

Cave in a Bottle

Purpose: To model the processes involved in making caves and how groundwater can be affected by surface pollution.

TEKS: 7.8C

Materials:

| | |
|------------------|------------------------------|
| Sand | smooth-sided plastic bottles |
| Sugar cubes | dowel rods |
| Granulated sugar | scissors or X acto knife |
| Brown sugar | Styrofoam or plastic cup |
| Ice pick | press-n-seal wrap |
| Water | food coloring |

Advanced Directions:

1. Using the scissors or X acto knife cut off the top of the plastic bottle an inch to two inches below where the curve towards the lid begins.
2. Using the ice pick or scissors punch 6 to 8 small holes in the bottom of the bottle for water drainage.

Student Directions:

1. Write your name on your Styrofoam or plastic cup using a permanent marker, and set it aside.
2. Begin by placing a layer of sand about one inch thick in the bottle. Pack lightly with the dowel rod.
3. Next alternate layers of different types of sugar with layers of sand. Remember to pack lightly with a dowel rod in between each layer. Stop making layers when you are about $1 \frac{1}{2}$ inches from the top. The top layer **MUST** be a layer of sand.
4. Place the bottom of your bottle inside the cup.

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5. Slowly pour about 200 mL of water into the top of the bottle. Be extra careful not to allow the water to make a hole in the top layer of sand, and not to let the bottle overflow as you add water.
6. Once all of the water has been added but has not all drained through the top sand layer, carefully place a few drops of food coloring in only one area of the top layer of sand. The food coloring represents pollution.
7. Place a piece of Pres-N-Seal wrap on top of the bottle and make sure it is completely sealed.
8. Over the next few days, watch and observe as the water moves through your layers of sand and sugar. Watch as caves are formed in the layers of sugar. Note where the food coloring does and does not travel.