



High Touch High Tech[®]

Science Experiences That Come To You

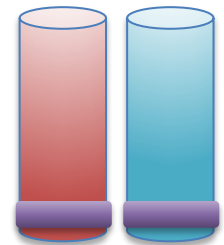
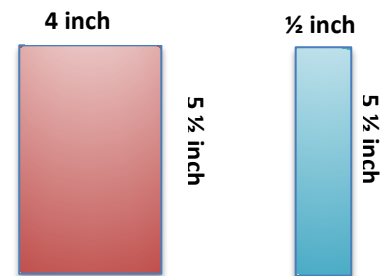
Binocular Build & Scavenger Hunt

Supplies:

- 2 Toilet paper tubes
- Ruler
- Yarn or string
- Elmer's Glue
- Optional: Modge Podge for stronger Adhesion or Hot glue gun (adult use only) or Glue sticks*
- 2 Rubber bands
- Scrapbook paper or construction paper
- Hole punch
- Scissors
- Clipboard
- Pencil

Construct your Binoculars!

1. Choose 3 colors of construction/ scrapbook paper
 2. Measure a 5 ½ x 4-inch rectangle on the paper
 3. Mark with a pencil
 4. Measure another 5 ½ x 4-inch rectangle on the second sheet
 5. Measure a 5 ½ x ½ inch strip on the third sheet
 6. Measure a second strip
 7. Cut out the 2 rectangles and 2 strips
 8. Glue the rectangles paper around the 2 toilet paper tubes
 9. Glue the strips around the end of each tube
 10. Let dry
 11. Use Hole punch to make one hole at the end of each paper tube.
(Not where you glued the strips)
 12. Glue the tubes together side-by-side
- ** (Modge Podge or Hot Glue Gun will make a stronger adhesion)
13. Measure 2 feet of yarn
 14. Lace the yarn through the hole on one tube
 15. Tie the yarn tightly onto the tube so it does not come undone
 16. Place the yarn around your neck to see how long you want it to be with the binoculars
 17. Now lace the yarn through the hole in the second tube. Tie it.



You've just created your own Scavenger Hunt Binoculars!



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The Science Behind It:

When we are exploring the outdoors, we walk quietly to not disturb the wildlife. If we hear an animal in the woods and want a closer look, we do our best to see the squirrel or bird or maybe even a deer. But, what if the animal is too far away to get a good look? We need binoculars to **magnify** faraway objects, so we can see them more clearly.

Binoculars are like telescopes to magnify distant objects. However, with a telescope you only look with one eye (**monocular vision**). Binoculars are used for **binocular vision** (using both eyes). The science behind binoculars is based on **light, reflection, and refraction**. These are the same scientific principles of how our eyes work.

When light travels through empty space, it goes in a straight line. When light travels through materials, such as glass, it bends. This is called **refraction**. When light hits a glass **lens**, it slows down and bends.

A **convex lens** curves like a dome. When light hits a convex lens, the rays bend toward the middle.) Convex lenses are used in magnifying glasses, because they make an image look bigger. A **concave lens** curves light outward. When light hits the concave lens, the rays spread out in all directions.

Binoculars use **convex** and **concave lenses**, in each tube. When a binocular points toward an object in the distance, the light from the object falls on the convex lens. The rays from the convex lens curves inward to form a focused image.

The image then lands on a second lens inside the binoculars. This is a **concave lens**, and it magnifies the image.

Because there are 2 tubes (basically 2 telescopes side-by-side), the binoculars have a **prism** between the 2 tubes inside the binoculars. The prism flips the image 180 degrees. This way, we can view the magnified image.

Binoculars are a wonderful optical instrument to use when exploring the outdoors. These devices are small but can provide a way to magnify the outside plants and animals without disturbing the natural habitat. Have fun on your scavenger hunt!

Now you are ready to go on Scavenger Hunt...Don't forget your binoculars!



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Scavenger Hunt with Binoculars

Earth is an incredible world with millions of different types of animals, called *species*. To help learn and remember these differences, scientists have special categories for the animals. There are 6 different groups of animals. The groups are mammals, birds, amphibians, reptiles, fish, and invertebrates. Every animal on Earth fits into one of these groups.

- *mammals* - dog, lion, monkey, polar bear
- *birds* – owl, eagle, cardinal, penguin
- *amphibian* – frog, salamander, toad (They live part on land and part in water.)
- *reptiles* – snake, turtle, alligator, lizard
- *fish* – angelfish, octopus, shark
- *Invertebrates* - butterfly, honeybee, spider, shellfish

Scientists estimate that there are between 10-100 thousand different species of animals. Even more amazing, around 10,000 new species of animals are discovered every year! It is believed that we have a long way to go to find all of the Earth's different living organisms.

A very important characteristic of all animals is they all have a type of body covering. What covers the bodies of mammals? They have hair or fur. What type of covering do fish have? Scales! What about reptiles? These animals also have scales. Some invertebrates, such as clams or oysters, have shell coverings. What type of body covering do birds have? Feathers! Finally, what are amphibians covered with? Slimy skin. Amphibians have a thin layer of skin that keeps their bodies cool and wet. Body coverings are very important for animals to help protect their bodies from the Sun, other animals, and the weather.

Scavenger Hunt List:

- 3 Types of Birds
- Listen for bird calls. How many do you hear?
- Locate a squirrel. Is it looking for acorns?
- Find a reptile.
- Look for a caterpillar
- Find an animal (besides a squirrel) that has a tail
- What animals have scales? Where do you need to look to find one?
- Find a spider's nest. (Look closely at tree branches and shrubs.)
- Observe colorful flowers. Do you see any butterflies or other insects?
- Look for an abandoned birds' nest



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- ❑ Find a hole in a tree? Who do you think lives there?

Animal Tracking:

- Find a muddy area. Do you see any animal tracks? How many?
- How many toes does the print have?
- Do you see any points that look like claws?
- How far apart are the prints? Use your ruler to measure
- What is the size of the print?
- Do you think there was more than one of this animal?
- Where is this animal going? Is there food nearby?
- Observe the colors and textures of the surrounding. What might an animal's skin or hair look like to blend in?
- Where is the closest body of water?
- What type of plants are nearby?
- Where do you think this animal lives?
- When do you hypothesize the animal made this print? Why?
- What other types of soft earth is good for animal tracking? (sand, snow)
- Find loose hair or feathers
- Are their animal droppings (also called scat)?
- Do you see any scratch marks on a nearby tree or fallen branch?

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