

Idea Exchange

Grade: Elementary (Upper Intermediate)

Subject: Properties of Matter

Concepts: Air expands when heated

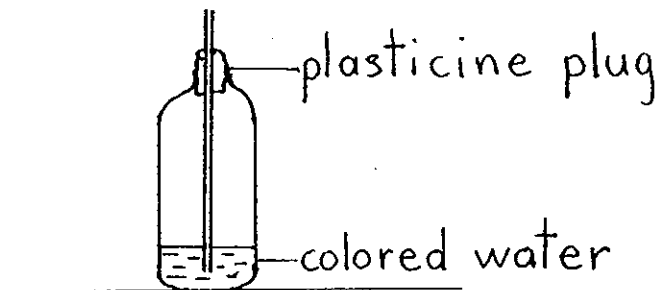
How a thermometer works!

Air pressure

THE THERMOMETER

Concept: Air expands when heated

Supplies: Snapple bottles (1 per 2 students)
Plasticine (not purple)
narrow straws
food colouring



Teacher makes up one "thermometer" ahead of time to show and motivate students. Also put about 2 cm of coloured water into student's Snapple bottles.

Teacher: We're going to make a special thermometer today and this is what it looks like. Take your Plasticine and make it into a ball. Take your pencil and poke it through the centre of the Plasticine ball. Place straw carefully through the centre of hole. Check to ensure that no Plasticine got into the opening of your straw. Gently squeeze Plasticine around straw so that it hugs the straw. Next place straw and Plasticine ball over mouth of bottle. Press down on Plasticine to seal bottle and ensure no air escapes. Adjust straw so that it's approximately 1 cm below the surface of the water.

What's inside the bottle? Can the air get out?

Student: Yes, the air can get out through the straw.

Teacher: But the end of the straw is in the water. Can the air travel through the water and up the straw?

Student: No

Teacher: Who has any ideas about how we can heat up the air inside the bottle?

Student: Put it in the sun.

Teacher: Yes, that would work. It would take a while though. Is there anything else we can do to heat it up more quickly?

Student: Blow on it.

Teacher: Why would that work?

Student: Actual response. - You're full of hot air!

Teacher: That's true. Let's blow on our hands and feel if the air is warmer. That would also take too long. Is there another possibility?

Student: Rub your hands together.

Teacher: Let's try it. Why are our hands warming up? What do you think will happen when we place our warm hands around the bottle?

Discussion: Did you see anything happen when you placed the Plasticine plug on the bottle?

Student: Some of the coloured water went up the straw.

Teacher: Why is that? What happened when you placed your hands on the bottle?

Student: The coloured water went up the straw.

Teacher: What was making the water go up the straw.

Student: Warm air rises.

Teacher: Where can it go?

Suggestion: (dramatize)

Have students pretend they are the warm air inside the bottle. They need more space and they try pushing up on the Plasticine seal but they can't get out so they try pushing down on the water.

Teacher: What is going to happen when we push down on the water?