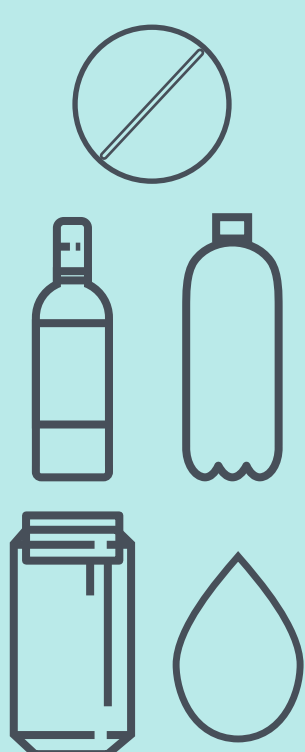


STEM EXPERIMENTS  
FOR YOUR HIGH  
SCHOOLER TO TRY:

# HOW TO MAKE A LAVA LAMP



## WHAT YOU'LL NEED:



- Effervescent antacid tablet (e.g., Alka-Seltzer)
- Vegetable oil
- Water
- Tall clear plastic container (1 or 2 liter bottle)
- Food coloring or beet juice

## WHAT TO DO:

- 1.** Fill the bottle about 2/3 full with oil.



- 2.** Add 8 to 10 drops of food coloring.



- 3.** Fill the rest of the bottle with water to a few inches below the brim.



- 4.** Add a half or quarter of an antacid tablet to the bottle.



**CONNECTIONS**  
ACADEMY®  
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STEM EXPERIMENTS  
FOR YOUR HIGH  
SCHOOLER TO TRY:

# HOW TO BUILD A BRIDGE



## WHAT YOU'LL NEED:



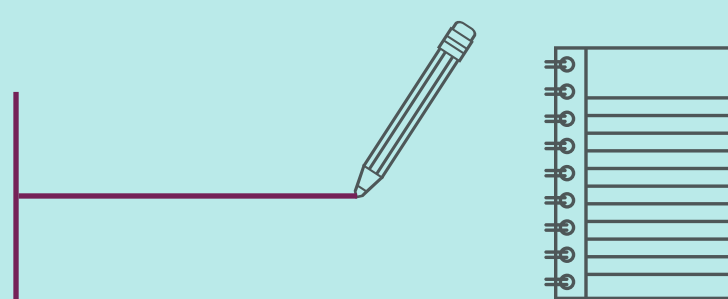
- Paper and pencil
- Popsicle sticks (from a craft store)
- Glue
- Tape
- Books
- 2 chairs

## WHAT TO DO:

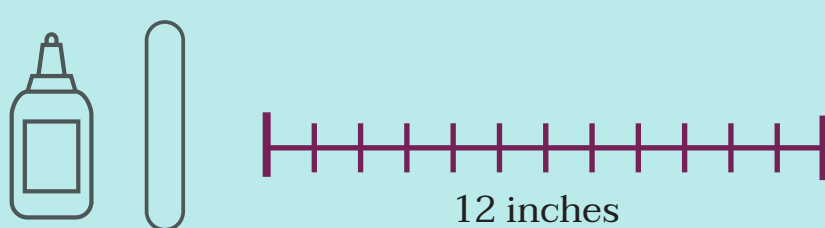
1. Research common types of bridges, such as beam, arch, truss, cantilever, suspension, and cable-stayed.



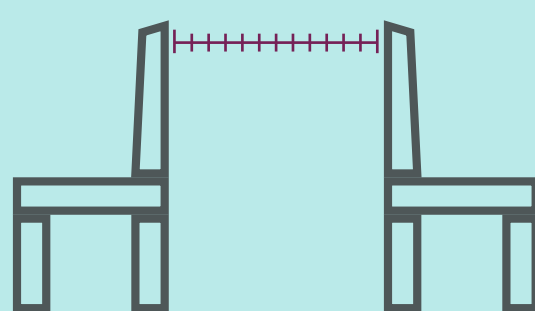
2. Design your bridge!  
Draw your design on paper.



3. Using popsicle sticks and glue, build a bridge that is at least 12 inches long.



4. Once the glue dries, tape (or get help to hold) your bridge between two chairs.



5. Place a book or two on the center of your bridge. Does the bridge hold?



6. Simulate an earthquake by shaking the chairs a little, then more and more.

7. If your bridge didn't stay up, redesign it and try again.

8. If it stayed up, make it longer and test it again.



## STEM EXPERIMENTS FOR YOUR HIGH SCHOOLER TO TRY:

# LEARN HOW THE DOPPLER EFFECT WORKS



### WHAT YOU'LL NEED:



- Tennis ball or whiffle ball (that you can cut open)

- Knife



- A 9-volt battery and connector

- A 9-volt buzzer (a high-pitched one works best)



- Scrap paper to pack inside the ball

- Heavy rubber bands or tape



- Strong string



- Optional: Toggle (on/off) switch (available at hardware stores)

### WHAT TO DO:

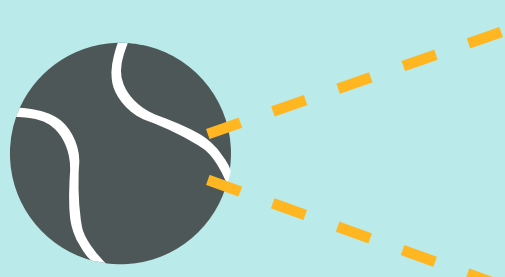
1. Cut a slit halfway around the ball with a sharp knife.



2. Connect one wire from one terminal on the battery to the wire from one terminal on the buzzer. (Be sure to connect the buzzer terminal—(+) or (—)—to the matching battery terminal.)



3. There will be a wire connected to the remaining terminal on the battery and another wire connected to the remaining terminal on the buzzer. Place both battery and buzzer inside the ball, leaving these two unconnected wire ends sticking out of the ball.



4. Pack the ball loosely with paper, positioning the buzzer close to the inner surface of the ball.

5. Twist the remaining two wires together to turn the buzzer on, then close the ball and secure the wires with rubber bands or tape. To turn the buzzer on and off more conveniently, wire a toggle switch into your circuit.



6. Attach the ball securely to a string and twirl it around your head or toss the ball back and forth with a partner. You might also have a group of students toss the ball around.

7. Notice how the pitch of the buzzer changes as the ball approaches you or moves away from you.

