
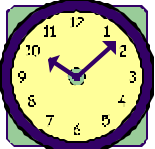


Word Factory

<p>The Basics</p>  <p>Grade Level: K-12</p>  <p>Estimated Time: 40 minutes</p>	<p>The Toolbox</p> <ul style="list-style-type: none"> • Sentence strips or paper to write on • A set of word factory cards for each group of 2-4 students 	<p>Education Standards</p> <p>Grammar English/ Language Arts Performance Standard</p> <p>Students should demonstrate a basic understanding and control of sentence construction, spelling and usage.</p>	<p>Safety Concerns</p> <p>None</p>	<p>For Kids with Disabilities</p> <p>Students with dexterity impairments may work with a partner. Students with vision impairments may participate orally.</p>
---	--	--	---	---

Educational Objective:

To become more familiar with word beginnings and endings commonly used for science vocabulary words, and identify their meaning.

What to Do:

- Duplicate the masters and cut them out. There are four master sets with eight cards per page. The pages are also labeled Sets A and B. Set A is a little easier. You may choose to use them one at a time or together.
- Divide into groups of 2-4 people and give each group a set of cards. Choose a beginning part of a word and an ending. Put them together. Decide what your word might mean. **Note:** In this exercise, the words made by participants do not necessarily have to be found in the dictionary. The emphasis is on recognizing common word beginnings and endings, and becoming familiar with their meanings.

- Rearrange the parts to make a new/different word. Play around for awhile making different words and deciding what they mean.
- Pick a favorite word or design a new one to share with the entire group, and make a sentence using that word. Have the group determine what the meaning for your word might be based on how it is used in the sentence.

For example:

The word might be hemomaniac

The definition would be – one who craves blood

A sentence could be – We often wondered in our teacher was a vampire because, she seemed to be a hemomaniac.

- Post your sentences and definitions for all to SEE! Don't forget to practice pronouncing the words!

WEB SITES

- **Vocabulary Charade Game**
http://wings.avkids.com/Curriculums/History/vocab_charade_game_howto.html
 (Grades K-6)
- **Brain Freeze Tag**
<http://faculty.washington.edu/chudler/letag.html> (Grades 3-8)

SOFTWARE

- **CornerStone Language Arts**
 SkillsBank Corporation, 1995
 (Grades 3-8)
- **Reader Rabbit, Reading 2**
 The Learning Company, 1997
 (Grades K-3)

READING ROOM

- Steig, William. **CDB!** Simon & Schuster, 2000. (Grades K-3)
- Nye, Bill. **Bill Nye the Science Guy's Big Blast of Science.** Perseus Publishing, 1993. (Grades 6 and up)

Career Connections

An editor refines and checks documents for accuracy before printing. Editors can work for magazines, newspapers, and even scientific journals.

WORD FACTORY ACTIVITY SHEET

Working with your group, list the words that you come up with and their definitions below.

Word	Definition

Any others? Use another sheet of paper if necessary.

Select your favorite word, and construct a sentence using that word to share with your group. Ideally, others should be able to determine the definition of your word based on its use in the sentence.

Set A Beginnings

<p>cyano- blue, bluish</p>	<p>crypto- hidden</p>
<p>hydro- water</p>	<p>tele- far, distant</p>
<p>hemo- blood</p>	<p>micro- small</p>
<p>thermo- heat</p>	<p>chrono- time</p>

Set A Endings

<p>-kinesis movement</p>	<p>-phobia fear of</p>
<p>-graph something that writes</p> <p>-gram something written</p>	<p>-mania craving</p> <p>-maniac someone who craves</p>
<p>-scope device for viewing</p>	<p>-logy study of</p> <p>-sophy science of</p>
<p>-meter device for measuring</p>	<p>-philia love of</p>

Set B Beginnings

<p>pedi- foot</p>	<p>bio- life</p>
<p>ortho- straight</p>	<p>tachy- fast, swift</p>
<p>pachy- thick</p>	<p>stereo- solid (also as in 3-D)</p>
<p>phono- sound, voice</p>	<p>geo- earth</p>

Set B Endings

<p>-pod foot</p>	<p>-pteros having wings</p>
<p>-phage eater</p> <p>-phagous eating</p>	<p>-morph shaped like</p> <p>-morphic being shaped like</p>
<p>-derm skin</p>	<p>-genous</p> <p>-genic producing, making</p>
<p>-lith stone</p>	<p>-phone device for listening</p>

Activity: Balancing Act

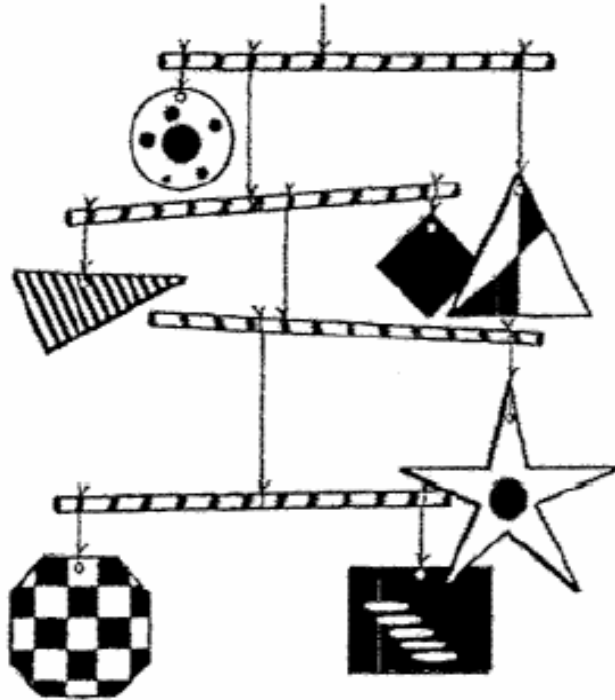
Objective: To explore the concept of balance by making a mobile.

Materials Needed

- 1 package plastic drinking straws
- cardboard scissors
- string
- scotch tape
- crayons or color markers
- white paper

What to Do:

- Refer to the diagram on page II-25 for assistance.
- Tie a piece of string about one foot long tightly around the center of a straw. Tape it securely.
- This is the base for your mobile.
- Tape the other end of the string to a table edge so that the straw hangs down.
- Cut out pieces of cardboard in the shapes of stars, triangles, squares, circles, and any other shapes you can think of. Use the shapes on page III-23 to help you get started.
- Cut out pieces of white paper that fit the shapes. Decorate the paper, and decorate both sides of your cardboard cut-outs by taping the pieces of paper to them.
- Cut another piece of string of any length up to one foot.
- Tape one end of the string to a decorated piece of cardboard.
- Tie the other end of the string to one of the ends of the straw. Observe what happens
- Cut another piece of string of a different length, and tape it to another decorated piece of cardboard. Tie the other end of the string to the free end of the straw.
- Move the pieces of cardboard until they balance.
- Repeat the above steps so that you have two mini-mobiles.
- Tie the free ends of the mini-mobiles to the ends of a third straw.
- Tie a piece of string to the middle of the third straw, and hang up your mobile.
- Observe what happens.



Questions to Ask Students about This Activity:

- What happens to a straw that only has one piece of cardboard hanging from it?
- Why does this happen?
- How does moving the pieces of cardboard around on the straw help this situation?
- What happens when you lose your balance?
- When you are walking a straight line, what do you do to keep your balance?

Background Information

A mobile is a good example of balance in action. When only one piece of cardboard hangs from a straw, the mobile is unbalanced, and the piece of cardboard weighs down one side of the straw. Adding a piece of cardboard to the other side helps to restore the mobile's balance. Then it will have as much weight on one side of it as on the other.

If you have ever ridden a bike or tried to walk a very straight line, you have used your sense of balance to keep your weight evenly distributed. If too much of your weight moves to one side of you, you lose your balance and fall down!

Activity: Butterfly Color Explosion

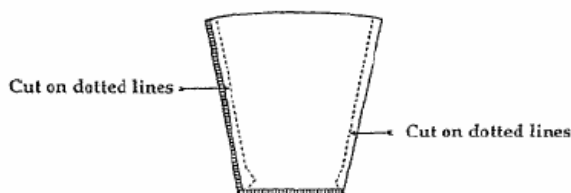
Objectives: To demonstrate the process of paper chromatography. To determine how colors can be separated by chromatography. To determine the components of black ink.

Materials Needed:

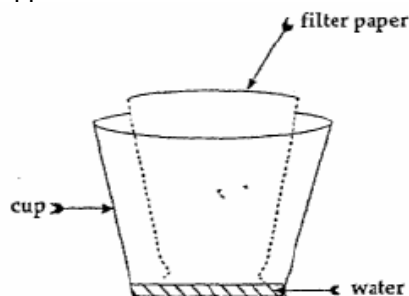
- 18-ounce wide-mouth plastic tumbler with ½-inch of water
- Melitta® coffee filters (no. 6), or comparable brand and size
- black water-soluble marker (overhead nonpermanent markers work best)
- scissors
- pencil
- 2-3 paper towels
- coleus leaf or other brightly colored leaf (optional)

Procedure:

- With the pencil, draw the butterfly outline shown below on a coffee filter.



- Cut only on the dotted lines. Your filter should still be in one piece.
- Using the black marker, decorate both sides of the filter with dots, lines, or other markings.
- **Be sure not to mark the ribbed bottom edge.**
- Place your filter in the cup of water as shown. Only the ribbed edge should touch the water.
- Allow the filter to sit undisturbed for 10-15 minutes.
- Once the water level has risen to the top of the paper, remove the filter from the cup, and gently open the filter. What do you see?
- What do you think will happen to the black ink?



Questions to Ask Students about This Activity:

- What happened to the black ink?
- What happened in this activity that you didn't expect or was different from what you expected?
- What did you learn about the black ink?
- Do you think the same thing would happen if you used red ink? Green ink? Purple ink? Try it!
- What do you think would happen if you ground up a coleus or other brightly colored leaf, placed a dot of the leaf's pigment on a filter, and immersed the end of the paper in water? Try it!

Background Information

This activity uses a technique called *paper chromatography*. The water is absorbed by the coffee filter and rises up the filter. When the water reaches a spot of black ink, it carries the spot up the filter. As the water continues to rise, some of the ink components are deposited at various distances from the original spot. In effect, the ink separates into the colors that comprise it. Black markers are made of many different dyes. Some of these dyes dissolve easily in water. They travel far up the paper. Some are more like oil and don't dissolve well in water. They only move a short distance up the paper. Substances that can cause other substances to dissolve, like water can, are called solvents.

Water is the simplest solvent to use in paper chromatography. Not all components in a sample may dissolve in water. Other liquids that can be used as solvents include alcohol and ammonia, but these should not be used with young children. They give off unpleasant fumes.

Scientists use chromatography frequently to determine the component parts of mixtures, solutions, and molecules. It is a valuable tool for helping us understand what makes up various solutions in our environment.

Activity: Round and Round

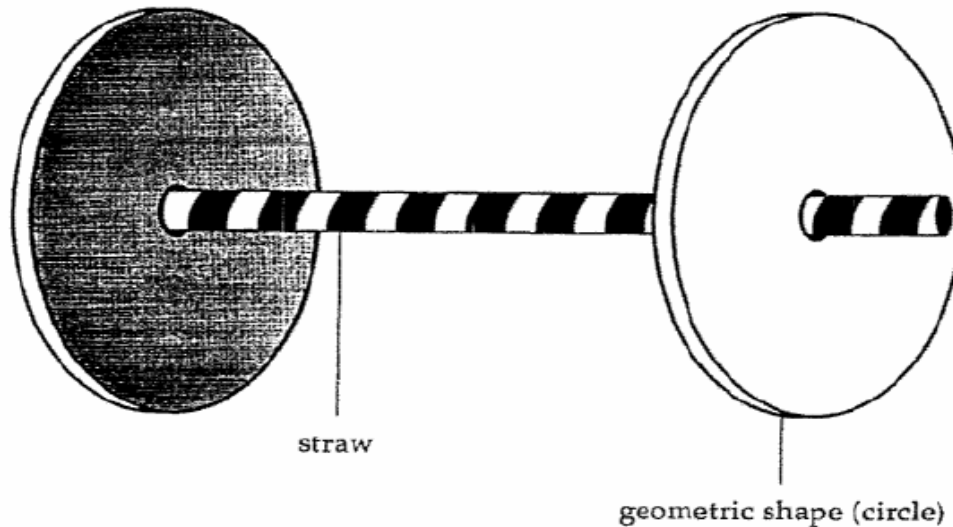
Objective: To learn about the function of the wheel and axle.

Materials Needed:

- Paris of geometric shapes cut out of thin cardboard (triangles, circles, squares, ovals, pentagons), some with holes cut precisely in the middle, and some with holes closer to a side.
- Use the shape on page 82 to help you get started.
- Straws or pencils
- Modeling clay (optional)

Procedure:

- Place the holes of a pair of geometric figures over the ends of the pencil or straw. Refer to the diagram below.
- If you like, attach the figures to the straw with modeling clay.
- Try to get the figures to move.



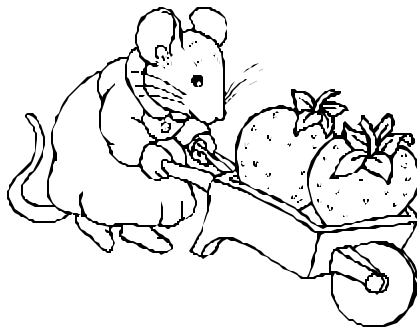
Questions to Ask Students about This Activity:

- Which geometric figures move the best? Why?
- Which hole placement works the best? Why?
- Why do you need the straw?
- Name some uses for the wheel and axle.

Background Information

Have you ever heard anyone use the expression “reinvent the wheel?” The *wheel* is one of the most useful inventions ever created. But it is not as useful on its own as it is when used with an *axle*.

When an axle attaches two wheels together, the resulting mechanism can be attached to another pair of wheels and another axle to create a space on which things could be pushed or pulled. Using wheels makes it much easier to push or pull a load. This is because the roundness of the wheel cuts down on the *friction*, or drag, that makes it difficult to push or pull things. Say, for example, that you tried to push your brother and sister down the street while they were sitting on the ground. You wouldn't get very far. But if they got into your wagon, which is made with two sets of wheels and axles, you would have no trouble at all getting them to your destination!



Activity: Building With Wonderful Junk

Materials Needed

- “Trashables” — lots of them! Try:
 - empty boxes of all sizes (cereal boxes, shoe boxes, large cartons, gift boxes, egg cartons, etc.)
 - Cups (paper, plastic, cardboard)
 - Tennis ball cylinders and other sports packaging
 - Paper, (tissue, crepe, gift)
 - Tubes (paper towel rollers, toilet paper rollers, poster tubes, gift paper rollers)
 - Foil (pie plates, cake pans, etc.)
 - Whatever else your imagination comes up with
- Masking Tape
- Glue
- Scissors

TIME: 30 MINUTES FOR EACH GROUP OF CHILDREN

GETTING READY!

Designate a large space in the room, where the structures can be built and stored. Put your “wonderful junk” on a table, or somewhere on the floor. Have the tape, glue, and scissors conveniently at hand. You’ll be working with small groups of children, three or four at a time.

ACTIVITY

1. Explain to children that they’ll be constructing something out of the “wonderful junk” they see nearby. The rules are that they.....
 - must plan and work together
 - must build something as tall as it can be and still stand on its own
2. Ask children to choose some junk to begin with. Suggest that they use at least one large carton in their structure. Explain that they are free to come back to the pile to select more junk as needed.
3. Encourage children to see that everyone participates in the building process. If you observe that someone is not involved, try suggesting that he or she select something special to add to the structure.
4. As children work, facilitate by suggesting ways they can balance their buildings, but guide them to discovering solutions of their own—don’t simply walk up and say: “You need to enlarge the base.”
5. When the building is finished, have each group take turns telling the other children in the room what they’ve made and how they made it.

CONCEPTUAL BACKGROUND

Construction activities will keep children busy for hours on end! Not only are they fun, they'll develop children's problem — solving, mathematical, and physical science skills, and when children work cooperatively together, they'll be developing social skills, as well.

Children can explore problems involving shape, size, scale and stability, in this activity. They'll also be dealing with the concepts of balance, weight, gravity and symmetry. Trial and error, a valuable way of learning, plays an important role in this project.

The physical properties of the materials being used will influence the kind of structure that's built. Children will discover that

- **seemingly flimsy materials can be strengthened by folding**
- **triangular shapes are rigid**
- **tubes have bending strength**
- **towers need a stable base**
- **symmetry is important in the overall strength of a tower**
- **if the weight of the whole structure leans out, beyond the base, the structure will topple.**

As a side effect of this activity, children may become aware of how much waste there is in our environment. "Wonderful Junk" is one way to recycle some of that waste.

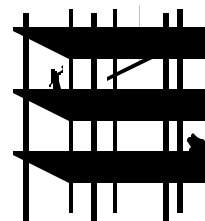
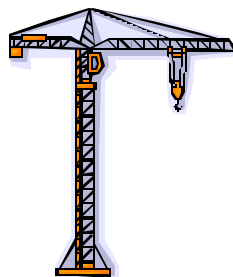
GLOSSARY

Balance: A stable state, characterized by cancellation of all forces by equal, opposing forces. A state of bodily equilibrium.

Gravity: The Force that pulls one object toward another.

Symmetry: A balanced correspondence of size, form, and arrangement of parts.

Weight: The force with which gravity pulls a body towards earth.



EXTENSIONS

No Tape? No Glue?

1. Gather the “trashables” as described in the activity. Leave out items that you think will not stay without tape or glue, e.g. tissue paper.
2. Choose small groups (4-8) to work together. Try to choose an equal number of girls and boys.
3. Tell the children that their job is to build something that will stay together without tape or glue.
4. Suggest that they make a plan together before they start to build. Older children can write down their plan. Have some paper and pencils handy for this task.

Choose Your Junk

1. Gather a large of supply of “trashables.” Glue and/or tape are optional.
2. Form small groups and ask each group to choose a pile of junk.
3. Tell the children that they can build whatever they want but:
 - they must use up every piece of junk.
 - it must be able to stand on its own.

Small Junk

1. Gather a supply of small “trashables,” tape, and glue.
2. Form small groups.
3. Explain to the children that:
 - first, each child will make her/his own construction.
 - next, they should make one big construction out of all the small ones.
4. Children also can make individual constructions to take home.



Activity: Seeing Is Deceiving!

Objective: To demonstrate persistent vision, which was one of the principles Thomas Edison used in developing moving pictures.

Materials Needed:

- white or light colored construction paper or other heavy paper
- scissors
- pencils or long sticks
- tape
- crayons or colored markers

What to Do:

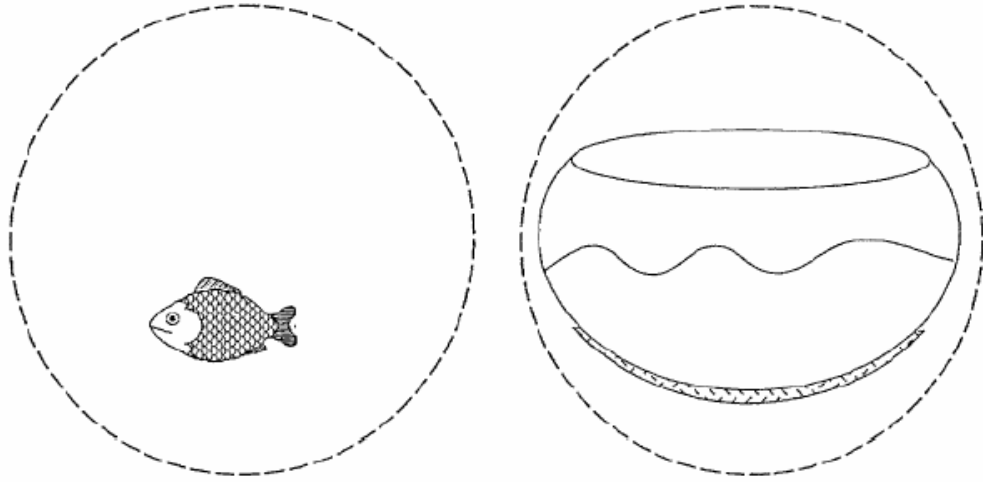
- Photocopy the drawings on the following pages onto two sheets of construction paper or other heavy paper.
- Cut out each drawing from the construction paper along the dotted lines. Tape the spider and the web, the bird and the cage, the fish and the bowl, and the face and the pumpkin back-to-back.
- Slide the pencil or stick between the back-to-back circles and tape the circles securely to the pencil or stick.
- Hold the pencil or stick between your hands and twirl it rapidly. Observe what happens.
- Try creating your own drawings.

Questions to Ask Students about This Activity:

- What do you see when you twirl the pencil or stick?
- Why can you see both images “at once?”
- Which designs work best?
- Does color play a role in how well you see both images?

Background Information

When you spin the circles quickly, you should be able to see the images on both sides at once. The spider looks like it is on the web, the bird looks like it is in the cage, the fish looks like it is in the bowl, and the face looks like it is on the pumpkin. This occurrence is known as *persistent vision*. It is the tendency of the brain to “see” an object for about ten seconds after the object disappears. The pictures in this activity are moving so fast that the brain doesn’t have time to process them as separate images. This is the basis for moving pictures, or *movies*. A movie is actually a series of still pictures shown in rapid succession. Persistent vision makes the things in the pictures appear to move.



Seeing is Deceiving! Materials Page
Cut out each of these circles along the dotted lines.

