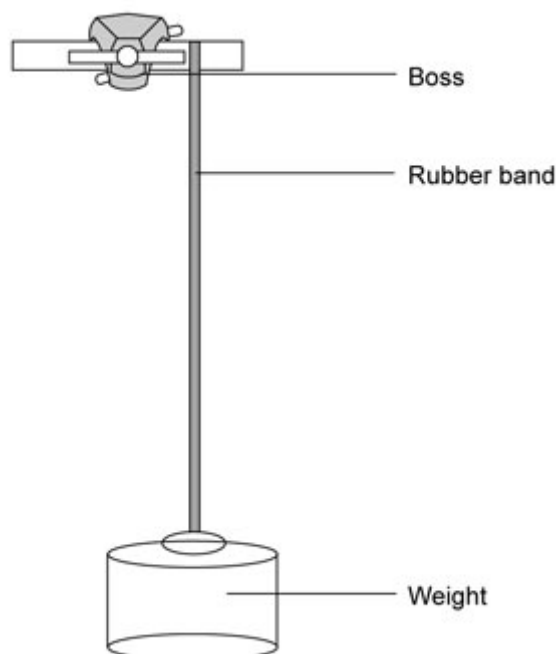


Rubber band experiment – student sheet

Introduction

This experiment involves an investigation into the effect of heat on a stretched rubber band.



Equipment

Apparatus

- Eye protection
- Rubber band, 0.5 cm wide (one for each participant)
- Hair dryer
- Weight >1 kg
- Ruler

Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3ELKqRS>
- Always wear eye protection.
- Ensure rubber bands are sterile and clean.
- Ask participant to stand back so that broken rubber bands do not drop weights onto feet.
- Hairdryers should not be brought from home, ensure all electricals used have an up-to-date pat test.

Procedure

1. Take the rubber band. Quickly stretch it and press it against your lips. Note any temperature change compared with the unstretched band.
2. Now carry out the reverse process. First stretch the rubber band and hold it in this position for a few seconds. Then quickly release the tension and press the rubber band against your lips.
3. Compare this temperature change with the first situation.

4. Set up the apparatus as shown in the diagram. Make sure that if the rubber band breaks, the weight cannot drop on feet.
5. Predict what happens if this rubber band is heated with a hair dryer.
6. Write down your prediction.
7. Measure the length of the stretched rubber band.
8. Now heat the rubber band using the hair dryer and observe the result.
9. Measure the new length.

Questions

1. Based on your initial testing (by placing the rubber band against your lips) decide which process is exothermic (heat given out): stretching or contracting of the rubber band?
2. The chemist Le Chatelier made the statement, '... an increase in temperature tends to favour the endothermic process'. Explain in your own words how this statement and how your answer to question 1 can account for your observations when heating the rubber band.
3. Draw a number of lines to represent chains of rubber molecules, showing how they might be arranged in the unstretched and stretched forms.