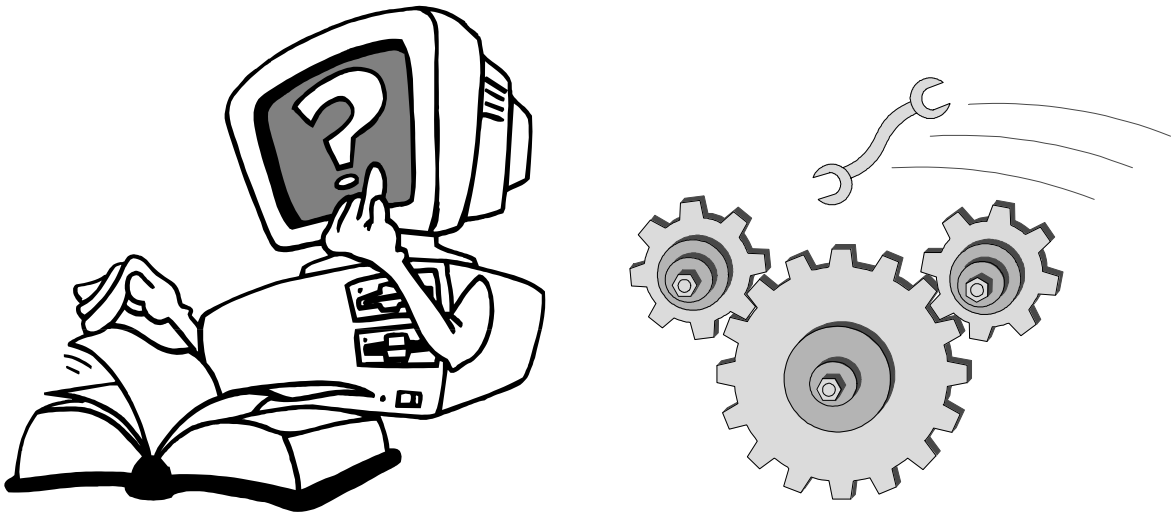
Why Does It Do That?



March 2003

Match Those Ologies

Scientists spend many years in college learning about their field of study. They like to use fancy names for their specialty, words that usually end in -ology. See how many of these scientific fields of study you can match up.

1.	____	Anthropology	A.	Study of relation of plants & animals to surroundings.
2.	____	Archaeology	B.	Study of numbers.
3.	____	Biology	C.	Science of origin & physical development of mankind
4.	____	Cardiology	D.	Study of poisons.
5.	____	Chronology	E.	Science of the nature & origin of the universe.
6.	____	Cosmology	F.	Science of the atmosphere and weather.
7.	____	Ecology	G.	Study of fossils.
8.	____	Genealogy	H.	Study of antiquities.
9.	____	Geology	I.	Study of human society.
10.	____	Hydrology	J.	Science of heart functions and diseases.
11.	____	Meteorology	K.	Study of earthquakes.
12.	____	Neurology	L.	Study of animal life.
13.	____	Numerology	M.	Science of life and living organisms.
14.	____	Paleontology	N.	Study of human and animal behavior.
15.	____	Psychology	O.	Study of family ancestries and histories.
16.	____	Radiology	P.	Science of time and arranging dates & past events.
17.	____	Seismology	Q.	Science of the physical history of the Earth.
18.	____	Sociology	R.	Study of the nervous system.
19.	____	Toxicology	S.	Study of water.
20.	____	Zoology	T.	Study of X-Rays and radioactivity.

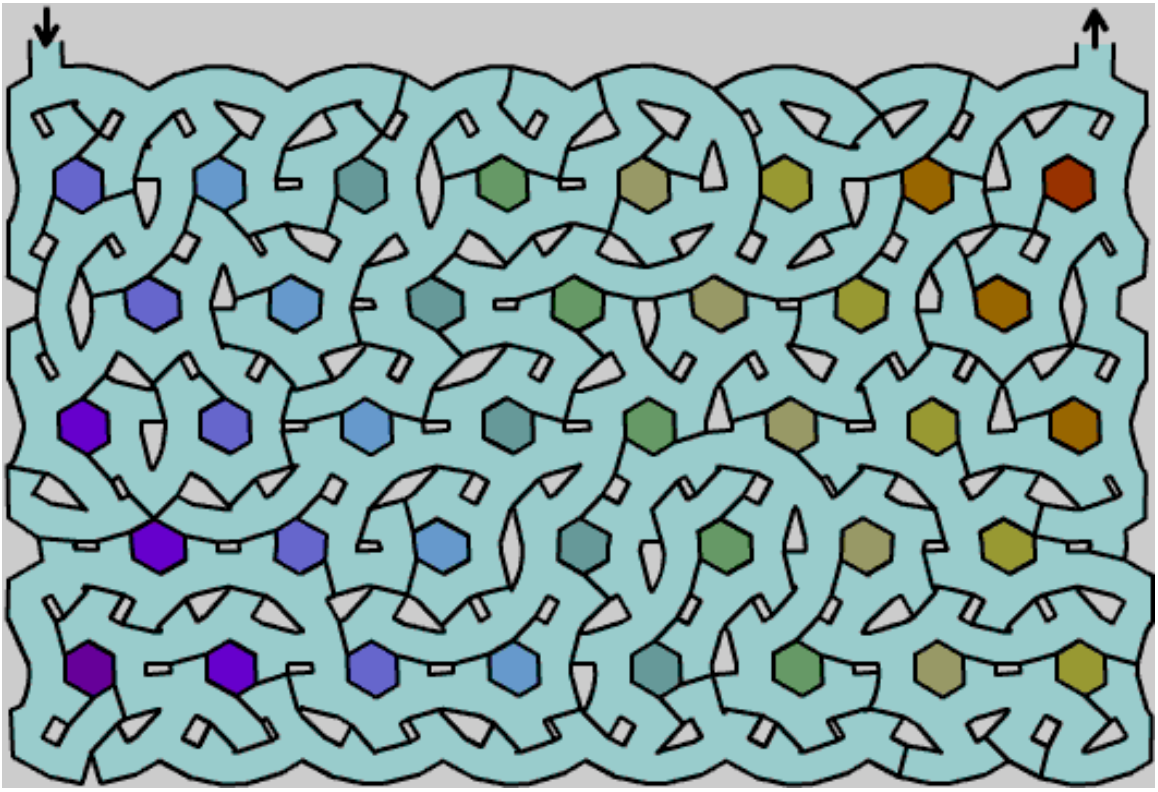
Answers: 1-C, 2-H, 3-M, 4-J, 5-P, 6-E, 7-A, 8-0, 9-Q, 10-S, 11-F, 12-R, 13-B, 14-G, 15-N, 16-T, 17-K, 18-I, 19-D, 20-L

Scientific Fields of Study Word Search

T Q M K F D E N D R O L O G Y X Y H V J
G N S Y G O L O I D A R P N G S U R V F
L E C O L O G Y V J N N M G O O W B H M
M U Y G O L O M S I E S E K L A B W X I
Z R R A Y Y M Q T D O S T E O L O G Y G
D O Z Q G M B H M S W B E I H Y S X G C
A L Y G O L O I D R A C R G C G O L O K
H O D G L L H K I S Y Q O D Y O R S L X
Y G O L O M Y T E Y J G L J S L M C O L
D Y L G P L G V U G A C O I P O H V C Y
R G Y G O L O T N O R E G L L R W R I G
O O G R R L L T R L C Y Y O O E I I X O
L L O X H O O L N O H X G N M M I A O L
O O L M T M Y T M O A Y O O I U O A T A
G H O R N V H D R Z E L J N L N J T H E
Y T T B A C T E R I O L O G Y O R C N N
D A P C R C H U O G L L A X O Q T Q M E
T P Y W K C C C Y K O Z L P L L K Y L G
R W R K A M I J K G G E O L O G Y Z C Y
S O C I O L O G Y N Y G O L O T N O D O

Find these scientific fields of study in the word search puzzle.

ANTHROPOLOGY	CYTOLOGY	HYDROLOGY	PALEONTOLOGY
ARCHAEOLOGY	DENROLOGY	ICHTHYOLOGY	PATHOLOGY
BACTERIOLOGY	ECOLOGY	METEROLOGY	PSYCHOLOGY
CARDIOLOGY	ENTOMOLOGY	NEUROLOGY	RADIOLOGY
CHRONOLOGY	ETYMOLOGY	NUMEROLOGY	SOCIOLOGY
COSMOLOGY	GENEALOGY	ODONTOLOGY	SEISMOLOGY
CRIMINOLOGY	GEOLOGY	ORNITHOLOGY	TOXICOLOGY
CRYPTOLOGY	GERONTOLOGY	OSTEOLOGY	ZOOLOGY



Opening Ceremony

Reaction

Prepare ahead two glasses, one containing baking soda and one containing vinegar. Compare one glass to the boys, just sitting there doing nothing (watching/waiting). Compare the other glass to the Cub Scout Program (lots of potential, but with nothing to act on—also just sitting there, doing nothing). Add the two together and liken the reaction to the boys in the Cub Scout Program. A whole lot of action going on! Now, on with the fun of the pack meeting!

Closing

Boy Genius

Cub #1: Everyone cannot be brilliant, everyone cannot be smart. I may not be a genius, but I can build a neat go-cart.

Cub #2: I can dam a stream with boulders, I can climb trees to the top, I can run for blocks and blocks and never need to stop.

Cub #3: I can't solve a chemical equation or lecture on Newton's rule, but I make a peanut butter sandwich that will really make you drool.

Cub #4: I don't know much about flowers, but smelling them is a joy, I don't think I'm a failure. I'm a genius at being a boy.

Boy to Man

Prepare ahead a picture with a boy on one side and a man on the other. This should be large enough to be easily seen. Make strips of paper with appropriate words written on them and tape or "stick-em" on the back. Begin by showing the picture of the boy and saying, "It takes all the elements of Scouting…" Then list the elements as you attach them onto the picture until the boy's image is covered:

FUN	FIELD TRIPS
CITIZENSHIP	LEARNING TO FOLLOW DIRECTIONS
OUTDOOR EXPERIENCES	PRIDE IN UNIFORM
PHYSICAL FITNESS	MEMBERSHIP IN A GROUP
MORAL FITNESS	PARENTAL SUPPORT
SOCIAL DEVELOPMENT	ADULT LEADERSHIP

"It takes all the elements of Scouting to turn a little boy into a responsible adult." Turn the picture, covered with "elements," around so that the picture of the man is now seen. Then say, "Thank you all for your support and participation in our Scouting program."

Advancement

Cubmaster, wearing lab coat or other appropriate scientist outfit, invites new Bobcat to come forward with his parents. Have parent hold a beaker while the Cubmaster adds the "ingredients" of the Bobcat award (Cub Scout Promise, Law of the Pack, etc, each written on a card and explained as it's added). Cubmaster stirs the mixture, then takes out the badge and present is to the parents, who award it to the boy. He then hands the beaker to the boy, stirs it some more, and takes out the parent pin, which he hands to the boy to present to his parent.

This same procedure can be followed for other awards.

”The Magnet Pull”

Have everyone stand and face the leader, who is the Magnet. The Magnet tells the audience, “I am a magnet that likes to attract people.” The Magnet then chooses a person or group of people that will feel the “pull” of the magnet, and give them a part of the body that will feel the most pull; for example, “I am pulling your left leg.” The person or group will then move toward the Magnet, acting as if they are trying to resist the pull. When he/they reach the leader, another person/group will be chosen (and a new body part assigned), until everyone has been attracted to the Magnet.

Run-Ons

Cub #1: What food is good for the brain?
Cub #2: Noodle soup.

Cub #1: What flies without wings, propellers or jets?
Cub #2: Time.

Cub #1: What does the Invisible Man drink with dinner?
Cub #2: Evaporated milk.

Cub #1: What do people make that you can’t see?
Cub #2: Noise.

Cub #1: What is black and boring?
Cub #2: A TV that doesn’t work.

Cub #1: What do you get when you cross a mosquito with a computer?
Cub #2: A lot of bytes.

Cub #1: 100 scouts were huddled under an umbrella that was 12 inches wide. Not a single scout got wet. How could that be?
Cub #2: It wasn’t raining.

Cub #1: What goes up but never comes down?
Cub #2: Your age.

Traveler: I’d like a ticket to the moon please.
NASA Scientist: Sorry Sir, the moon is full right now.

Cub #1: Did you hear about the mad scientist who invented a gas that could burn through anything?
Cub #2: No, what about him?
Cub #1: Now’s he trying to invent something to hold it in!

Mad Scientist

Cub #1: Did you hear about the mad scientist who's changing Cub Scouts into green frogs?

Cub #2: Really? Green frogs? How awful! Let's go watch.

Cub #1: All right, but let's not get caught. I don't think I'd like eating flies.

(Cubs go to outskirts of "Mad Scientist" area. Webelos Leader, wearing fright wig and lab coat, is mixing potions, doing experiments, etc. A couple of Scouts sit spellbound, watching.)

Cub #1: See, she's/he's working on a couple of them right now.

Cub #2: Hey, that looks kind of neat. I think I'll go in and watch.

Cub #1: No, no! (Holding him back) You're too young to go!

Webelos Leader: Well boys, that's the last requirement. You've earned your Scientist Activity Badge.

Webelos #1: That's great! That's all I needed for my Arrow of Light.

Webelos Leader: Just in time, too, since you'll be old enough to be a Boy Scout next week.

Cub #2: Green frogs! She's/He's not turning Cub Scouts into green frogs—she's/he's turning them into Boy Scouts!

Cub #1: It looks like fun. I can't wait until I'm ten and can be a Webelos Scout.

Cub #2: Yeah—me, too!

Scientist and the Frog

Scientist: I have trained this frog to jump on command. I will conduct an experiment.
(Boy squats, pretending to be a frog)

Scientist: Jump, Frog!
(Frog jumps)

Scientist: I will now remove one of his legs
(Tugs on boy's arm, puts arm behind back)

Scientist: Jump, Frog!
(Frog jumps; Scientist jots in notebook)

Scientist: I will now remove another leg
(Tugs on boy's other arm, both arms behind back)

Scientist: Jump, Frog!
(Frog jumps; Scientist jots in notebook)

Scientist: I will now remove the third leg
(Tugs on boy's leg, boy stands on one leg)

Scientist: Jump, Frog!
(Frog jumps on one leg; Scientist jots in notebook)

Scientist: I will now remove the last leg
(Tugs on boy's other leg, boy kneels)

Scientist: Jump, Frog! (repeat 3 or 4 times)
(Frog remains motionless)

Scientist (while writing in notebook):
After frog loses all legs, it becomes completely deaf.

The Cub Scout Fair
(Tune: Animal Fair)

Oh come to the Cub Scout Fair
And see all the great sights there,
There's lots of fun for everyone
And displays beyond compare.
There are thrilling experiments,
And prizes that will entrance.
Food to eat that can't be beat,
Oh come to the Cub Scout Fair.

Oh come to the Cub Scout Fair.
And leave at home every care.
You'll be so busy that you'll get dizzy
As you walk and look and share.
The sights they will amaze,
It'll be one of your very best days.
You'll be so bright and learn about light
When you come to the Cub Scout Fair!

Fun at the Fair
(Tune: Cruising Down the River)

Strolling by the displays
At the Cub Scout Science Fair,
With guys we know, our work we show,
While all the fun we share.

The bunch of us together
Will remember being there.
What memories we'll treasure
Of our great Pack's Science Fair!

Model Hovercraft

Supplies: Cardboard, pencil, glue, paper, thread spool, balloon

Directions:

1. Cut a 4" square piece of cardboard
2. With help from an adult, punch a hole in the center of the cardboard. Make the hole the same size as the hole in the spool.
3. Glue the spool to the cardboard on top of the hole. Make sure the holes line up, and that you use enough glue so that no air can escape between the spool and the cardboard.
4. Cover the top of the spool with a circle of paper – secure with glue.
5. Punch a hole in the middle of the paper cover where the hole of the spool is. The hole should now run through the paper, spool, and cardboard without any obstructions.
6. Blow up the balloon and twist the end to keep the air from escaping. Stretch the balloon over the top of the spool.
7. Set the hovercraft on a level table.
8. Let go of the balloon. Give the hovercraft a few gentle pushes, and watch it travel across the table.

EXPERIMENTS

Why the Sky is Blue and the Sunset is Red

When sunlight travels through the atmosphere, blue light scatters more than the other colors, leaving a dominant yellow-orange hue to the transmitted light. The scattered light makes the sky blue; the transmitted light makes the sunset reddish orange.

Materials:

- A transparent plastic box, or a large jar
- A flashlight
- Powdered milk
- Blank white card for image screen

Preparations:

1. Fill the container with water.
2. Place the light source so that the beam shines through the container.
3. Add powdered milk a pinch at a time.
4. Stir until you can clearly see the beam shining through the liquid.

Activity:

- Look at the beam from the side of the tank and then from the end of the tank. You can also let the light project onto a white card, which you hold at the end of the

tank. From the side, the beam looks bluish-white; from the end, it looks yellow-orange.
- If you have added enough milk to the water, you will be able to see the color of the beam change from blue-white to yellow-orange along the length of the beam.

What's Happening?
- The sun produces white light, which is made up of light of all colors: red, orange, yellow, green, blue, indigo, violet. Light is a wave, and each of these colors corresponds to a different frequency, and therefore wavelength, of light. The colors in the rainbow spectrum are arranged according to their frequency: violet, indigo, and blue light have a higher frequency than red, orange, and yellow light.

- When the white light from the sun shines through the earth's atmosphere, it collides with gas molecules. These molecules scatter the light. Blue light also has a frequency that is closer to the resonant frequency of atoms than that of red light. This causes the blue light to be reradiated out in all directions, in a process called *scattering*. The red light that is not scattered continues on in its original direction. When you look up in the sky, the scattered blue light is the light that you see.

- Why does the setting sun look reddish orange? When the sun is on the horizon, its light takes a longer path through the atmosphere to your eyes than when the sun is directly overhead. By the time the light of the setting sun reaches your eyes, most of the blue light has been scattered out. The light you finally see is reddish orange, the color of white light minus blue.

<u>The Balancing Stick</u>

In this experiment you demonstrate that a weight on a stick does affect how well you can balance it on a finger.

Materials:
- One ½ inch dowel, about 3 feet long
- A lump of clay

Preparations:
- Place a lump of clay about the size of your fist 8 inches (20 cm) from the end of the dowel.

Activity:
- Balance the stick on the tip of your finger, putting your finger under the end that's near the clay. Now turn the stick over and balance it with the clay on the top. Notice that the stick is easier to balance when the clay is near the top.

What's Happening?

- The dowel rotates more slowly when the mass is at the top, allowing you more time to adjust and maintain balance. When the mass is at the bottom, the stick has less rotational inertia and tips more quickly. The dowel rotates more slowly when the mass is at the top, allowing you more time to adjust and maintain balance. When the mass is at the bottom, the stick has less rotational inertia and tips more quickly.

An alternate activity is to not demonstrate the experiment in advance. Instead, give the boys the clay and dowel separately, and challenge them to see who can balance the dowel the longest. Let them discover the role of the clay.

The Downhill Race

Two objects with the same shape and the same mass may behave differently when they roll down a hill. How quickly an object accelerates depends partly on how its mass is distributed. A cylinder with a heavy hub accelerates more quickly than a cylinder with a heavy rim.

Materials:

- 2 identical round metal cookie tins (such as cookie tins)
- 10 large metal washers (about ¼ pound each)
- Double-sided foam stick-on tape
- A ramp (find one, or make one from a plywood board)

Preparations:

- Arrange five of the washers evenly around the outside rim of the bottom of one tin. Stack five washers in the middle of the bottom of the second tin. In both cases, secure the washers with the foam tape.

Activity:

- Place both tins at the top of the ramp. Be sure the tops are on. Ask the boys to predict which tin will reach the bottom of the ramp first. Release the tins and let them roll down the ramp. The tin with the mass closer to the center will always reach the bottom first.

What's Happening?

- At the top of the ramp, both tins have identical potential energy, since both have the same mass and are at the same height.

- Though both tins have the same total mass, each has this mass distributed differently. It is harder to get the tin with its mass distributed along the rim rotating than it is to get the tin with its mass concentrated at the center rotating. The tin with its mass at the rim will use a greater part of its original potential energy just to get rolling than will the tin with its mass concentrated at the center.

- The tin with its mass concentrated around the rim will lose the race to the bottom of the ramp, and the tin with its mass concentrated at the center will win.

Try this experiment again by rolling cans of soup down the ramp. Solid soups roll down the ramp at a slower rate than liquid soups. The liquid does not have to rotate with the can, so the potential energy of the liquid soup can go into forward motion, not into rotation of the soup.

Yeast-air Balloon

The purpose of any leavener is to produce the gas that makes bread rise. Yeast does this by feeding on the sugars in flour, and expelling carbon dioxide in the process. Yeast is tiny: Just one gram holds about 25 billion cells. That amount of fungi can churn out a significant amount of carbon dioxide, provided it has the simple sugars it uses as food. Make a yeast-air balloon to get a better idea of what yeast can do.

Materials:

- 1 packet of active dry yeast
- 1 cup very warm water (105° F–115° F)
- 2 tablespoons sugar
- a large rubber balloon
- a small (1-pint to 1-liter) empty water bottle

Directions:

1. Stretch out the balloon by blowing it up repeatedly, and then lay it aside.
2. Add the packet of yeast and the sugar to the cup of warm water and stir.
3. Once the yeast and sugar have dissolved, pour the mixture into the bottle. You'll notice the water bubbling as the yeast produces carbon dioxide.
4. Attach the balloon to the mouth of the bottle, and set both aside.
5. After several minutes, you'll notice the balloon standing upright. If you don't see anything happen, keep waiting. Eventually, the balloon will inflate.

What's Happening?

- As the yeast feeds on the sugar, it produces carbon dioxide. With no place to go but up, this gas slowly fills the balloon.

A very similar process happens as bread rises. Carbon dioxide from yeast fills thousands of balloon-like bubbles in the dough. Once the bread has baked, this is what gives the loaf its airy texture.

Follow the Sound Tag

Give a bell or an empty container with dried beans in it to one player. All the other players are blindfolded. The one with the "noisemaker" moves around the area, ringing or rattling, while the others, guided by the sound, try to catch him. The player that succeeds becomes trades blindfold for noisemaker, and the game continues.

Fiz

All players sit in a circle and begin to count in turn, but when the number 5, or any multiple of 5 comes, they say "fix" instead. If anyone forgets this, he sits out, and the game starts over again. ("Buz" for 7 makes a more challenging game.)

Morse Code Game

Everyone sits in a circle and joins hands. The person with a birthday closest to July 1 starts the game by squeezing a message to the person seated on his right. It can be an ordinary squeeze, or a series of squeezes like Morse code. The message travels around until it comes back to the start. See how much the message changes. Try to do it quickly so that the message flashes around the circle in shortest time possible.

Scientist Match-up

Take the list of scientific fields of study in the "Match Those Ologies" Preopening activities section, and convert the names into names of scientists by dropping the 'y' and adding 'ist' to the end of the word. For example: Biology, becomes Biologist. Write each name on a separate 3"x5" index card. On another set of index cards, write the job description of each scientist. For example, "I study the atmosphere and weather" (job description for meteorologist). You may want to use different colored index cards for each set. Mix up the cards and hand out a card to each person. Have the players try to pair up their scientist with their correct job description. This is a good game for parents too.

Soda Pop

As an experiment, mix up an old-fashioned soda drink. It will not taste like commercially made sodas, but the bubbles will still tickle your nose.

Fruit drink, punch, iced tea or juice
½ tsp cream of tartar
¼ tsp baking soda
White sugar

Into a 2/3-full glass of fruit drink, punch or other beverage, add the cream of tartar and baking soda. If the drink you are using does not already contain sugar, add one teaspoon to the glass.

Stir for a few seconds, until the soda is bubbly, then taste quickly. You'll have to decide whether you like it enough to finish the whole glass. Experiment with different beverages and flavors or different proportions of the ingredients.