

SHAC Day Camp Program



V.1.0

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Overview

(Guide for Day Camp Chairs and Program Directors)

Day Camp is an organized program conducted by the council under certified leadership. Day Camp is “the camp that comes to the boy.” Sites are located in districts around the council convenient for maximum participation by Scouts (Camping and Outdoor Program Guide, page 6). Day Camp has a direct impact on Sam Houston Area Council’s Strategic Plan and on District and Council Journey to Excellence (JTE) goals:



Cub Scout Camping: Increase the percentage of Cub Scouts attending day camp, family camp, and/or resident camp

Cub Scout Advancement: Increase the percentage of Cub Scouts earning rank advancements.

Youth Retention: Improve retention rate of traditional members.

Membership/Youth Growth: Increase number of registered youth.

Projects developed are based on Scouting literature (i.e., Cub Scout Handbooks, How-To Book, Webelos’ Leader Guide) in order to be age appropriate, advancement based and easily implemented by current and future camp Program Directors delivering the program across the Council. Each Day Camp should offer a minimum of the following for each rank:

Six to Ten 45 minute Craft/Skills Sessions (or equivalent time equaling approximately 270 minutes)

Two (2) Field or Indoor Sports as permitted by facility

Shooting Sports (Archery, BBs, Wrist Rockets) as permitted by facility.

The 270 minutes of Craft and Skills that are to be offered are outlined in this document. Choose the number of Craft and Skills Sessions based on the amount of time your camp has to deliver the program. The delivery and instruction method is left up to the individual camp as long as it covers the outlined achievements for that specific rank along with the Projects/Crafts during the sessions.

Field Sports offered are left up to the discretion of each Camp depending on facilities available. Shooting Sports (i.e., BBs, Archery, Wrist Rockets) are highly encouraged as Cubs may only participate in these activities at a District/Council event but again, are left up to the discretion of the Camp depending on facilities available. If a Camp needs to fill more time, use the provided program aide materials to enhance the topic in the advancements listed, but do not add or change from what is listed.

BEAR PROGRAM



Bear Adventure: Bear Claws

Complete 1-3

Craft - 2 carvings (soap or soapstone)



Requirement and What you will need

1. Learn about three common designs of pocket knives.

- Pocket knives or pictures of pocket knives

2. Learn knife safety and earn your Whittling Chip.

- Whittling Chip

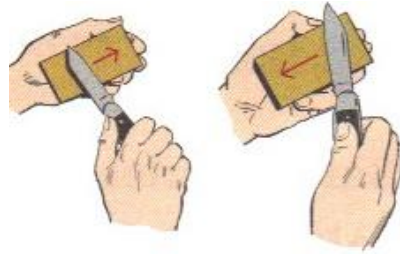
Your Cub Scout knife is an important tool. You can do many things with its blades. The cutting blade is the one you will use most of the time. With it you can make shavings and chips and carve all kinds of things. You must be very careful and alert when you whittle or carve. Take good care of your knife. Always remember that a knife is a tool, not a toy. Use it with care so that you don't hurt yourself or ruin what you are carving.

Knives are usually used as tools, but they can be weapons, too. Many places, such as schools, prohibit knives. To be sure you never take a knife where they are banned, always keep your knife at home unless your parent or guardian and den leader tell you otherwise.

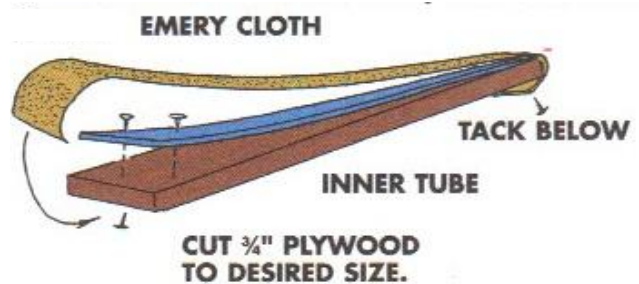
Safety Rules

- A knife is a tool, not a toy.
- Know how to sharpen a knife. A sharp knife is safe because it is less likely to slip and cut you.
- Keep the blade clean.
- Never carry an open pocketknife.
- When you are not using your knife, close it and put it away.
- Keep your knife dry.
- When you are using the cutting blade, do not try to make big shavings or chips. Easy does it.
- Make a safety circle: Before you pick up your knife to use it, stretch your arm out and turn in a circle. If you can't touch anyone else, it is safe to use your knife.

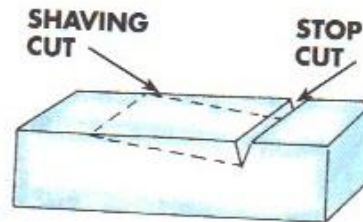
Sharpening a Knife. Lay the blade on a sharpening stone as though you were going to shave a thin sliver from the stone. Push the blade forward. Turn the blade over and shave the stone toward you. It is not necessary to push down hard. Continue this back-and-forth action until the edge is sharp along its whole length.



Sharpening Stick: If you don't have a sharpening stone, you can use a sharpening stick. Look at the picture to see how to make one. Cover a piece of plywood with a piece of inner tube. Tack it down. Cover the inner tube with emery cloth and tack it down as shown.



Shavings and Chips: You don't have to be strong to whittle and carve, but you do have to be smart. Take it easy. Make a lot of small shavings cuts. Here is the secret: Before you make a shaving cut, make a stop cut. At the place you want the shaving to stop, cut straight down with your knife. Press down and rock the blade back and forth until the cut is as deep as you want the shaving to go. Then make the shaving cut into it and lift away the shaving.



Whittling Chip

Read, understand, and promise to abide by the Knives Are Not Toys guidelines and the Pocketknife Pledge.

Knives Are Not Toys

- Close the blade with the palm of your hand.
- Be careful that you do not cut yourself or any person nearby.
- Never use a knife on something that will dull or break it.
- Never use a knife to strip the bark from a tree.
- Do not carve your initials into anything that does not belong to you.

Pocketknife Pledge

In return for the privilege of carrying a pocketknife to designated Cub Scout functions, I agree to the following:

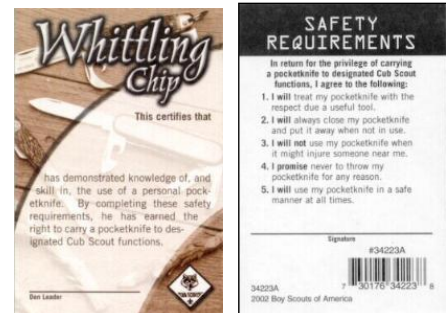
I will treat my pocketknife with the respect due a useful tool.

I will always close my pocketknife and put it away when not in use.

I will not use my pocketknife when it might injure someone near me.

I promise never to throw my pocketknife for any reason.

I will use my pocketknife in a safe manner at all times.



- Wolves, Bears, and Webelos can **only** carry or use a knife at scout functions under the following conditions:

They have earned the Whittling Chip Card and have it in their possession

And the Leader in charge gives permission

And the Parent (or Guardian) gives permission

- You can lose your Whittling Chip Card under the following circumstances:

For each minor violation of the knife safety rules, one corner of the Whittling Chip Card will be cut; if all four corners are cut, you lose the Card and must re-earn it.

Any major violations of the knife safety rules (e.g., cutting yourself or someone else, throwing a knife) will result in the immediate lose of the Card and you must re-earn it.

- Always cut away from you, never toward you.
- When you are using the cutting blade, do not try to make big shavings or chips.

Learn & use the "Safety Circle."

Learn & use the "make eye contact" method of handing a knife to someone else.

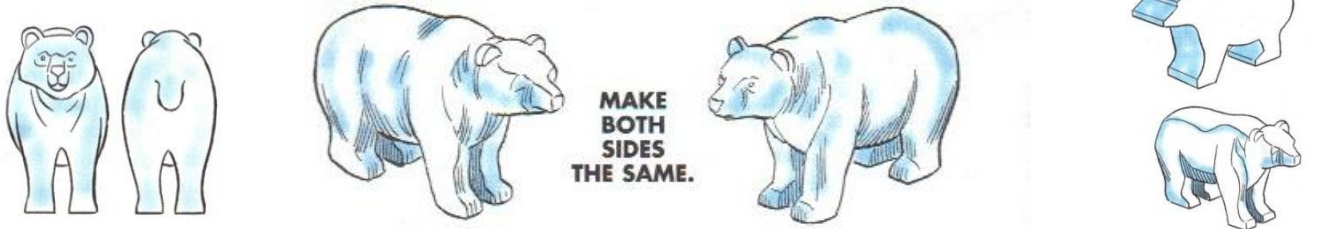
3. Using a pocketknife, carve two items

Item 1 – Ivory Soap

- Ivory Soap Bars – other soap is too hard and will crumble so avoid
- Plastic Knives

Instructions:

Eskimos carve beautiful animals from walrus ivory. They make seals, bears, dogs, and people. You can make a carving of a bear that looks like an Eskimo carving. Carve it out of soap.



Item 2 – Soap Stone

- Pocket knife
- Soap stones
- Files and Rasps
- 200 grit sandpaper



Carve Using Soapstone

Lightly sketch out your design on your stone, using a pencil.

Shape your sculpture with rasps and files of various sizes. These tools are used primarily for smoothing other types of stones but can be used to form shapes in a soft material like soapstone.

Apply a wet/dry sand paper to your soapstone. Start with a 200 grit paper and work up to a grit in the range of 600.

Heat your kitchen oven to 200 degrees F to warm your sculpture before polishing. Ten to 15 minutes is sufficient.

Rub furniture wax into your warmed soapstone, using a soft cloth. If you want some areas to appear darker than others, apply more wax to those sections.

Buff until you achieve the level of shine you prefer.



Bear Elective Adventure: Baloo the Builder

Complete 1-4

Craft

Tool box (Scout Shop 7046)

Mosaic Box (S&S WD50X12)

Requirement and What you will need

1. Discover which hand tools are the best ones to have in your tool box.

Learn the rules for using these tools safely. Practice with at least four of these tools before beginning a project.

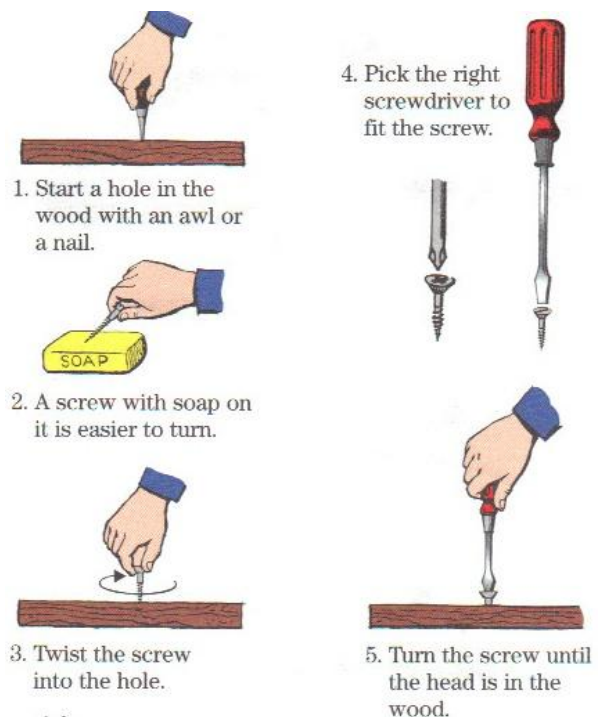
Note: Power tools are not appropriate for use by Cub Scouts. Review the Age-Appropriate Guidelines for Scouting activities (www.scouting.org/HealthandSafety/Resources/AgeAppropriateGuidelines).

Materials:

- Pliers
- Philips head screwdriver
- Standard screwdriver
- Hammer
- Three more tools (such as C-clamp, coping saw, claw hammer, hacksaw, file, plane, adjustable wrench, awl, hand saw)
- Philips head screws
- Standard screws
- Nails (suggest small and/or thick nails for easier hammer)
- Boards for nailing (and removal of nails)
- Soap for screwing (and removal of screws)
- Safety glasses

Hint: Set up 4 stations (naming tools, using pliers, using screwdriver, and use a hammer) that the Bears can rotate through as a round robin style.

Have boards and screws ready, one setup for each Cub. Show how to put soap on a screw to make it easier to drive. If they are having trouble turning them, go ahead and drill pilot holes for the screws



How to use a hammer properly.

Slip-joint pliers

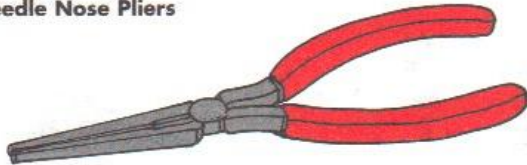


Slip the joint this way for small jobs.

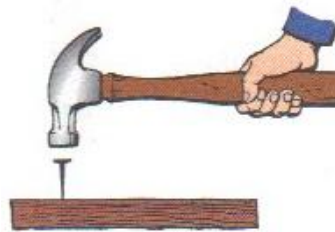


Slip the joint this way for big jobs.

Needle Nose Pliers



These are used to hold very small parts.



Tap a nail to get it started.



Lift up the hammer and drop it on the nail. Let the hammer do the work.



Push

If you bend the nail, pull it out this way.



Block of wood



Handsaw for straight cuts in wood

C-clamp to hold things in place



Coping saw for cutting curves in wood



Claw hammer to drive nails and pull them out



Hacksaw to cut metal



Awl to punch holes



File to smooth metal



Plane to smooth wood



Adjustable wrench to turn bolts or nuts

2. Learn the steps of planning a building project and how to read the instructions or drawings.
Have the boys read

3. Select and build one useful project and one fun project using wood.

First Project Option : Make a Toolbox

Materials:

- Handybox Woodcraft Kit from the Scout Shop
- Hammer
- Wood Glue (Optional)

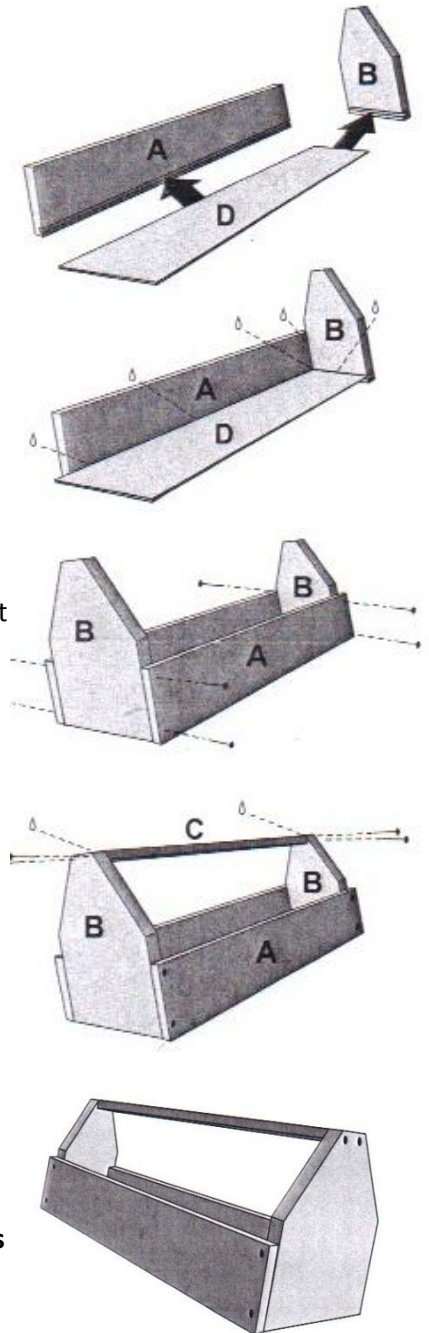
Kit includes precut wood parts. Measures 11 ½" X 5" X 3 ½"

1. Check all parts for proper placement. For best results, sand and paint before assembly..

2. Assemble D to A and B, glue A, B and D together as shown.

3. Nail both sides A to both sides B as shown; make sure that they are all flush at the bottom.

4. Nail and glue the handle C to the top of both pieces B.



Note – the nails that come with the project bend. Either substitute better nails that you buy from the hardware store or use wood glue to assemble (use masking tape to hold it together while it dries if needed)

Second Project Option: Pinewood Derby Stand

Materials:

- 1"x4" for the base
- 2"x4" for the upright
- 1"x2" for the top to hold the car.
- Four wood screws
- Paint or stain
- Paint brushes
- Water to clean brushes
- Bowl to hold paint



Instructions:

1. Cut the 1"x4" to make a base 6" long.
2. Cut the 1"x2" to make a 4" top on which the car will rest.
3. Cut the 2"x4" into a 4" upright. One end will be a square cut. The other end will be at a slight angle.
4. Use two screws each to attach base and top to upright.
5. Paint or stain.



Third Project Option: Recipe Card Holder

Materials:

- Wood base
- Wood upright
- 2 wood screws
- Screwdriver
- Clothes pin
- Wood glue
- Decorations, optional



Preparation: Adult cuts upright piece of wood before camp.

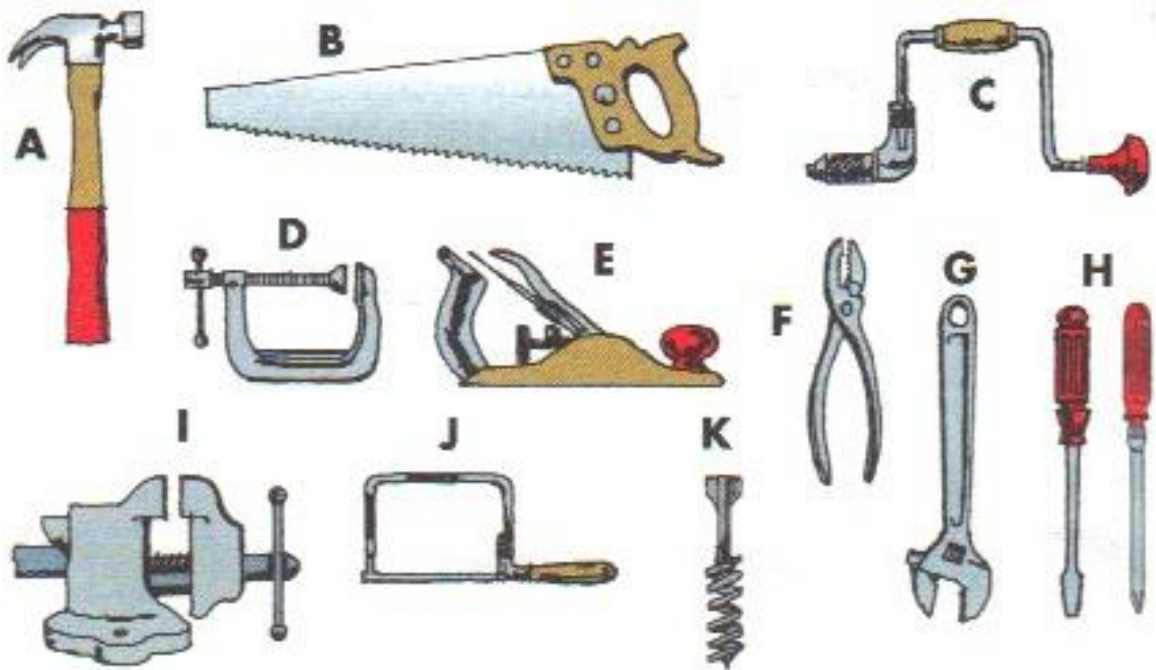
Instructions: Use one or two screws to attach the upright to the base and use wood glue (or equivalent) to attach clothes pin to upright. Paint or decoupage.

4. [Learn how to finish a wood project.](#)

Sand and use wood stain or poly to finish your projects. You can also have the boys paint it or decoupage it like the recipe card holder shows.

Other Supporting Material

TOOLS



- ___ HAMMER. Used for driving nails, for prying boards apart, and for pulling nails.
- ___ SCREWDRIVER. Sets screws.
- ___ PLIERS. Slip-joint pliers have wide and normal jaw openings to grip things of different sizes. (Don't use pliers on nuts-use a crescent wrench instead.)
- ___ HAND SAW. There are two kinds: one for crosscutting, and another for ripping lengthwise along the grain of wood.
- ___ COPING SAW. Lets you cut curves.
- ___ CRESCENT WRENCH. This open-end wrench can be adjusted to fit many sizes or nuts.
- ___ DRILL BIT. Corkscrew-shaped drills are called drill bits. They are used to drill holes in wood.
- ___ HAND DRILL. Uses drill bits to bore holes in wood and metal.
- ___ CLAMP. Holds pieces of wood together after gluing
- ___ WOOD PLANE. Smoothes rough boards.
- ___ BENCH VISE. Holds wood in place for sawing or planing.



Bear Elective Adventure: Make It Move

Complete 1-4

Craft

Exploding Stick reaction
Rube Goldberg from recycled stuff

Requirements and What you will need

1. Create an “exploding” (Cobra Weave) craft stick reaction.

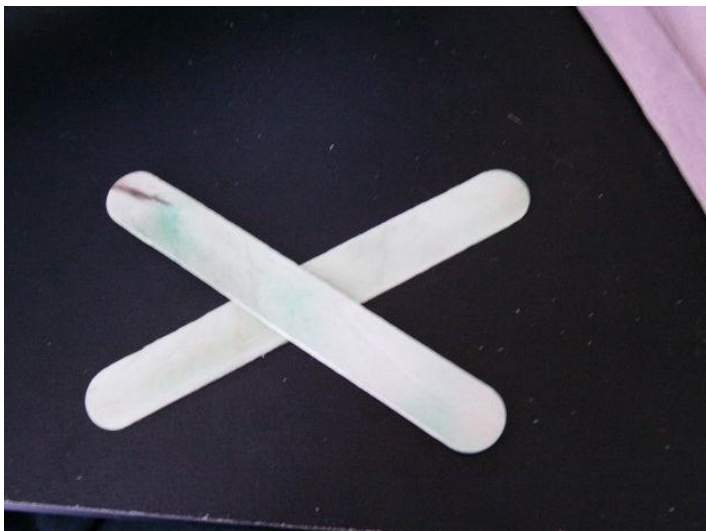
Step 1: Materials



-a
-
-

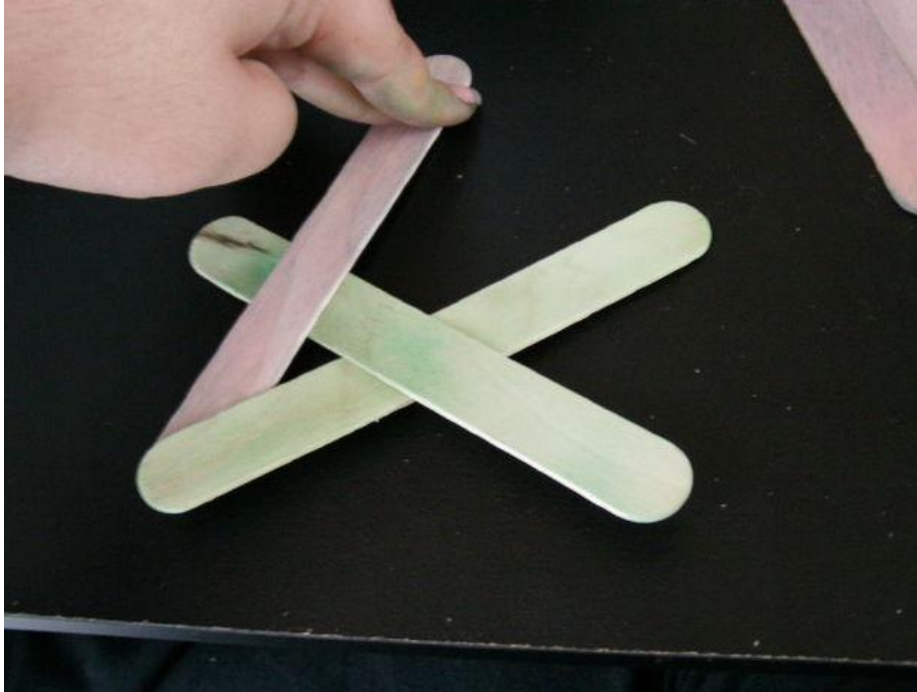
What you need:
big ol' pile of popsicle sticks
string (optional)
your hands and maybe a buddy's hands too

Step 2:



Cross two sticks into an "x" shape like in the picture. You want it to be a little slantly so that there are two obtuse and two acute angles. The stick on top will be stick 1 and the stick on bottom will be stick 2, see picture for note.

Step 3:



Add a Stick 3 by tucking one end under the end of Stick 2. The new stick should go over Stick 1.

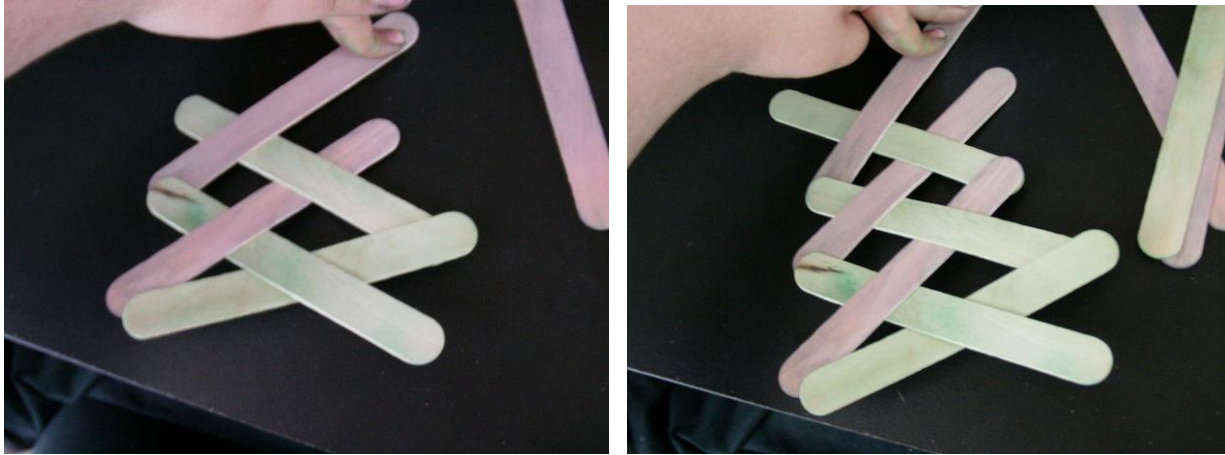
Step 4:



the

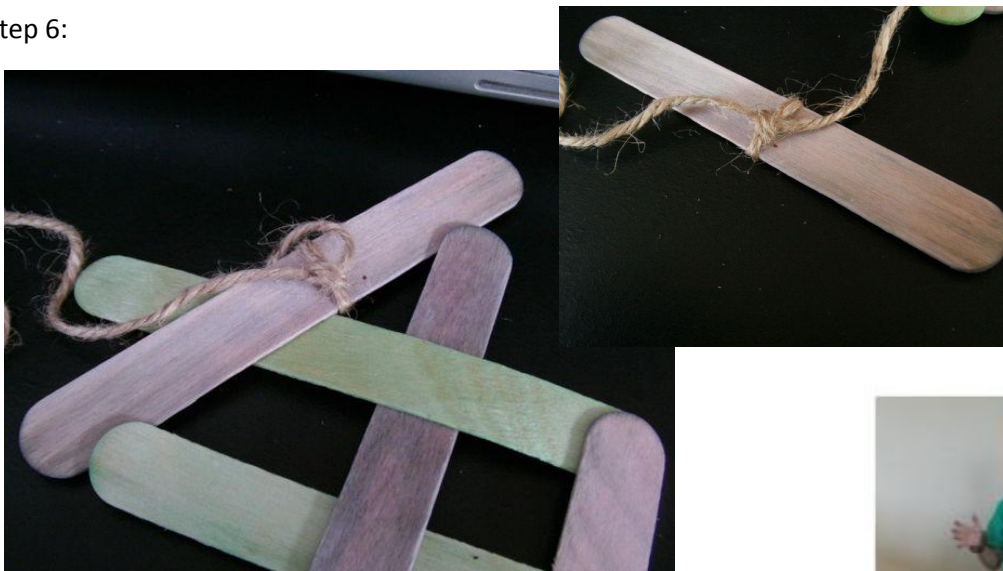
Add another stick by tucking it's end under Stick 2 and letting rest lay over Stick 3.

Step 5:



Continue adding sticks by tucking the end under the opposite color stick and letting the rest go over the other stick until you've reached the desired length. Just remember that patience will pay off and the longer the stick bomb you make the longer explosion show you'll have.

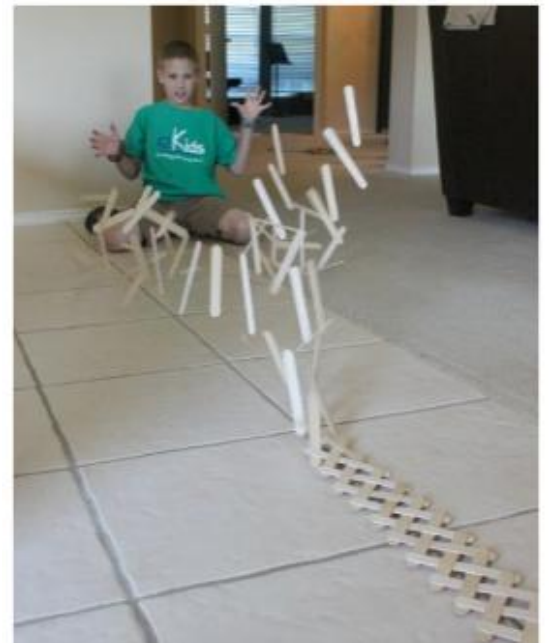
Step 6:



For safety you want to be able to trigger the stick bomb from a distance. Simply tie a piece of string to a stick then use that to bind the working end.

Step 7:

When your ready for the action, give the pull string a nice tug and stand back. If all goes well your cobra weave should rise up like a wave while sticks are wildly thrown across the room. Enjoy!



2. Make two simple pulleys, and use them to move objects.

The pulley is really a wheel and axle with a rope or chain attached. A pulley makes work seem easier because it changes the direction of motion to work with gravity. Let's say you have to lift a heavy load, like a bale of hay, up to the second floor of a barn. You could tie a rope to the bale of hay, stand on the second floor, and pull it straight up. Or you could put a pulley at the second floor, stand at the first floor, and lift the bale of hay by pulling straight down. It would be the exact amount of work in either case, but the action of pulling down feels easier because you're working with the force of gravity.

Show the difference in work required by using a simple pulley and a block and tackle pulley.

You will need:

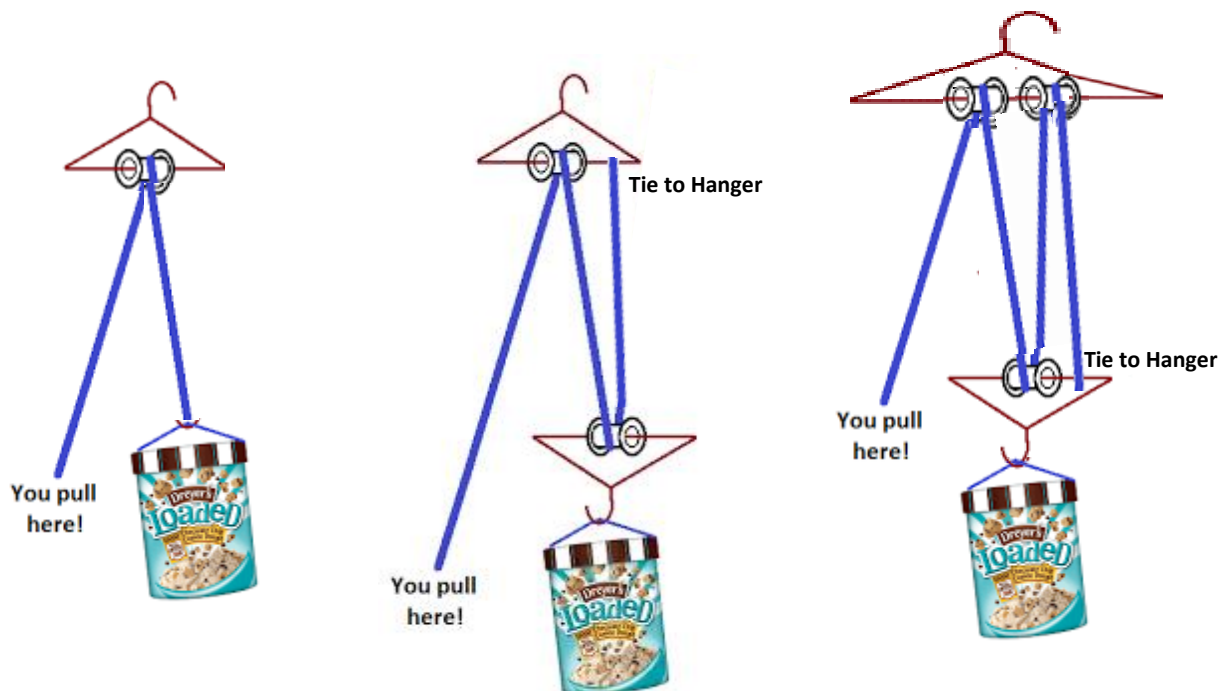
Two-three empty spools

Two wire coat hangers

String (thick)

Have boys work in pairs to build a simple pulley. See how much work is required by having one boy hold the hanger with the pulley while the other one lifts the load by pulling on the string.

Have them add a second pulley and build a moving pulley (also called block and tackle.) The amount of work needed should be less (cut in half) but they will need twice as much rope. If you want to take it further, have them add a third spool and see what happens (work will be cut to a third but they will have to pull even further (more string will be needed.)



3. Make a lever by creating a seesaw using a spool and a wooden paint stirrer.

Explore the way it balances by placing different objects on each end.

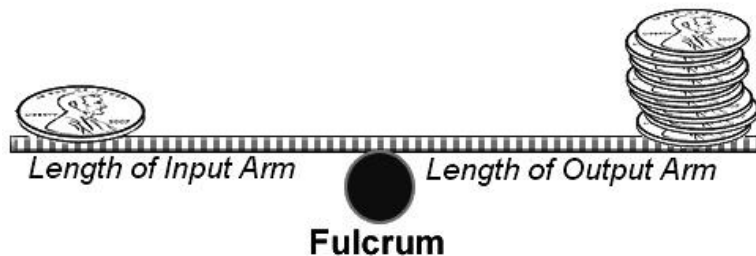
Material needed

Paint sticks

Spool (or piece of round dowel for fulcrum)

Pen or marker

Ruler



Make 1 inch marks starting with the "center" all the way to each end of the stick.

Start with balancing the stick with the fulcrum in the middle. Add equal number of pennies to each side (same distance from the end on each side) and move the stick on the fulcrum until it is balanced.

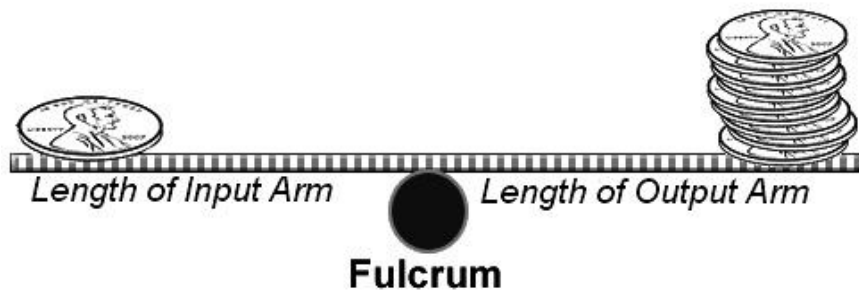
Move the fulcrum to a different location and without moving the position of the pennies on the stick see how many pennies you need on each side to create a perfect balance.

Move one stack of the pennies closer to the fulcrum and see what happens. Experiment with different length of arms (distance from fulcrum to stack of pennies) and different weights (number of pennies). See if you can find the relationship between the length of the arms and the weight.

Use the table below to record your results

Hint : $\text{Length of Input Arm} \times \text{pennies on Input Arm} = \text{Length of Output Arm} \times \text{pennies on Output Arm}$

Combination	"Input Arm"			"Output Arm"		
	Length of Arm	# of Pennies	Length x # of Pennies	Length of Arm	# of Pennies	Length x # of Pennies
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						



4. Do the following:

a. Draw a Rube Goldberg – type machine. Include at least six steps to complete your action.

b. Construct a real Rube Goldberg – type machine to complete a task assigned by your den leader.

Use at least two simple machines and include at least four steps.

Give the kids “stuff” and have them build the machine – don’t forget duct tape!

Have them work as a den. Here are examples.





Bear Elective Adventures: Super Science

Complete 1-6

Note – The experiments for static electricity may not work if the weather is very humid.

Requirements and What you will need

1. Make static electricity by rubbing a balloon or a comb on a fleece blanket or wool sweater.

2. Conduct a balloon or other static electricity investigation.

Explain what you learned.

Supplies Needed:

- 2 balloons
- sweater
- assorted materials
- tissue paper {we used 2 different sizes}
- aluminum foil
- cardboard scrap
- paper scrap
- yarn/string
- pom pom
- pipe cleaner
- ribbon
- cloth
- foam

Gather a random assortment of materials. See the suggestions in the materials list.

Blow up the balloons.

Touch a balloon to each of different materials including the other balloon. {Notice none of the materials is attracted to the balloon.}

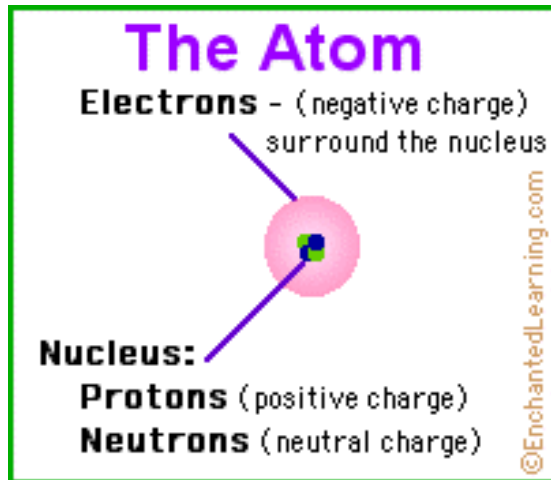
Rub one balloon onto the sweater. {This will add electrons to the balloon and cause it to become negatively charged.}

Now touch the balloon again to each of the materials. Observe what happens.

What is Static Electricity?

Static electricity is a stationary electric charge that is built up on a material. A common example of static electricity is the slight electrical shock that we can get when we touch a doorknob during dry weather. The static electricity is formed when we accumulate extra electrons (negatively-charged particles which we rub off carpeting) and they are discharged onto the doorknob.

Producing Static Electricity



Everything is made up of atoms, and atoms are made of tiny particles, some of which are electrically charged. Most atoms are electrically neutral; the positive charges (protons in the nucleus or center of the atom) cancel out the negative charges (electrons that surround the nucleus in clouds). Opposite charges attract one another. Similar charges repel one another.

Sometimes the outer layer (the negatively-charged electrons) of atoms are rubbed off, producing atoms that have a slight positive charge. The object that did the rubbing will accumulate a slight negative charge as it gets extra electrons. During dry weather, these excess charges do not dissipate very easily, and you get

static electricity. (During humid weather, the electrons flow through the damp air and the object become electrically neutral.)

3. Conduct one other static electricity investigation.

What do I do?

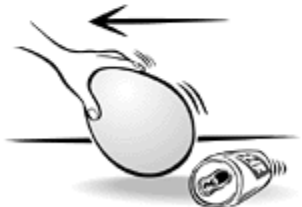
1 Put the can on its side on a table or the floor -- anyplace that's flat and smooth. Hold it with your finger until it stays still.



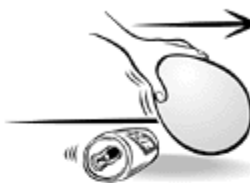
2 Rub the balloon back and forth on your hair really fast.



3 Hold the balloon about an inch in front of the can. The can will start to roll, even though you're not touching it!



4 Move the balloon away from the can -- slowly -- and the can will follow the balloon.



5 If you move the balloon to the other side of the can, the can will roll in the other direction.



6 How fast will the can roll? How far can you roll it before the can stops? Will it roll uphill?

7 If you have some friends with cans and balloons, you can have a race across the room or down the sidewalk.

4. Do a sink - or - float investigation.

Explain what you learned.

Suggested materials for activity include:

- Rock
- Pumice Stone (this stone will actually float)
- Wood
- Metal
- Plastic
- Aluminum
- Foil
- Apples
- Oranges
- plastic bottles
- toy blocks
- paper
- bathtub toys
- plastic forks
- rubber balls
- soda-bottle caps
- pencils
- erasers
- sponges.

Brainstorm on what it means to sink or float. Ask boys to describe things that they have seen sink or float. Ask for ideas on what kinds of things they think will sink or float, for example: Can people float?

Extend the ideas in this lesson by having the boys explore the question, "Can we change something from a sinker to a floater?"

Here's a cool demonstration.

You'll need

- water
- a clear glass or plastic cup or some other shallow vessel
- a small piece of paper. *Optionally, a piece of newspaper or paper towel.*

Create it

1. Fill a cup or shallow vessel with water. Demonstrate that the clip will actually sink by placing it on the surface of the water, not perfectly flat, and letting go.
2. Retrieve the clip and wait for the water to settle and be still.
3. Cut a small piece of newspaper or paper towel and put the clip on the strip. Place the strip with the clip on the surface of the water and let go. The paper will keep the clip afloat, but once the paper soaks up water, it will sink, leaving the clip floating on the surface of the water.

The paperclip floats because of surface tension, which you can read more about on Wikipedia or a variety of science-related websites. Surface tension is the force that causes the molecules on the surface of a liquid to be pushed together and form a layer

5. Do a color - morphing investigation.

Explain what you learned.

(milk, food coloring, detergent)

What You'll Need:

- Milk (whole or 2%)
- Dinner plate
- Food coloring (red, yellow, green, blue)
- Dishwashing soap (Dawn brand works well)
- Cotton swabs



What To Do:

1. Pour enough milk in the dinner plate to completely cover the bottom to the depth of about 1/4". Allow the milk to settle.
2. Add one drop of each of the four colors of food coloring — red, yellow, blue, and green — to the milk. Keep the drops close together in the center of the plate of milk.
3. Find a clean cotton swab for the next part of the experiment. Predict what will happen when you touch the tip of the cotton swab to the center of the milk. It's important not to stir the mix. Just touch it with the tip of the cotton swab. Go ahead and try it. Did anything happen?
4. Now place a drop of liquid dish soap on the other end of the cotton swab. Place the soapy end of the cotton swab back in the middle of the milk and hold it there for 10 to 15 seconds. Look at that burst of color! It's like the 4th of July in a bowl of milk!
5. Add another drop of soap to the tip of the cotton swab and try it again. Experiment with placing the cotton swab at different places in the milk. Notice that the colors in the milk continue to move even when the cotton swab is removed. What makes the food coloring in the milk move?

What's Happening:

Milk is mostly water, but it also contains vitamins, minerals, proteins, and tiny droplets of fat suspended in solution. Fats and proteins are sensitive to changes in the surrounding solution (the milk). The secret of the bursting colors is the chemistry of that tiny drop of soap. Dish soap, because of its bipolar characteristics (nonpolar on one end and polar on the other), weakens the chemical bonds that hold the proteins and fats in solution. The soap's polar, or *hydrophilic* (water-loving), end dissolves in water, and its *hydrophobic* (water-fearing) end attaches to a fat globule in the milk. This is when the fun begins.

The molecules of fat bend, roll, twist, and contort in all directions as the soap molecules race around to join up with the fat molecules. During all of this fat molecule gymnastics, the food coloring molecules are bumped and shoved everywhere, providing an easy way to observe all the invisible activity. As the soap becomes evenly mixed with the milk, the action slows down and eventually stops.

Try adding another drop of soap to see if there's any more movement. If so, you discovered there are still more fat molecules that haven't found a partner at the big color dance. Add another drop of soap to start the process again.

This activity and images are courtesy of [Steve Spangler Science](#).

6. Do a color - layering investigation.

Explain what you learned.

(Experiment from Steve Spangle Science)

Materials

- Light Karo syrup
- Water
- Vegetable oil
- Dawn dish soap (blue)
- Rubbing alcohol
- Lamp oil
- Honey
- Graduated cylinder
- Food Coloring or True Color Coloring Tablets
- Food baster
- 9 oz portion cups

Experiment

1. Measure 8 ounces of each type of liquid into the 9 ounce portion cups. You may want to color each of the liquids to make a more dramatic effect in your column. Light Karo syrup is easier to color than dark syrup. The only liquids that you may not be able to color are the vegetable oil and the honey.
2. Start your column by pouring the honey into the cylinder. Now, you will pour each liquid SLOWLY into the container, one at a time. It is very important to pour the liquids slowly and into the center of the cylinder. Make sure that the liquids do not touch the sides of the cylinder while you are pouring. It's okay if the liquids mix a little as you are pouring. The layers will always even themselves out because of the varying densities. Make sure you pour the liquids in the following order:
 - Honey
 - Karo syrup
 - Dish soap
 - Water
 - Vegetable oil
 - Rubbing alcohol
 - Lamp oil
3. As you pour, the liquids will layer on top of one another. After you pour in the liquids you will have a seven-layer science experiment - a science burrito!

Magic colors

Materials

- Vegetable Oil
- Water
- Food coloring (red, yellow, blue)
- Powdered Tempera Paint (red, yellow, blue)
- Small soda bottles with labels removed.

1. Prepare 3 small glasses full of water that has been dyed with regular food coloring –red, yellow, blue.
2. Prepare 3 small glasses of vegetable oil with powdered tempera paint – red yellow, blue.
3. Mix two different colors - one water and one oil in a small soda bottle. Example- use the blue water and the yellow oil.
4. Secure the cap on and shake it. The new color will appear.
5. Let it sit for a while and the colors will return back to their original color with the oil on top of the water.

How Does It Work?

The same amount of two different liquids will have different weights because they have different masses. The liquids that weigh more (have a higher density) will sink below the liquids that weigh less (have a lower density).

To test this, you might want to set up a scale and measure each of the liquids that you poured into your column. Make sure that you measure the weights of equal portions of each liquid. You should find that the weights of the liquids correspond to each different layer of liquid. For example, the honey will weigh more than the Karo syrup. By weighing these liquids, you will find that density and weight are closely related.

**** NOTE:** The numbers in the table are based on data from manufacturers for each item. Since each manufacturer has its secret formula, the densities may vary from brand to brand. You'll notice that according to the number, rubbing alcohol should float on top of the lamp oil, but we know from our experiment that the lamp oil is the top layer. Chemically speaking, lamp oil is nothing more than refined kerosene with coloring and fragrance added. Does every brand of lamp oil exhibit the same characteristics? Sounds like the foundation of a great science fair project.

The table shows the densities of the liquids used in the column as well as other common liquids (measured in g/cm^3 or g/mL).

Density is basically how much "stuff" is smashed into a particular area... or a comparison between an object's mass and volume. Remember the all-important equation: $\text{Density} = \text{Mass} \div \text{Volume}$. Based on this equation, if the weight (or mass) of something increases but the volume stays the same, the density has to go up. Likewise, if the mass decreases but the volume stays the same, the density has to go down. Lighter liquids (like water or rubbing alcohol) are less dense than heavy liquids (like honey or Karo syrup) and so float on top of the more dense layers.

Material	Density
Rubbing Alcohol	.79
Lamp Oil	.80
Baby Oil	.83
Vegetable Oil	.92
Ice Cube	.92
Water	1.00
Milk	1.03
Dawn Dish Soap	1.06
Light Corn Syrup	1.33
Maple Syrup	1.37
Honey	1.42