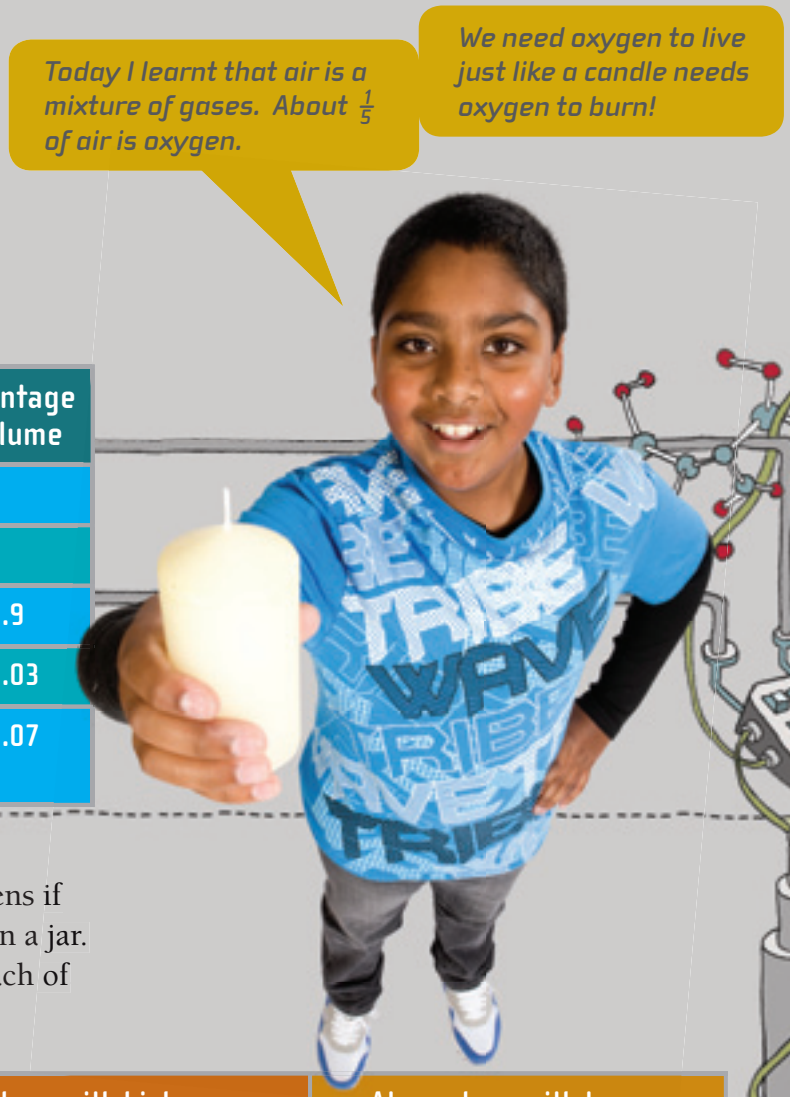
Invisible Resources

You need
- tealight candles
- a beaker or glass jar
- a peeled potato
- hydrogen peroxide
- vinegar
- baking soda
- a drinking straw
- a small dish, saucer, or empty candle base
- a timer or stopwatch
- sticky putty
- classmates

Activity

Even though we can't see it, air is a resource. People use air when they breathe. Plants renew air by removing carbon dioxide from it and adding oxygen.



Gases in the air	Symbol	Percentage by volume
Nitrogen	N_2	78
Oxygen	O_2	21
Argon	Ar	0.9
Carbon dioxide	CO_2	0.03
Other trace gases	Ne, He, Kr, Xe, H_2, O_3	0.07

Rajan decides to investigate what happens if you change the composition of the air in a jar. He times how long a candle burns in each of three different environments:

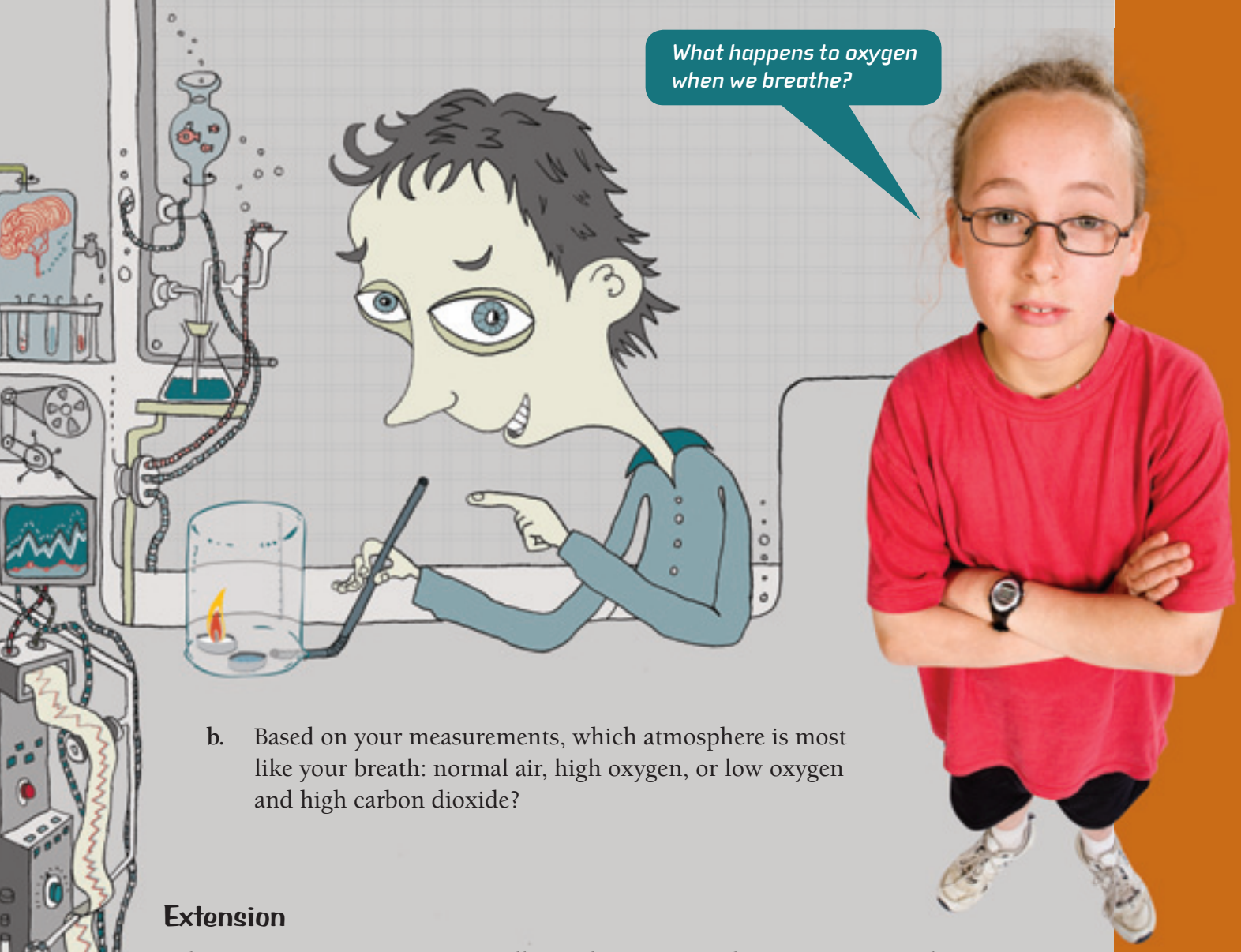
Normal atmosphere (control)	Atmosphere with high oxygen	Atmosphere with low oxygen and high carbon dioxide
Candle, water	Candle, peeled potato, hydrogen peroxide	Candle, vinegar, baking soda

1. a. In a group, with adult supervision, carry out Rajan's experiment. Time how long the candle burns in each atmosphere and record your data.

   b. What happens to the candle when you raise or lower the oxygen content?

   c. Estimate the percentage volume of oxygen in the high- and low-oxygen atmospheres compared with the 21 percent found in normal air. Explain how you made your estimate.

2. a. Repeat Rajan's experiment with a candle and water, this time using air you have breathed. You will need to decide on a good way to replace the air in the jar. Time how long the candle burns this time.



   b. Based on your measurements, which atmosphere is most like your breath: normal air, high oxygen, or low oxygen and high carbon dioxide?

Extension

When we use a resource, we usually produce waste. The main waste product of breathing is carbon dioxide. Use the results from your experiments to estimate how much oxygen your body converts into carbon dioxide when you breathe. Explain how you got your estimate.

Compare your results with those of others (or repeat the experiments). Why might results differ?

Focus Using percentages to make comparisons