it is o.k. to be different. By communicating with each other we find that we are more similar than we are more different. The Webelos Scout will learn to use his communication skills more effectively as he works on the various assignments for badge completion. Hopefully, he will also learn about himself as he learns how to introduce himself to groups or other individuals. Listening is an integral part of being an effective communicator. As the Webelos Scout learns to listen carefully to what is being said around him, he will become more skillful in his communication skills.

Our means of communications have mushroomed over the last 50 years. Where the newspaper was once the major way of spreading the news, now we have satellite connections, tv news, and computer linkages. These improvements have made events occurring half way around the world everyday knowledge for us. It is important for the developing Webelos Scout to learn to present his messages accurately and concisely. He will learn to interpret the information he is receiving from the world about him.

Den Activities:

1. Visit a tv or radio station and learn about these forms of communication.
2. Visit a newspaper and learn how a newspaper is produced.
3. Ask a drama teacher or actor to visit the den to talk about story telling.
4. Make posters to help publicize a school or pack event.
5. In a den meeting, have the boys practice introducing themselves to the group and introducing their denmates to each other.
6. Have a school counselor talk with the boys about body language and its meanings.
7. Ask a computer expert to visit the den and talk about this form of communication.

Related Boy Scout Merit Badge Books:

Communication - poster making, telephone communication, speech making, introductions, listening

Computer - history, programs, languages

Public Speaking - Speech preparation and delivery, audio-visual aid use

Printing Communication - various printing processes, linoleum block carving, screen process printing

Signaling - Morse, Semaphore codes, signaling devices

Boy Scout Communications Skill Book

We are all constantly in communications with each other in many ways. We can strengthen the boys understanding of communications with some challenging and fun activities.

SECRET CODES

A simple code which substitutes numbers for letters is made by building a square of 25 boxes into which the alphabet almost fits. The 26 letters of the alphabet can be fitted into 25 squares because some are used less often, and two such letters can be put together. When decoding, the other letters in the word will show which of the two letters to choose. The square with the alphabet in place looks like this:

| | | | | | |
|---|---|---|---|--------|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1 | A | B | C | D | E |
| 2 | F | G | H | I or J | K |
| 3 | L | M | N | O | P |
| 4 | Q | R | S | T | U |
| 5 | V | W | X | Y | Z |

With this system, the code number for A is 11 because it is in the first row, first column; for H, 23 (row 2, column 3); and for M 32. The row and column number identifies each letter. The code is a bit clumsy but it has been used with success. Here is a hidden message disguised as a grocery order.

| |
|---|
| <p>Joseph Bulochi & Sons, Grocers 48 Liberty Street Gentlemen; Please accept my order for the following and deliver at once: 43 cans best sardines @.15 33 boxes soap flakes @.14 23 large boxes napkins @.15 31 large cans peaches @.35</p> |
|---|

Can you find the message hidden in this simple 'order' to the grocer?

This isn't all there is to invented alphabet codes. There are still other ways to make them and still other types which include our most important, though not our most secret, codes.

MORE SECRET CODES

Rail Fence Code: This codes has been around almost as long as fences. It's quick to write and not so easy to untangle -- unless you know how.

Suppose you want to send the message LOUIS LIKES BEAN SOUP. Just drop every second letter down --

L U S I E B A S U
O I L K S E N O P

in a rail fence pattern. Then take the bottom line of letters and put them next to the top line of letters and you'll come up with: LUSIEBASU OILKSENOP. If you'd like to make it even more confusing, just break the letters up in any old way you want, like: LUISE BASUO ILK SENOP.

When your codes friend wants to find out what message is hidden in this strange sounding mass of letters, he just counts the number of letters in the message. This one has 18 letters, so he takes the last nine, like this:

L U S I E B A S U
O I L K S E N O P
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

Then he reads down, the way the arrows point, and comes up with your message 'Louie Likes Bean Soup'.

If your message has an odd number of letters, as in Hello John, you encode it the same way as we did the message above:

H L O O N
E L J H

It then comes out HLOON ELJH. Maybe, to make it more confusing, you decide to break it up into H LOON ELJH.

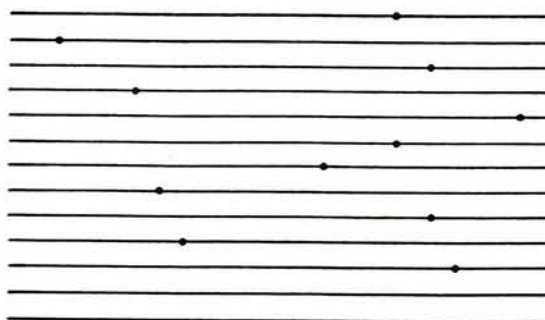
This time, when your friend decodes it, he finds that the secret message has an odd number of letters. This one has 9 letters, so he takes the first five and under them writes the last four letters, like this:

H L O O N
E L J H
↓ ↓ ↓ ↓ ↓

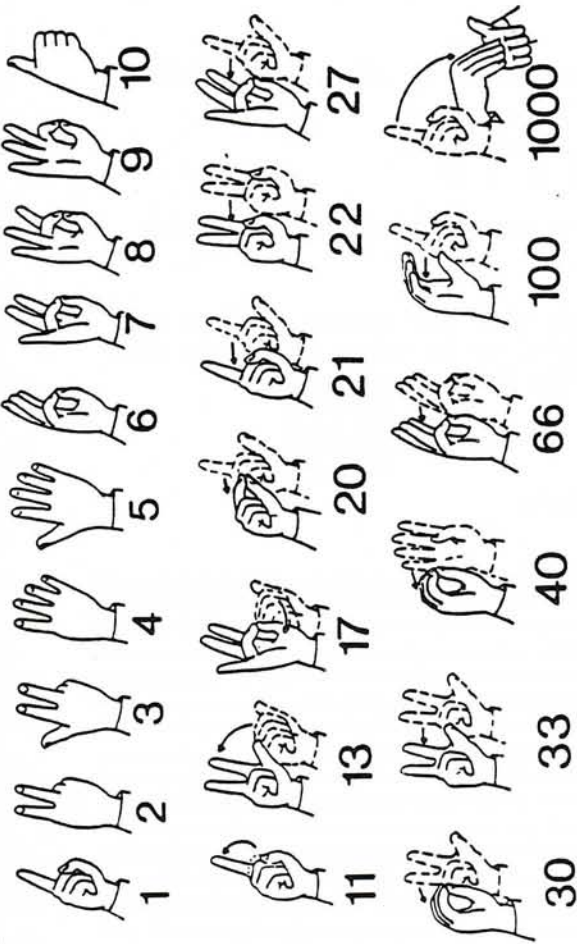
Then he reads the message by following the arrows.

Dot Code: For writing the dot code it's best to use line paper. On the top line write a mixed-up alphabet, with the letters evenly spaced across the sheet, as you see. (Can you figure out the message? It's something you're going to do right now.)

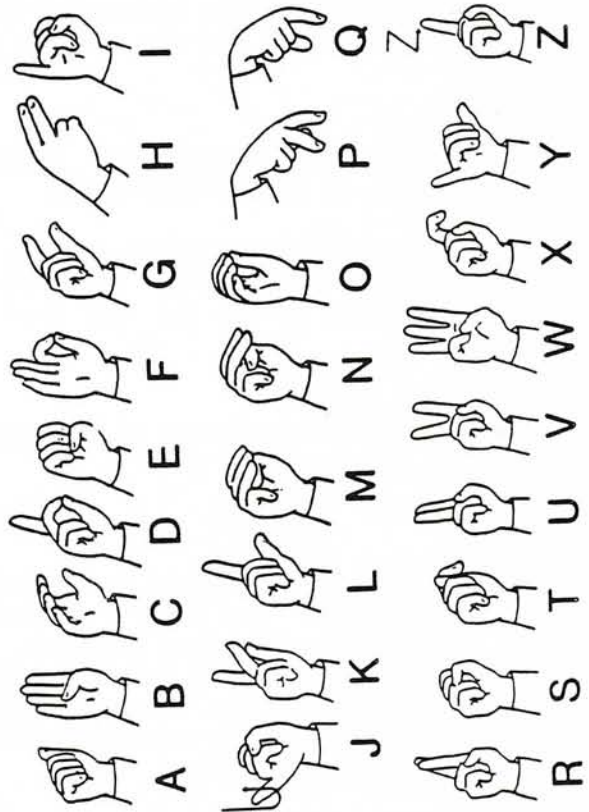
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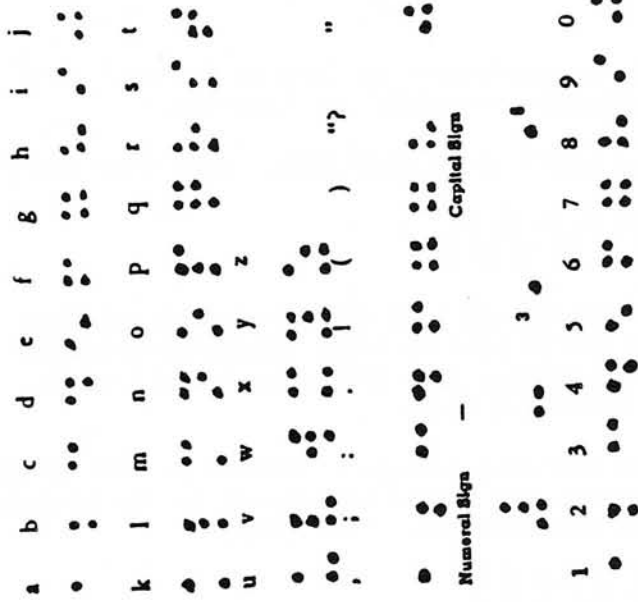
NUMBERS



THE AMERICAN MANUAL ALPHABET



Braille Alphabet and Numerals



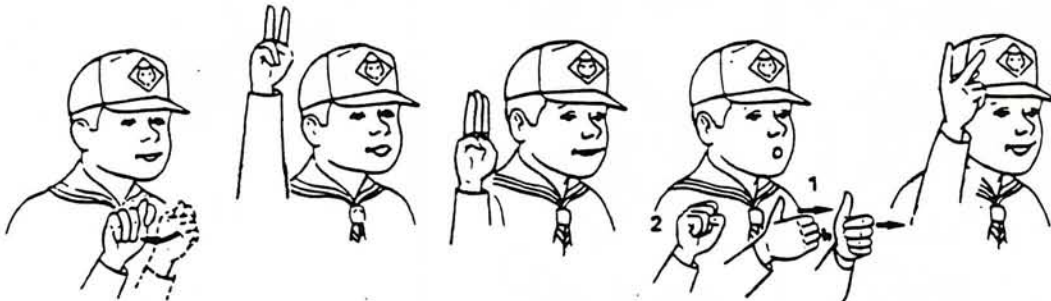
The six dots of the Braille cell are arranged and numbered thus:
 1 2 3 4 5 6
 The Capital sign, dot 6, placed before a letter, makes it a capital. The numeral sign, dots 3, 4, 5, 6, placed before a character makes it a figure and not a letter. The apostrophe, dot 3, like the other punctuation marks, is formed in lower part of the cell.

The braille alphabet and numerals, shown above, consist of a system of raised dots for touch reading and writing by the blind. Until a blind French student named Louis Braille developed this system, there was no adequate way of reading and writing to educate the blind, whom many thought uneducable. Because of the braille system, blind people all over the world can read and write.

The Law of the Pack



THE LAW OF THE PACK:



THE CUB SCOUT FOLLOWS AKELA



THE CUB SCOUT HELPS THE PACK GO

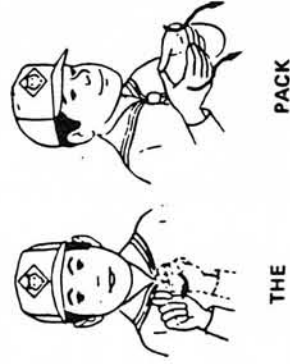
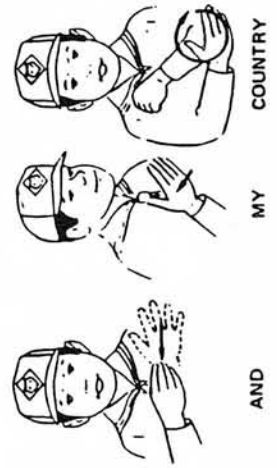
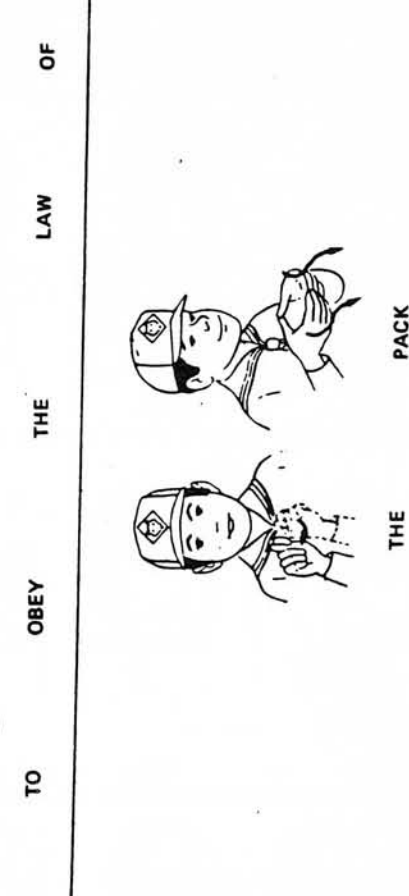
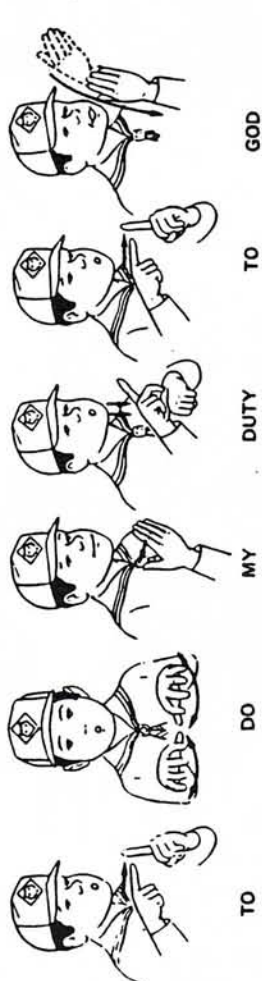
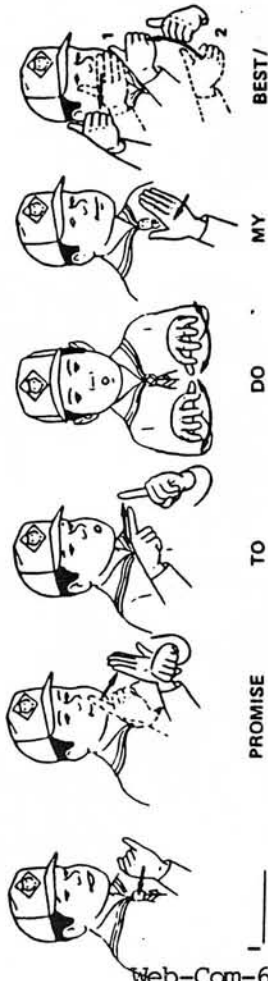
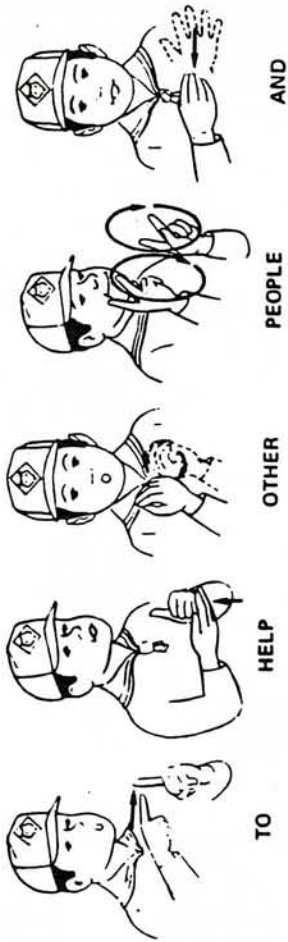
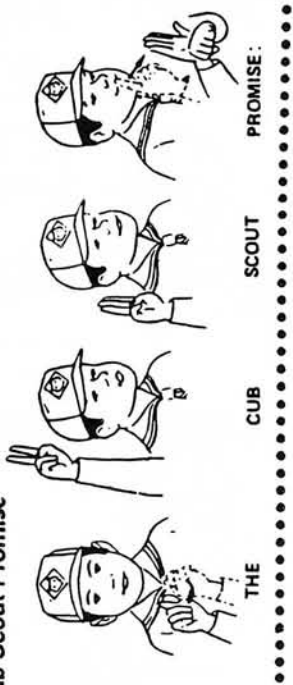


THE PACK HELPS THE CUB SCOUT GROW



THE CUB SCOUT GIVES GOODWILL

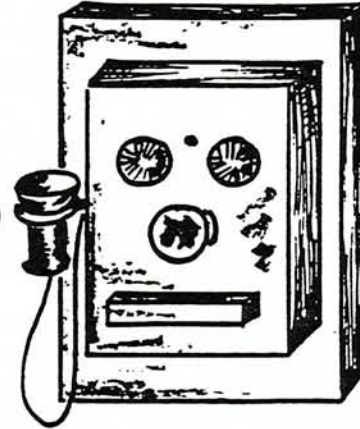
The Cub Scout Promise



TELEPHONE

Materials: 2 3/4" of 1/4" elastic
3 pieces of wood - 1/8" x 1 3/4" x 3"
 2 1/2" x 1 3/8" x 5/8"
 7/8" x 3/4" x 1/8"
(stain all three pieces of wood with a
walnut stain, wipe off excess, set to dry)

- 2 brass tacks
- 2 regular thumb tacks
- 2 small brass nails
- 2 black plastic push pins
- 1 metal electrical connector
- 3 1/2" black yarn
- 1/4" black plastic striped from electrical wire



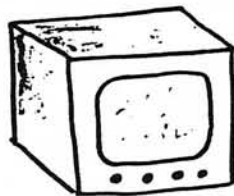
Drill a hole the size of round end of connector one-third of the way down on the left side of the thickest piece of wood. With pliers, pull out pin in one of the push pins. Den leader should use a hot nail and melt hole in the opposite end 1/8" deep. Glue one end of yarn in this hole. Insert other end of yarn and electrical connector together into hold previously drilled. Bend up prongs of metal connector slightly to hold the push pin which serves as the listening device.

Put 1/4" black plastic from wire onto brass nail. Nail 1/3" down on right side of wood. Bend nail 90° then 90° out from block of wood at 1/4" intervals to form a crank.

On face of the phone, nail second brass nail 1/2" down in center of wood with brass tacks on each side. Put second black push pin in center half way down in center of wood. Then glue smallest piece of wood 3/4" down from black push pin to make a shelf.

Glue phone box to the remaining back piece of wood. Make a ring from the elastic, overlapping 1/2". Attach to back one-third of the way down from top of the back piece with 2 thumb tacks (or hot glue gun).

(To make into a refrigerator magnet, glue strip of magnetic tape to back.)



There are so many ways we communicate with one another - books, newspapers, television - think of other means of communication and develop them in miniature to make tie slides.



SCIENTIST ACTIVITY BADGE

We are living in exciting times. Each day brings new explorations and discoveries in science. The scientist tries to learn the laws of nature that govern the how, why, and wherefore of the world about him so that these laws can be used by people to improve their living environment.

The Webelos Scout has been studying science in school and will probably have seen or participated in various scientific experiments. During this activity badge, the he will learn, as the scientist learns, how and why some of the laws of nature work. They will learn about some of the laws of physical science such as how airplanes fly, how the diving bell works, the effect of gravity on balance, and why the bicycle rider keeps going forward when he stops his bike suddenly. The Webelos Scout will learn from the interesting experiments as he performs them.

Many years ago, Jules Verne wrote Twenty Thousand Leagues Under the Sea describing the travels of an undersea craft called the Nautilus. Today, the U.S.S. Nautilus runs by nuclear power and travels around the world without surfacing for air. Indeed, none of the modern conveniences - the electric light, the automobile, the airplane, the telephone, radio and television - would have been possible without experimentation and the application of scientific knowledge.

Den Activities:

1. Make some optical illusions and show how the eyes converge.
2. Visit an eye specialist and learn how the eyes work.
3. Study fog and show how it is formed.
4. Have a slow-motion bicycle riding contest to illustrate balancing skills. Discuss the effect of gravity on objects and its effects on balance.
5. Demonstrate the formation of crystals by making rock candy using sugar and hot water with a string suspended into the solution until it cools.
6. Visit an airport; ask an expert explain flight principles.
7. Visit the National Weather Station and learn about weather formation. Contact Chuck Terrell - 254-2048. Or invite a weather expert to visit the den meeting.

Related Boy Scout Merit Badge Books

Aviation - Bernoulli's principle and explanation, air pressure and density

General Science - fog and precipitation experiment, making crystals, Bernoulli's principle and experiments, bouyancy and density of fluids

Geology - drawings of different kinds of crystals

Weather - air pressure description, making a simple barometer

FOG MAKING MACHINE

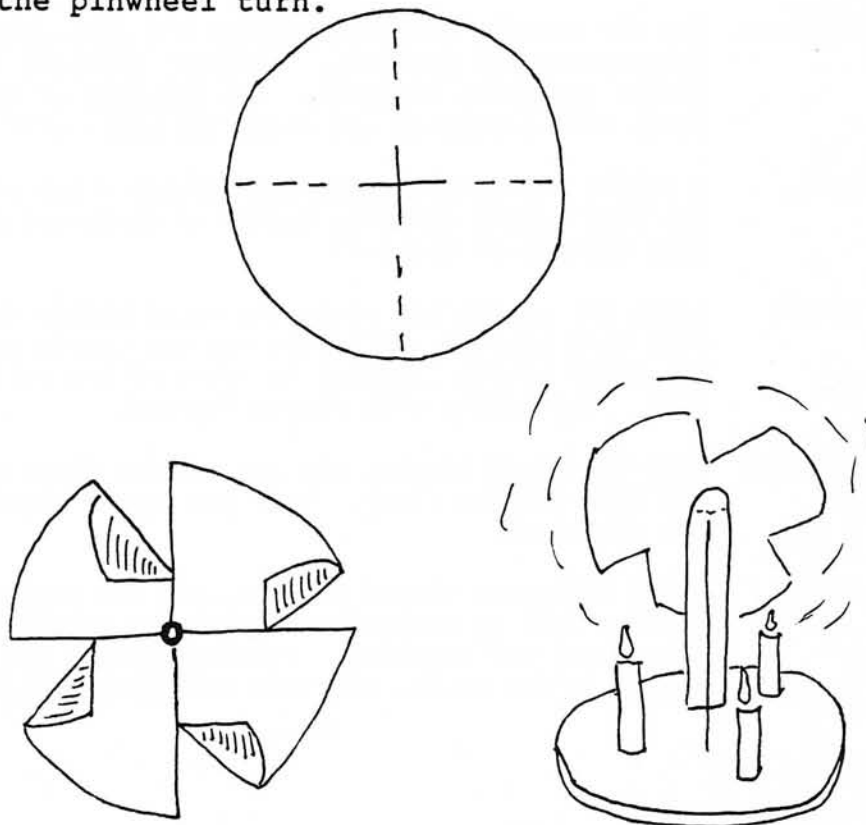
Materials: plain gallon glass jug, stopper to fit jug, bicycle pump, small amount of water or alcohol

Put a small amount of water or alcohol in the jug. Bore a hole through the stopper and put in mouth of jug. Hold end of bicycle pump over the hole and pump air into the jug. After a few strokes of the pump, remove the stopper quickly. There will be a loud pop and you will see a cloud form in the jug. To get 'fair weather', replace parts and pump air back in. Cloud formed because temperature was raised, making it possible for air to hold more moisture. When top was removed, the air expanded and cooled. This cool air could not hold as much moisture, thereby forming cloud.

ENERGY FROM A CANDLE

Materials: Aluminum foil pan, soft clay, long pencil with point, three candles about 4" long, pyrex test tube, 10" square of aluminum foil and a pair of scissors.

Put a wad of clay in the middle of the pan and stick the pencil with the point up in the clay. Put 3 more wads of clay about 3" from the middle, and put a candle in each one. Next, make a pinwheel of aluminum foil. Turn it upside down and fit it over the tube. Slip the tube over the pencil. Test it make sure the tube spins freely. Light the candles and watch the pinwheel turn.



BERNOULLI'S PRINCIPLE

The following experiments are listed in the order that requirements appear in the Webelos Scout book.

1. **Materials:** A ping-pong ball, some adhesive tape, 1 ft. thread or string and a faucet.
What to Do: Fix the string to the ping-pong ball with tape. Turn on the water to form a steady stream. While holding onto the string, flip the ball into the water from a few inches away. Not only will the ball stay with the string at an angle, but you can draw the ball up the stream almost to the faucet.
What happens: The water, streaming around one side of the ball, exerts less pressure than the air which surrounds the other side. Even though you can feel the resistance of the water as you draw the ball upward, the air pressure is still stronger, as the experiment proves.
2. **Materials:** Two ping-pong balls, two feet of thread, some mending tape and a drinking straw.
What to Do: Tape each ball to an end of the thread and hold the center of the string so that the balls dangle about 1 ft. below your fingers and about one or two inches apart. Have the boys blow through a straw exactly between the balls, from a distance of a few inches. Instead of being repelled, they will be attracted.
What happens: The air current directed between the ping-pong balls reduces the intervening air pressure. Stronger pressure from the far sides pushes the balls together. The strength of the air from the straw will determine how close the balls will come.
3. **Materials:** A candle and candlestick; two bottles - one with rounded corners, one with square corners; (metal or cardboard containers can be used instead of bottles)
What to Do: Light the candle and place the round bottle in front of it. Blow hard against the bottle and the candle will go out. Place the other bottle (square) in front of the relit candle and blow hard. The candle will remain lighted.
What happens: With the round bottle, the air current flows around the bottle and puts out the flame. With the square bottle, the air currents are dispersed.
Next step: Using different shaped bottles, and two ping-pong balls on strings, place a ball on opposite sides of the bottle so that they are close, but not touching. Blowing against the bottle at right angles to the balls, one ball will come closer to the bottle and

(continued)

the other will move away. The shape of the bottle will determine the way the balls move due to the ease with which the air currents move around the bottle. This is the principle that supports airplanes.

PASCAL'S LAW

1. **Materials:** Coke bottle, balloon, vinegar, baking soda.
What to Do: Place about 1/4 cup baking soda in the coke bottle. Pour about 1/4 cup vinegar into the balloon. Fit the top of the balloon over the top of the bottle, and flip the balloon so that the vinegar goes into the bottle. The gas formed from the mixture will blow the balloon up so that it will stand upright on the bottle and begin to expand.
What happens: The baking soda and vinegar produce CO_2 , which pushes equally in all directions. The balloon, which can expand with pressure, will do so.
2. **Materials:** A medicine dropper; a tall jar, well filled with water; a sheet of rubber which can be cut from a balloon; a rubber band.
What to Do: Dip the medicine dropper on the water and press the rubber bulb so the dropper is partly filled. Test the dropper in a jar - if it starts to sink, eject a few drops from it until finally it floats with the top of the bulb almost submerged. Now, cap the jar with the sheet of rubber and fix the rubber band around the edges so that the jar is airtight. Push the rubber downward with your finger and the upright dropper will sink. Relax your finger and the dropper will rise.
What happens: You have prepared a scientific device known as a "Cartesian Diver". The downward pressure on the rubber forces the water up into the bottom of the diver, compressing the air above it, producing the effects of sinking, suspension and floating, according to the degree of the pressure.
3. **Materials:** Large tin can, tape, water
What to Do: Punch three holes in the can, one near the top, one in the middle and one near the bottom. Tape the holes closed. Fill the can with water to the top. Pull the strips of tape off and measure the length of the streams. The bottom stream will go the farthest due to the added pressure of the air and the water in the can.
What happens: The total pressure in a container of water is the sum of the air pressure and the water pressure at that point.

4. Materials: A rubber balloon, several pins with large heads, a roll of plastic tape.

What to Do: Inflate the balloon and affix little squares of plastic tape to it. Stick each pin through the center of the tape and to your amazement, the balloon will not burst. When you remove the pins, the balloon still will not burst.

What happens: The adhesive substance on the tape acts like a self-sealing automobile tire, adhering to the pin as it is pressed inward. When the pin is removed, the adhesive is forced outward by the air pressure from within the balloon, automatically sealing the tiny pinholes.

BALANCE

1. Materials Three baseball bats of similar size.

What to Do: Point the handles of the bats together so they form a "Y". Slide the handle of the lower bat over the handle of the bat to the left. Slide the handle of the bat to the right under the of the bat on the left and over the handle of the lower bat. The bats should form a low solid stool.

What happens: Due to the interlocking arrangement, each bat supports another, making a simple experiment not only in balance, but also in structural engineering.

(This experiment can also be done with three knives with the blades being the handles; or three pieces of wood of the same general shape)

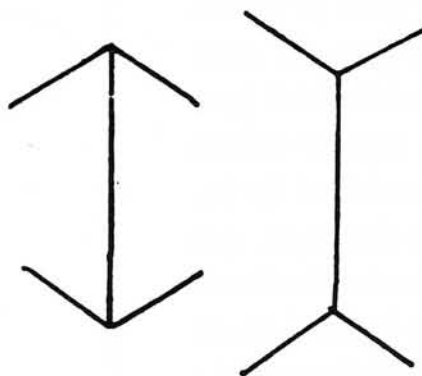
2. Materials Two table forks, a drinking glass, a coin chosen for its size

What to Do: Point the prongs of the forks in an inward direction and thrust them together so that the forks are interlocked. Press a coin between the upper prongs from the inner side. Rest the coin on the far side of the glass rim so the handles of the forks extend in your direction. By properly adjusting the forks, you can make the coin balance on its side, keeping the forks balanced with it.

What happens: The handles of the forks serve as a counter balance for the coin and prongs. Precarious though it looks, it is like adjusting weights on ordinary scales - the only difference being the weight of materials used.

OPTICAL ILLUSION

1. **Materials:** Two curved pieces of cardboard; one red and one blue.
What to Do: Set the red cut-out above the blue, and the blue will look larger than the red. Transpose them, and the red will appear larger and the blue.
What happens: Due to the curve of the cut-outs, they produce an optical illusion when one is placed above the other. Always, the lower cut-out will look larger. So, by switching their positions, first the blue and then the red will seem larger.
2. **Materials:** A sheet of paper about 11 inches long.
What to Do: Roll the paper into a tube one inch in diameter. Hold the tube to your right eye and place the side of your left hand against the middle of the tube, with your left palm directly toward your left eye. Keep both eyes open as you look through the tube and you will "see through" your left hand.
What happens: Since one eye is looking through the tube and the other is looking at the hand, the two views blend to form an optical illusion of a hole in the center of your left palm. A slight shifting of the tube may improve the illusion.



INERTIA

"Inertia is the tendency of a thing at rest to remain at rest and a thing in motion to continue in the same straight line."

1. Get a small stick about 10 inches in length and the diameter of a pencil. Fold a newspaper and place it near the edge of a table. Place the stick under the newspaper on the table and let about half the stick extend over the edge of the table. Strike the stick sharply with another stick. Inertia should cause the stick on the table to break into two parts.
2. Get a fresh egg and a hard-boiled egg. Give each of them a spinning motion in a soup dish. Observe that the hard-boiled egg spins longer. The inertia of the fluid contents of the fresh egg brings it to rest sooner.

BAROMETER

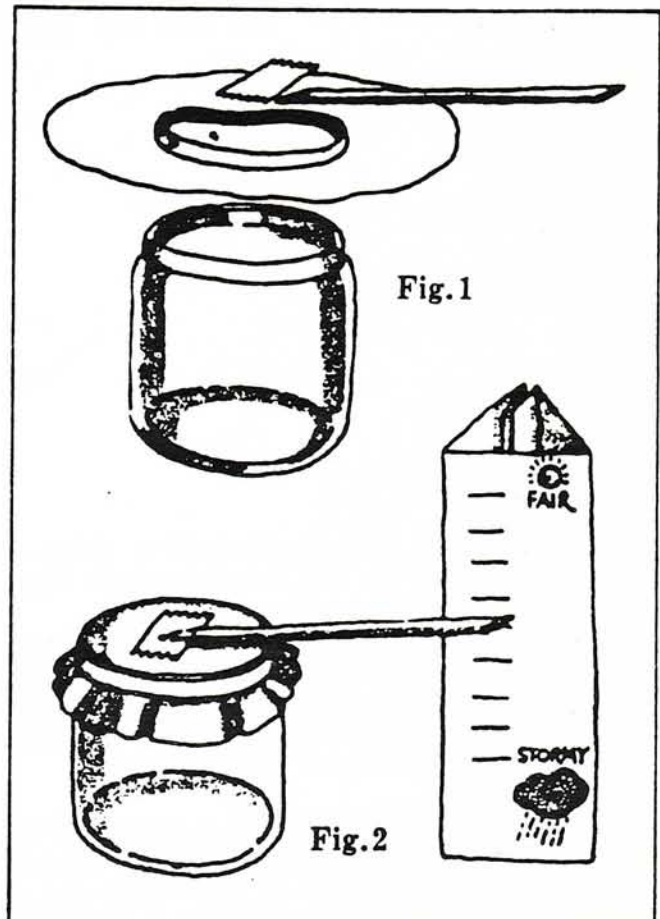
To predict a change in the weather, a weatherman needs to know the temperature, the wind direction, and what the weather is like in nearby and faraway places. But most important of all, he needs a BAROMETER to measure the air pressure—the forces of the air pressing against the earth. Change in air pressure is one of the best predictors of the weather that's soon to arrive—rain, snow, wind, sun, or clouds. A BAROMETER will give you a clue to tomorrow's temperature too. If the air pressure goes up, the temperature will probably go down; if the air pressure goes down, the temperature probably will rise.

MATERIALS glass jar; balloon; rubber bands; drinking straw; tape; paper

TOOLS scissors; ruler; pencil

Get a medium to large size glass jar with a wide mouth. Peanut butter jars are good. Wash out the jar and remove the label (you won't need the lid). Cut a piece of balloon large enough to fit over the mouth of the jar. Stretch the balloon smooth and tight, and hold it in place with one or two rubber bands around the top of the jar. The inside of the jar should now be airtight. "Point" the ends of a drinking straw by cutting them as shown in Fig. 1. With a small piece of tape, fasten one end of the straw to the center of the balloon. The BAROMETER is finished, but you will need a chart to read the air pressure changes indicated by the movement of the pointer straw. Fold and tape a piece of paper into a triangular tube so that it will stand by itself and be a few inches taller than the jar, Fig. 2. Put the chart next to—but not touching—the pointer. Mark a small pencil line on the chart

next to the tip of the pointer, and write the weather condition outside at that moment—stormy, rainy, cloudy, or sunny—opposite it. Check the position of the pointer once or twice a day to see if it has moved up or down. Each time it does move, put another line on the chart and write in the weather. After you have made some sunny and rainy marks on the chart, you will be able to predict the weather with reasonable accuracy. Just check in which direction the pointer is moving—towards sunny or stormy. To make certain that your predictions are as accurate as possible, you should put the BAROMETER in a place where the temperature doesn't change too much or too fast. (Don't put it on a radiator or by a window.) Can you figure out what makes the pointer go up or down? Look in a science book, or ask your teacher.

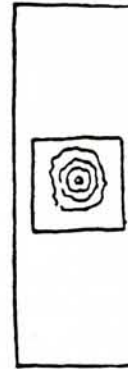


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MICROSCOPE SLIDE TIE SLIDE

Materials: 1" x 3" x 1/8" clear plexiglass slide
3/4" x 3/4" slide covers
Sharpie markers
Plastic pipe

Smooth corners of slide and polish on wet-dry emory paper. Let the boy draw a scientific glob (germ, cells, blood) on the slide. Glue the cover over the blob. Epoxy the pipe on the center back for the neckerchief to go through.



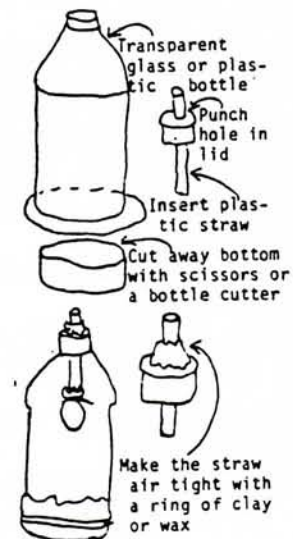
MODEL LUNG

Use a transparent plastic bottle. Punch a hole in the lid. Insert a plastic straw in the lid. Make the straw air tight by using a ring of clay or wax.

Cut away the bottom of the bottle with scissors. Cut open a large balloon into a plastic sheet. Place the sheet under the bottom of the cut bottle. Attach it to the bottom of the bottle with a rubber band. Stretch the balloon (diaphragm) tight.

Attach a small balloon (lung) to the bottom of the straw. Put the lid on the bottle.

Push the diaphragm and feel the air rush out the top. Watch the lung contract...relax...contract. Now check your own diaphragm. How is it going? Why can't you exhale when you close your nose and mouth?



MATCHSTICK PULSE METER

Your pulse can be converted to a visual display. Roll a ball of clay about the size of a dime. Stick a wooden match (or a thumb-tack base can be used) into the ball. Place it on your wrist. Shift it around until you find the spot with the strongest beat. Impress your friends, tell them you have made a device to test cardiac beat frequency. Ask if you can try it out on them.





FITNESS ACTIVITY BADGE

When we hear the word "fitness" it gives us the image of a healthy body. For each one of us to keep our bodies in good shape, we have to overcome a lot of temptations. The Athlete Activity Badge stresses health through physical activity. The Fitness Activity Badge is designed to inform Webelos Scouts against the harmful habits in life. This badge warns us to guard against the effects of tobacco, drugs, and alcohol. It also teaches us to help our bodies with proper diet and exercise.

In working through the requirements of this badge, the Webelos Scout will be encouraged to say "No" to drugs and alcohol. The boys are never too young to be educated to the daily temptations that could confront them in their everyday lives. Fitness is both mental, moral, and physical. Fitness is for all of us.

Den Activities:

1. Invite a registered nurse or other health-related person to visit den and talk about the harmful effects of tobacco and alcohol.
2. Contact a local anti-smoking group or anti-drug group and ask a representative to come speak and/or show a film.
3. Invite a school dietician to visit the den and talk about a balanced diet.
4. Visit a fitness center or have someone visit den and give a talk on exercise and take the den through some aerobic exercises.
5. Establish an exercise routine and chart it for a period of time.
6. Contact an anti-alcohol group and ask them to send a representative to speak about alcohol abuse.

Related Boy Scout Merit Badge Books:

Dentistry - Tooth composition, oral hygiene, dental careers.

Personal Fitness - Overall fitness, basic health facts, including drug and alcohol abuse, health habits, fitness exercises.

Sports - Fitness training in sports.

Boy Scout Physical Fitness Skill Book

DRUGS

A drug is a substance that people take into their bodies to change the way they think or feel. You may have already seen some of the effects of alcohol, the most widely used drug of all. Almost any drug you take can affect your reaction times, your ability to make judgments, and your ability to coordinate your movements. One of the things that we have heard a lot about is the effect of drugs, especially alcohol, on driving.

DEPRESSANTS are drugs that slow down the body's processes. Alcohol is a depressant, and so are barbiturates and tranquilizers. The general effect of a depressant is to calm and to relieve anxiety. Like alcohol, however, any depressant can affect judgment, decrease alertness, and slow reactions.

STIMULANTS are drugs that speed up the body's processes. Amphetamines, sometimes called "speed" are a class of drugs that are powerful stimulants. Amphetamines can prevent sleep, and for this reason people who feel that they need to stay awake for a long time might unwisely use them; like long distance drivers. These drugs can affect vision and impair the ability to make judgments. In large doses, amphetamines make some people hallucinate - that is see or hear things that exist only in their imaginations.

The effects of marijuana on a person's abilities are similar to those produced by alcohol. Marijuana smokers also have more trouble than other people in adjusting their eyes to glaring light. This could be very hazardous in driving. Even small amounts of the drug may affect the perception of time and space. Large amounts may induce hallucinations.

Other drugs, including those you can buy over the counter and those your doctor prescribes, also may affect you. Headache and cold remedies may make a person dizzy or sleepy. Antihistamines, prescribed to relieve the symptoms of hay fever and allergies, may cause double vision, nervousness, or a lack of coordination. Many drugs have unexpected side effects when combined with alcohol. For this reason, if any alcohol has been used, other drugs should not be taken.

DRUG KNOWLEDGE

Write the one word from the list below that best fits each numbered blank.

impair
feel
dizzy
depressants

marijuanas
reactions
stimulants
hallucinate

think
alcohol

A drug is a substance that people take into their bodies in order to change the way they (1)_____ or (2)_____. (3)_____ are drugs that slow the body's functions. (4)_____, the most widely used of all drugs, is an example. Depressants can affect judgment and slow (5)_____. Amphetamines and other strong (6)_____ speed up the body's functions. Like depressants, these drugs may (7)_____ a person's ability to make judgments. In large doses, amphetamines make some people (8)_____ - that is, see or hear things that are not really there. Other drugs, including (9)_____, over the counter medicines, and prescription medicines, can also affect a person's ability to drive. Headache and cold remedies can make a diver (10)_____ or sleepy.

Snacking Around on Snacks

Is snacking really bad for you? Well, yes and no. The real problem isn't when you snack. It's what you eat when you do snack. "Americans are big" snackers. "We spend \$2.4 billion a year, on such snack foods as soda, other sweetened drinks, potato chips, pretzels, buttered popcorn, and corn chips. Many snack foods have a lot of fat, calories, and salt or sugar in them — and very few other important nutrients. And that's the problem. The same goes for cookies and candy bars.

When you fill up on these snacks, you don't have room in your stomach for the other foods you need. And if you do eat the other foods you need — plus these snacks — you'll probably end up with too many calories and too much sugar and salt.

So what can you do? Well, the next time you feel like snacking on something, try some fresh juicy fruits or a glass of cold milk. Another good snack idea is raw carrots, peppers, and cucumbers — or a cottage cheese fruit sundae. You probably won't hear anyone complaining about your snacking around on those foods! ☐

Fats:

A Little Goes A Long Way

Fats are the most compact source of energy. One way we measure energy is by the number of calories. And an ounce of fat, for instance, has more than twice the number of calories as an ounce of either proteins or carbohydrates.

Fat does more than provide calories. It carries four important vitamins throughout your body. They are called the "fat-soluble" vitamins. (We'll talk about them later.) But there are problems with fat. Many scientists think Americans eat too much fat.

First, fat is fattening. So if you eat a lot of fatty foods — like potato chips, french fries, fatty meats, frosted cakes and cream pies — you may be getting more calories than you need for energy. And you can guess what happens then! You get fat!

Secondly, scientists think that eating too much fat over a lifetime is linked to some very serious diseases that you may get as you grow older — like heart disease, strokes, some kinds of cancer and high blood pressure. Maybe you know somebody who has these problems.

Fats are found in such foods as whole milk, cheese, nuts and seeds, and meats. Fats are also found in the skin of poultry, certain fatty fish, like the bluefish or mackerel, and avocados and olives. But fats

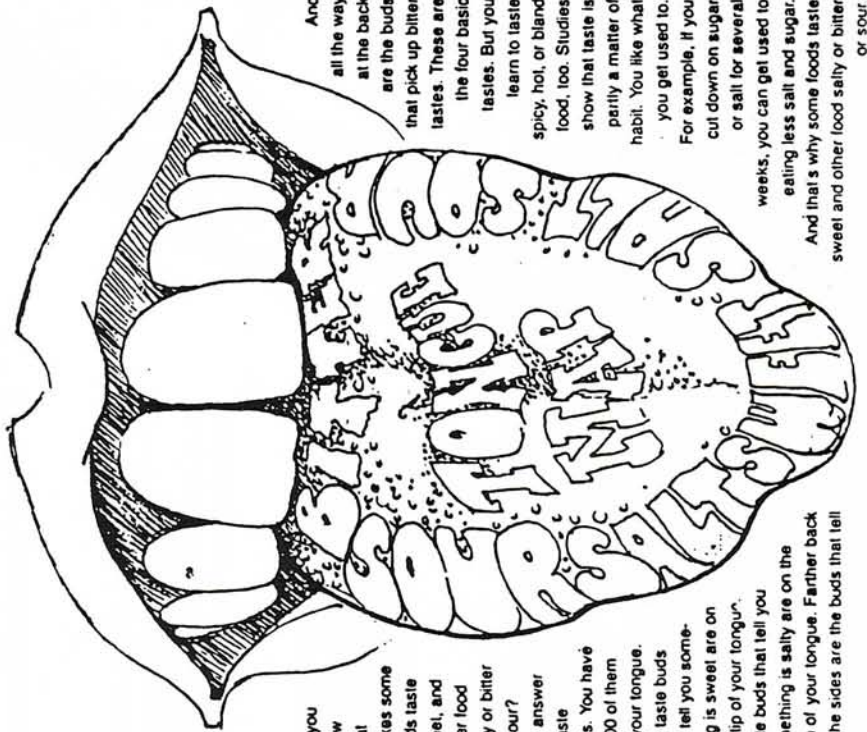
are also often added to prepared foods, such as fried foods, cakes, candies, cookies, frosting, gravies, sauces, and salad dressings.

Picking Out the Fats

Do you know when you're eating fats? Many times it's obvious, like when you're eating butter or fried foods.

But sometimes you need to look for the following words on a food label: shortening, margarine, lard, hydrogenated vegetable or salad oil, coconut oil, and corn oil.

How's It Taste?



Do you know what makes some foods taste sour, salty or bitter or sour?

The answer is taste buds. You have 9,000 of them on your tongue. The taste buds that tell you something is sweet are on the tip of your tongue.

Taste buds that tell you something is salty are on the side of your tongue. Farther back on the sides are the buds that tell

And all the way at the back are the buds that pick up bitter tastes. These are the four basic tastes. But you learn to taste spicy, hot, or bland food, too. Studies show that taste is partly a matter of habit. You like what you get used to.

For example, if you cut down on sugar or salt for several weeks, you can get used to eating less salt and sugar. And that's why some foods taste sweet and other food salty or bitter or sour.

And that's why some foods taste sweet and other food salty or bitter or sour.





Minerals: For Teeth, Bones and Health

Minerals are essential to your health, even though you need only small amounts of each.

The 20 known minerals can be divided into four groups:

- 1.** Minerals which are part of bones: calcium, magnesium, phosphorus and fluorine.
- 2.** Minerals that regulate body fluids: sodium, potassium and chlorine.
- 3.** Minerals that are needed to make special materials the cells need to do their work: iron and iodine.
- 4.** Trace elements, or minerals, needed in tiny amounts — traces. They trigger chemical reactions in the body that are essential for good health. ▶

A Needed for good vision, healthy skin, strong bones, and wound healing.
Found in yellow, orange, and green vegetables; yellow fruits; and in the fat of animal products like fish, milk, eggs, and liver.

B Needed for using protein, fat, carbohydrates; for keeping eyes, skin, and mouth healthy; for development work of the brain; and for the nervous system.
Found in many foods such as whole grain and enriched cereals and breads, meats and beans.

C Needed for wound healing; for development of blood vessels, bones, teeth, and other tissues; and for minerals to be used by the body.
Found in food like citrus fruits, melons, berries, leafy green vegetables, broccoli, cabbage, and spinach.

D Needed for using calcium and phosphorus to build strong bones and teeth. It's a vitamin your skin produces when getting sunshine.
Found in fatty fish, liver, eggs, butter; added to most milk.

E Helps preserve the cell tissues.
It is found in a wide variety of foods, and most people get enough.
Vegetable oils and whole grain cereals are especially rich sources.

K Needed for normal blood clotting.
Found in dark green leafy vegetables; peas, cauliflower, and in whole grains.
It's also made in our bodies.

Vitamin A

B Vitamins

Vitamin C

Web-Fit

Vitamin D

Vitamin E

Vitamin K

Protein: Your Body's Building Blocks

Nearly everything in your body is made up of protein. This includes your hair, bones, muscles, teeth — even your brain.

The protein you eat gets broken down and built back up into all these parts of your body. You need protein to build cells and to repair them. As much as 3 to 5 percent of the protein in your body is replaced each day. Red blood cells live for only about 120 days. Cells in the lining of your small intestine get worn out in a few days and have to be replaced. So you're really not the kid you were even a few weeks ago.

There are certain times of life when you need extra protein — like now when you are growing, or when you're recovering from injury. When you get older, and as your growth slows, you will need less protein.

What foods have protein? Most people think first of meat, fish and chicken. But milk, nuts, cheese, peanut butter, eggs, beans, and grains also have protein.

But you don't have to worry about getting enough protein. Most of us in this country get much more than we need.

Completing the Protein Picture

Proteins are not all alike. They vary in the number of building blocks they have for your cells to use. Therefore you should eat a variety of protein foods in order to keep your cells growing and working right.

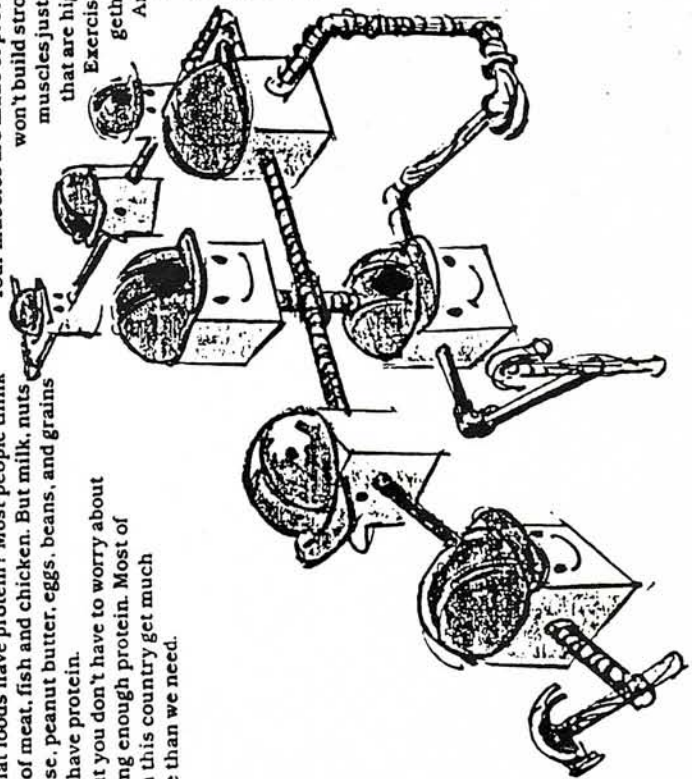
Most people in the world get their proteins from two or more sources.

Mexican people, for example, eat red beans and corn meal tortillas; Chinese people soybean cakes and rice; Arabic people eat chickpeas and cracked wheat. You eat peanut butter sandwiches, for example, or cereal and milk, or macaroni and cheese. These foods not only taste good together, they work together for you in your body.

Building the Next Mr. America

Your muscles are made of protein. But you won't build stronger or bigger muscles just by eating foods that are high in protein.

Exercise and food together build muscles. And if you eat a lot of extra protein without exercising, that protein will be turned into fat. And who needs that?



Vitamins: For Good Health

Vitamins are very tricky chemicals. They don't give us energy. But we do need them in the right amounts for our cells to do their work. Some vitamins help to make blood cells.

hormones, and the regulating substances you need all the time. Other vitamins help you use other nutrients. Most of us get all the vitamins we need from our food nowadays, because we eat a variety of food.

There are about 13 vitamins that are absolutely necessary for good health. Four are called fat-soluble vitamins because — you guessed it — they dissolve in fat. These are vitamins A, D, E, and K. They are digested and absorbed with the help of fats from the diet.

These vitamins can be stored in your body for long periods of time, mostly in fatty tissue and in the liver. Because they can be stored for long periods, you don't need to eat foods every day containing these vitamins.

Nine other vitamins are called water-soluble. They include eight B vitamins, and vitamin C. These vitamins aren't stored in your body very long, so you need to eat foods that are good sources of these vitamins every day.

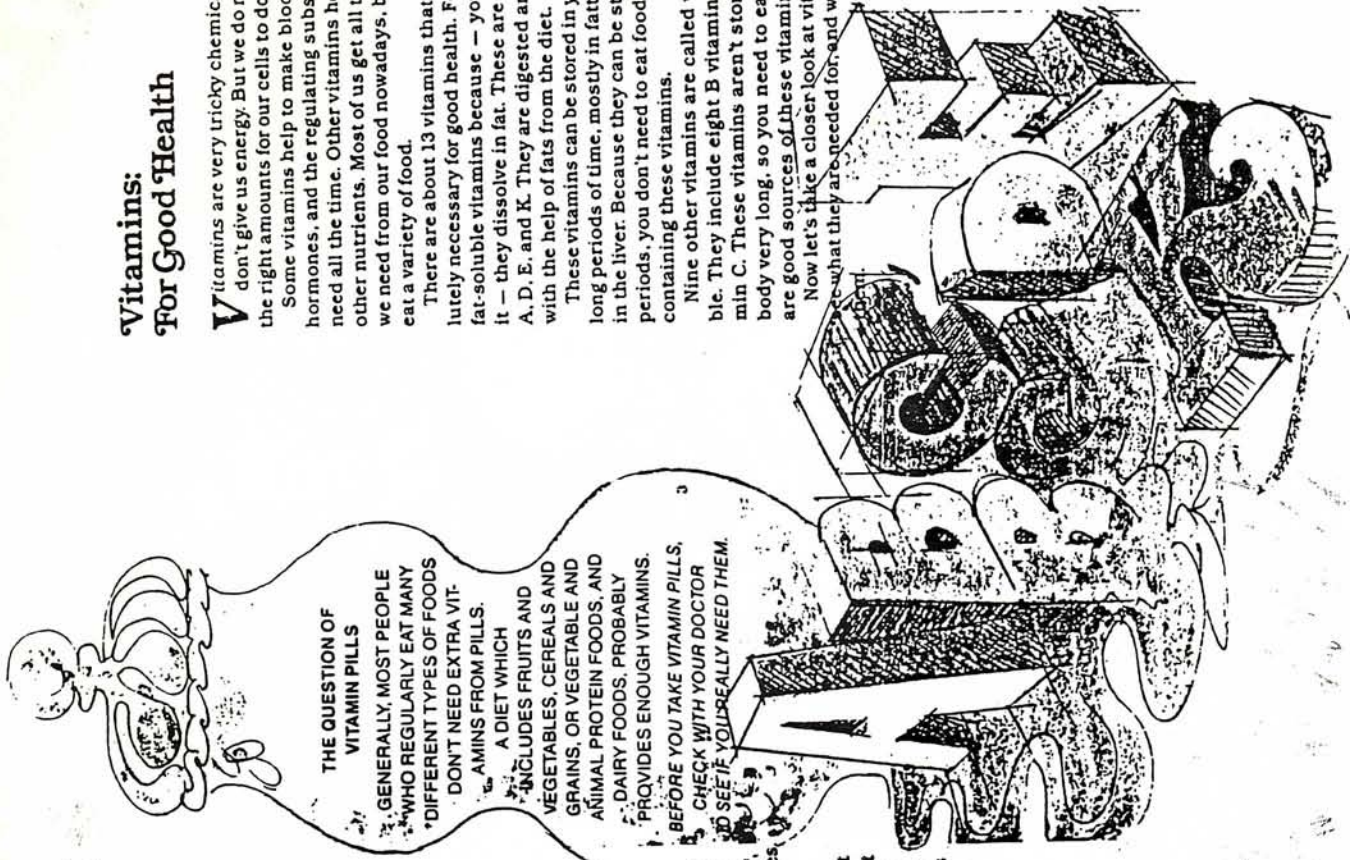
Now let's take a closer look at vitamins. We'll see what they are needed for, and where you get

THE QUESTION OF VITAMIN PILLS

GENERALLY, MOST PEOPLE WHO REGULARLY EAT MANY DIFFERENT TYPES OF FOODS DON'T NEED EXTRA VITAMINS FROM PILLS.

A DIET WHICH INCLUDES FRUITS AND VEGETABLES, CEREALS AND GRAINS, OR VEGETABLE AND ANIMAL PROTEIN FOODS, AND DAIRY FOODS, PROBABLY PROVIDES ENOUGH VITAMINS.

BEFORE YOU TAKE VITAMIN PILLS, CHECK WITH YOUR DOCTOR TO SEE IF YOU REALLY NEED THEM.



Carbohydrates For Energy

What kind of food do you think of when you hear the word carbohydrates?

If you're like most people, you probably think of corn on the cob, or baked potatoes, or spaghetti, or breads. And you're right.

But what about celery or a peach or table sugar? Did you know these foods are also made of carbohydrates? It's true.

The fact is that there are three different kinds of carbohydrates:

- Sugars are called simple carbohydrates. They are found naturally in foods like fruit, milk and some vegetables like beets and peas. Refined sugars from sugar cane and sugar beets are added to foods like candy, soda, cakes and ice cream.

- Starches, which are one type of complex carbohydrates, are found in foods like bread, potatoes, rice, and vegetables.

- And fiber, which is also a complex carbohydrate, is found in the walls of plant cells, the tough, structural parts of plants, like the stringy part of celery or the bran of wheat and other cereals. And even though humans can't digest fiber, it plays an important role.

It helps move the other food through the body, and then helps the body get rid of wastes left over from digestion. Some people

also think that fiber helps you feel full without eating too many calories and that it helps you to keep healthy and well.

But of the three kinds of carbohydrates, starches have been the main part of people's diets for as far back as anyone can remember. And that's true even today. In Asia, for example, rice is the main part of every meal.

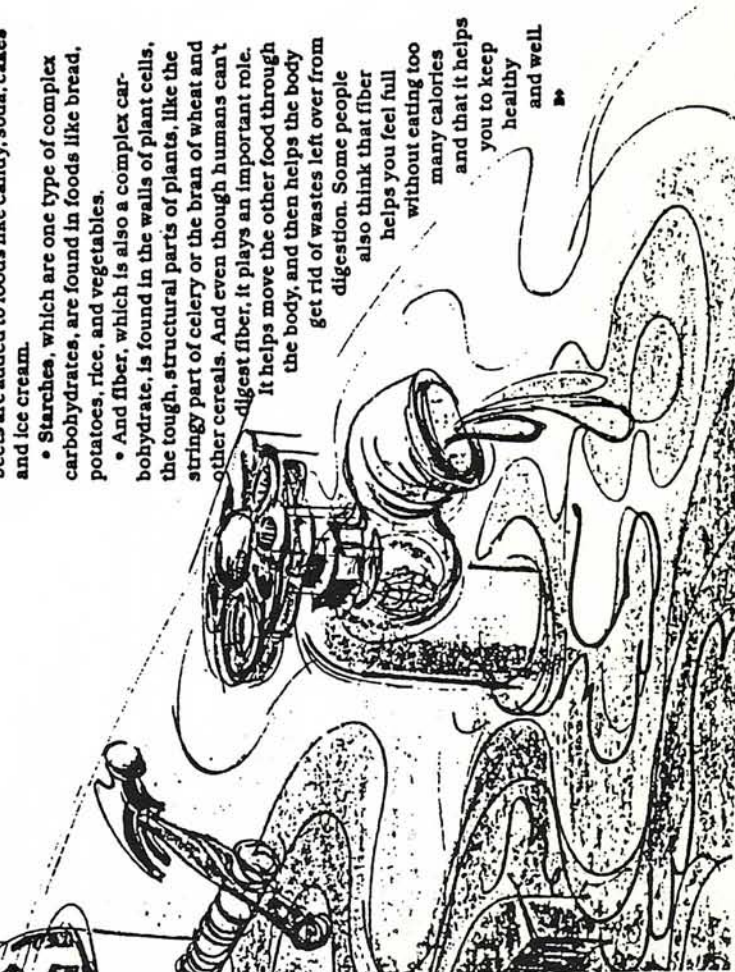
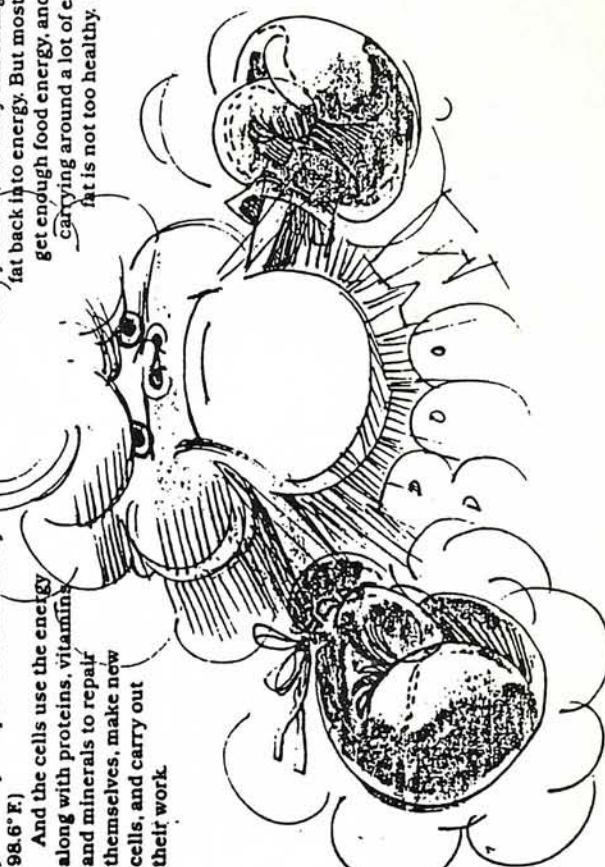
Carbohydrates are your main source of energy. Here's how that works. As carbohydrates enter your body, your body changes the starches and sugar to glucose. Glucose is like gasoline for a car. It provides fuel for your cells.

This fuel burns in the cell. And even though it doesn't produce a flame, it does produce energy and heat. (That's one reason why your body temperature is normally 98.6° F.)

And the cells use the energy along with proteins, vitamins and minerals to repair themselves, make new cells, and carry out their work.

Whenever you eat more carbohydrates than your body needs, two things happen. A little of that extra glucose gets changed into another substance. This is called glycogen. Your body stores the glycogen for when you need extra energy — like when you decide to race your brother to the corner grocery store. Your body then changes the glycogen back into glucose so that it can send it to the cells to use for energy. (You only have about one pound of glycogen in storage at any one time.)

But most of the extra glucose from the food you eat gets changed into fat. Your body stores fat almost everywhere. And when you really need it, the body can change that fat back into energy. But most of us get enough food energy, and carrying around a lot of extra fat is not too healthy.



1. Bone Minerals

Bone mineral: calcium, magnesium, phosphorus and fluorine.

Calcium is the mineral we need the most. Calcium makes bones and teeth strong and sturdy and is found in milk products.

Magnesium helps bones and muscles do their work, and helps turn food into energy. It also helps the body use certain vitamins. You get this mineral in nuts, seeds, dark green vegetables, and whole grain products.

Phosphorus works with calcium in making bone and teeth. Phosphorus is very plentiful in a typical American diet.

Fluorine is also important for strong bones and teeth. It helps prevent cavities. It is found in seafood and in some plants. But many of us get our supply from the fluorine added to drinking water.

2. Fluid Regulating Minerals

These minerals include sodium, potassium, and chlorine:

More than half your body is water. And these minerals help keep the right amounts of water inside the cells — while keeping the rest out.

3. Material Makers

Minerals that make materials: These minerals include iron, iodine, and sulfur:

Iron carries oxygen in your blood. The best sources of iron are meats (especially liver). But foods from some plants — like beans, green leafy vegetables, and grains — are good sources of iron, especially when eaten along with foods rich in vitamin C. An example is drinking some orange juice with your whole wheat toast in the morning. The vitamin C helps your body absorb iron better.

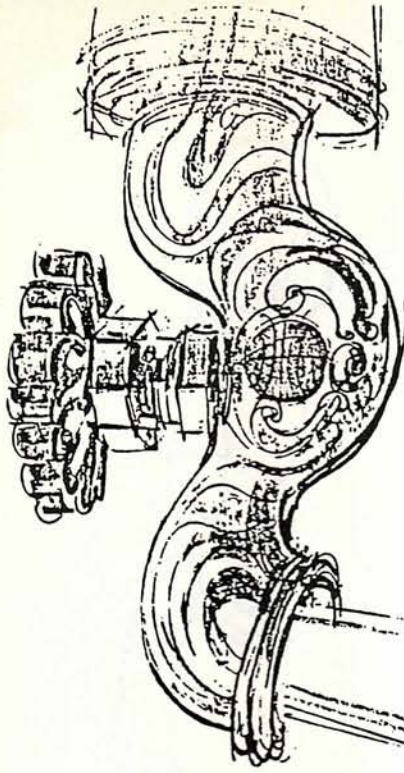
Iodine is needed to make a hormone produced by the thyroid gland, which controls growth. Many years ago people worried about getting a disease called goiter, because they didn't get enough iodine. But now we don't worry because iodine is added to salt.

4. Trace Elements

There are more than 17 trace minerals. Zinc and copper are two examples.

Zinc helps you grow, taste, make proteins, and heal wounds. You get zinc in whole grain bread and cereals, beans, meats, shellfish, eggs, and in many more foods.

Copper, along with iron, is important for healthy red blood cells. It also helps build muscles. Good sources are fish and meats, as well as nuts, raisins, oils, and grains. *



Water: For Life

Water? You probably didn't even think it was food at all. But it is. And it's a nutrient, too. Water is the most important food of all. You can survive for weeks without a single bite of food. But you can only live for a few days without water.

Your body is more than half water. Your blood, for instance, is 90 percent water. Your brain is 75 percent water. And there is water in every one of your cells.

Water carries nutrients to all your cells. It carries wastes away. It keeps your body at just the right temperature.

You lose about 2 1/2 quarts of water a day. Some is lost as urine. Some as perspiration. Some when you breathe. (Ever clean your glasses?)

But water is usually easy to replace. Every time you eat food, you eat water, and water is a by-product of the cells' work.

Can you think of foods that contain a lot of water? You probably guessed tomatoes, oranges, and watermelon. But do you know that bread is more than one-third water?

Meat is more than half water. Milk and juice are nearly all water — plus natural flavoring and nutrients.

So those are the nutrients — carbohydrates, protein, fats, vitamins, minerals, and water. They come from the food you eat and they make you what you are. □

