

FANTASTIC PLASTIC: TESTING BOUNCE

Many solid polymers are bouncy. Here you can test two different bouncy balls to see if they are the same. You will start by using the rubber ball you made in activity A4. Then you will make a ball from a different polymer called polymorph.

Task A

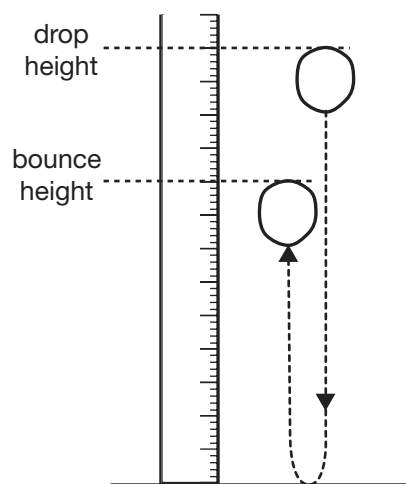
Testing your rubber ball – how high does it bounce?

1. Support a metre rule vertically on the floor using a clamp and retort stand.
2. Try dropping the ball and see how easy it is to measure the height to which it bounces.
3. Choose a sensible drop height and use the rule to measure the height from which you will drop the ball accurately.
4. Allow the ball to fall then note height to which it bounces. You may have problems with the balls not bouncing vertically. You need to think carefully how you will solve this problem. It will be difficult to measure the bounce height accurately and you may have to try several times before you get an accurate measurement.
5. Measure the bounce height accurately 3 times and take the average.

Task B

Making a ball from a different polymer (polymorph)

6. Make another ball using 'polymorph'. To do this, drop some polymorph beads into warm water (at about 62 °C).
7. The beads will begin to soften and stick together. Lift them out of the water using tongs, and dry with a fabric towel.
8. When the polymorph is cool enough to handle, mould it into a ball making it the same size as your rubber ball.



The polymorph will be very warm when it is first taken out of the hot water. Take care when you handle it. Do not handle until it is comfortable to hold it without feeling your hands are getting hot.

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Task C

Comparing the two balls

9. Test the bounce of the polymorph ball in the same way as you tested your rubber ball.
10. Which ball bounces higher?
11. Why do you think one ball bounces higher than the other? Use the idea of energy transfers to help your explanation.

Task D

Going further

12. For each ball, change the drop height and measure the bounce height three times again. Take the average.
13. Repeat this until you have measured the bounce height for 5 different drop heights.
14. Draw a graph for each ball (on the same axes) to show the relationship between drop height and bounce height.
15. How do the two materials compare for bounciness? Is one material always better than the other for all drop heights?
16. Is polymorph a thermoset or a thermoplastic? How can you tell?
17. Is rubber a thermoset or a thermoplastic? How can you tell?

