Science Sleuth



Here are some questions you can ask or investigate, just like a scientist. There isn't always a "right" or "only" answer—that's the challenge of sleuthing.

1. What's Vibration Got to Do with It?

Make a simple musical instrument that you can tune. Here are some ideas: bottle pipes (blowing across the top of water bottles), glass chimes (using a spoon against water glasses), comb kazoo (using tissue paper), drum (using plastic stretched across a cup), shaker (a container with dried beans), *maraca* (using a shaker with a handle), or idiophone (using your fingers to rub around the rim of crystal wine glasses). Listen to the pitches of the sounds and experiment with ways to change the pitches and add more notes. Then, try to explain how the sound is created using vibration, or play a simple melody.

2. The Science of Papermaking

How many kinds of paper can you find around your house? Compare the differences in color, texture, absorption, and composition. Create a paper-testing lab and choose different types of paper that are best for wiping up spills, painting, writing in ink, and writing in pencil.

3. Crystal Quest

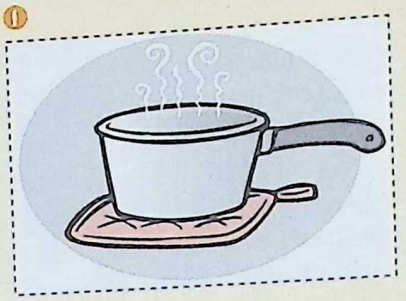
What do ice, diamonds, rock candy, quartz, and snowflakes have in common? Crystals, of course! Grow your own crystals by following the recipe below.

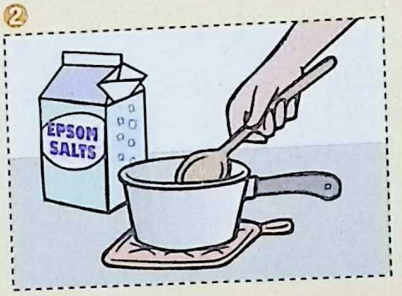
What You Need

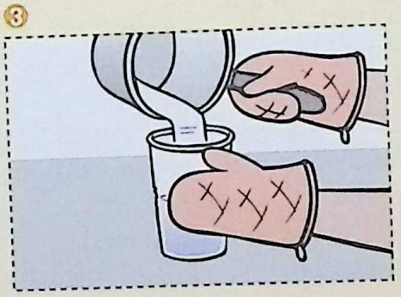
- Epsom salts
- Water
- Small saucepan
- Large spoon
- Pipe cleaner
- Food coloring
- Pencil
- Clear plastic cup

What You Do

1. With the help of an adult, boil the water in the saucepan, take the pan off the burner, and place it on a hot pad.
2. Using the spoon, slowly add the Epsom salts a little bit at a time, stirring constantly. Keep adding the salts until no more will dissolve or mix in.
3. Pour the solution into the plastic cup, almost up to the top.
4. Follow illustrations 4 and 5. Wrap the pipe cleaner around the pencil so that it hangs over and into the cup. Curl the end so that the crystals will have a good place to grow and suspend it in the solution.













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4. When Is Silver Green?

Find out what happens to different kinds of metals when they are exposed to air (oxidation) and weathering. Compare iron, silver, copper, and brass. Find at least five examples of metals, indoors or outdoors, that have undergone some kind of surface changes.

5. You Can't Escape Your Identity

With the help of a police officer, private investigator, or other professional, dust for and lift a fingerprint. Try comparing your fingerprints to someone else's and note the differences and similarities. Find out what other evidence, such as DNA from hair or skin samples, can be used to identify a person or a vehicle. The FBI uses seven main characteristics in fingerprint identification: the loop, arch, whorl, tented arch, double loop, central pocket loop, and accidental. Here are illustrations of the three most common. Can you find them in your fingerprints?

6. Water Questions

Have you ever seen a bug walking on water and wondered how it does it? Sometimes things look impossible to do, but if you know your science, there might be an answer. Here are some challenges to try with your friends, family, or troop members. Do at least two of the following:

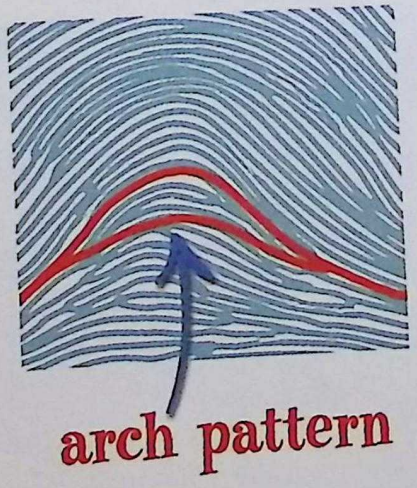
- Move water from one container to another without pouring it.
- Use water to show how that air exists, exerts pressure, and takes up space.
- Make something heavier than water float.
- Cause a plant to drink water indoors without watering it, as shown in the "Incredible Slurping Plant" activity in the Explore and Discover" chapter of your *Junior Girl Scout Handbook.*

7. Read the Directions—But How Does It Work?

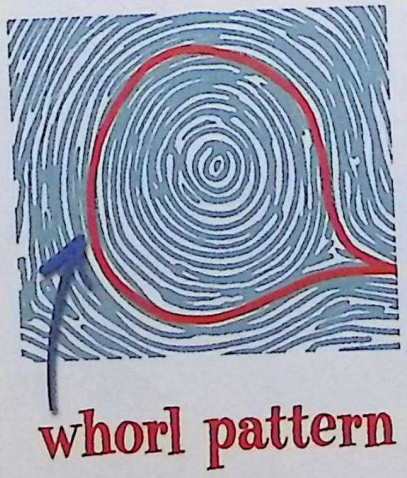
Find out how to hook up a computer to the Internet, a VCR to your television, or a music system to speakers. Demonstrate to another person how all the parts and pieces link to each other and what each piece of equipment does.

8. Seeing the Light

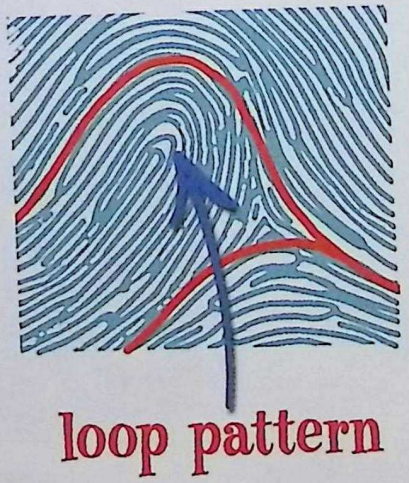
Your eyes can only see a portion of the light that is there—the white light. With technology, you can see other kinds of light on the spectrum, such as infrared or X-ray. Each type of light has its own signature pattern that can be seen when it is separated with a prism. Try separating light. Use a crystal or prism to separate natural light. Then separate light that is created by technology. Can you record the signature of a regular light bulb? The sun? A fluorescent bulb? Are there any differences?



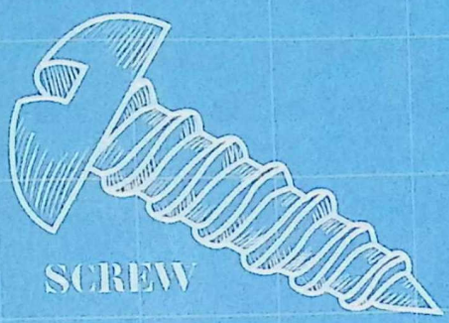
arch pattern

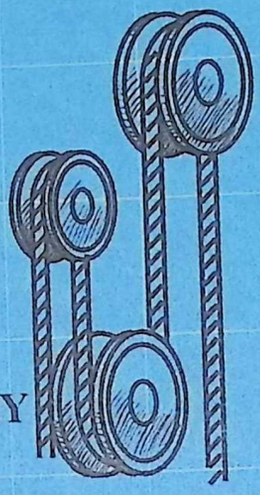


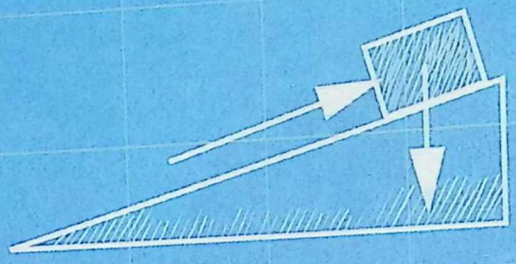
whorl pattern

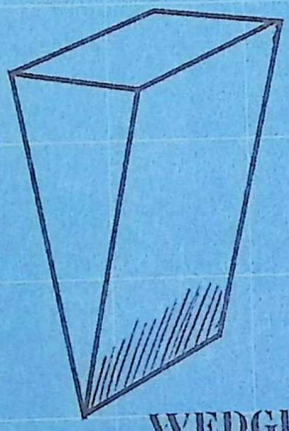


loop pattern

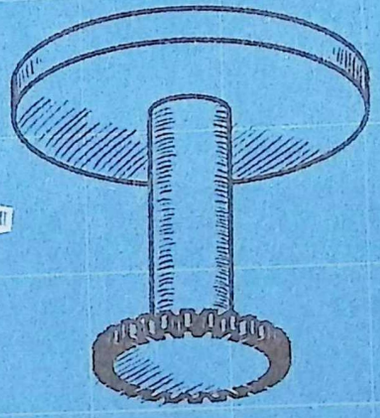












9. It's in the Genes

Genes "tell" each cell in your body how to develop. In the future, scientists may be able to anticipate and cure illnesses by mapping individuals' genes. Find out about a disease or condition that is believed to be linked to genes. Discuss the following with your troop, family, or another adult:

- In what situations would you want to know about your genes? In what situations would you not want to know? Why or why not?
- Do you think others should have access to information about your genes? Why or why not?

10. What Is a Simple Machine?

A machine is a device that helps use a force to move something and do work. See the six simple machines above. Do one of the following:

- Participate in a scavenger hunt where you find two examples of each of the machines, one indoors and one outdoors.
- Use at least three simple machines to put together a piece of equipment that will perform a job.
- Create a complex machine that combines two or more simple machines.