

TOUCH TOMORROW

A FESTIVAL OF SCIENCE, TECHNOLOGY, AND ROBOTS

ACTIVITY INFORMATION & INSTRUCTIONS

ACTIVITY NAME: Little Liquid Lenses

EXPLANATION OF ACTIVITY: In this activity, elementary students will learn how to make lenses out of water droplets to magnify words and images! This module will provide a gentle and fun introduction to the basics of optics and their applications.

GATHER THESE SUPPLIES FOR THE BOTTLE ROCKET

- Paper Towels
- Paper with pictures or words on it
- Cup of water
- Ruler
- Substrate material - (need only one: plastic wrap, Ziploc bag, Clear packing tape, clear take-out container lid)
- Pipette material - (only need one: Straw or hallow coffee stirrer, plastic spoon)

STEP BY STEP PROCESS

1. Find a piece of paper with pictures or words on it (like a magazine or newspaper page).
2. Choose ONE clear, flat **substrate** from the list of supplies. If you chose the packing tape, carefully stick a strip of packing tape on top of the words on your paper with text. Please try to avoid forming "bubbles" in the tape.
3. Place your substrate on top of your piece of paper.
4. Choose ONE **pipette** from the list (or picture) of supplies. (You will use this to form your lens)
5. Get a cup of water.
6. Use your pipette to put a water **droplet** on your substrate. (Straws work best).

If you choose the straw:

1. Put one end of the straw in your cup of water
2. Use a finger to cover the other end of the straw
3. Keep your finger on the top of the straw and carefully take the straw out of the water
4. Hold the straw above your substrate
5. Take your finger off of the end of the straw
6. Yay! You made a droplet!

If you choose the plastic spoon:

1. Put the tip of the spoon in your cup of water
2. Slowly take the spoon out of the water and let most of the water fall back into the cup
3. Keep only a small drop of water on the spoon
4. Hold the tip of the spoon above your substrate
5. Slowly tilt the tip of the spoon until the small drop rolls onto the substrate
6. Yay! You made a droplet!

7. Look at how the droplet changes the size of what is under it.
 - Are the words or pictures bigger or smaller?

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ACTIVITY NAME: Little Liquid Lenses (pg 2)

CHALLENGE

1. Use your pipette to make another droplet that is a different size than your first droplet.
2. Put the new droplet close to the first droplet on your substrate.
3. Lay the ruler down on the substrate next to one of your droplets and measure its diameter.
4. Repeat Step 2 for your other droplet.
5. Compare the effects of each droplet on the words or pictures under them.

Which droplet makes things bigger: the bigger droplet or the smaller droplet?

This droplet has the larger magnification.

COMMON PROBLEMS AND SOLUTIONS

Problem: My droplet is too big or in the wrong spot.

Solution: Use your paper towels to wipe up the water. Then, start again from the beginning of the steps.

Problem: I have a hard time moving or seeing under my substrate.

Solution: Please try a different substrate from the list of supplies and try again.

Problem: I have a hard time forming a water droplet with my pipette.

Solution: Please ask your parent, older sibling, or someone else for help. If you are still having trouble, please try a different pipette from the list of materials and try again.

Problem: I spilled my water or my droplet on my paper.

Solution: Please use your paper towels to clean up the water. Then try to find another piece of paper and start over.

