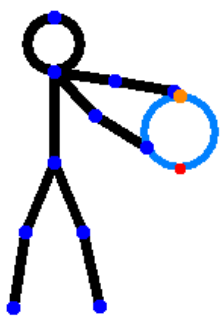
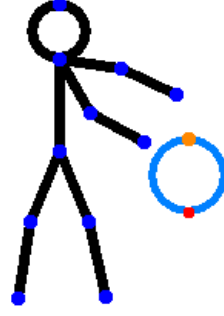
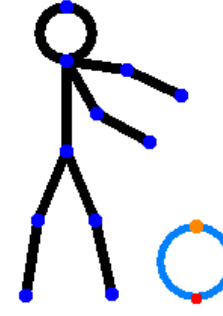
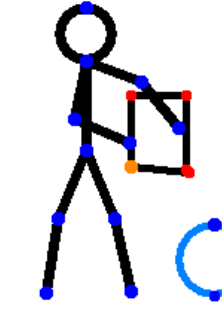


Maths for the Match

Football Bouncing Experiment – TEACHER COPY

- Number place and value.
- Measurement
- Mean average
- Draw and interpret graphs.

Hi Team, we need to work out what inflation does to the ball, and to help our players find a good amount of inflation for the big game.

The drill for the experiment:			
			
1. Hold the ball out at chest height.	2. Drop the ball.	3. Count the number of bounces.	4. Write down the score.

We're going to do this drill 5 times. Our average will be the most common number of bounces. Circle which ball and surface you are using. Write down your scores here:

Surface: **Hard Floor / Carpet / Astroturf / Grass**

Ball	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Average (Mean)



Surface: **Hard Floor / Carpet / Astroturf / Grass**

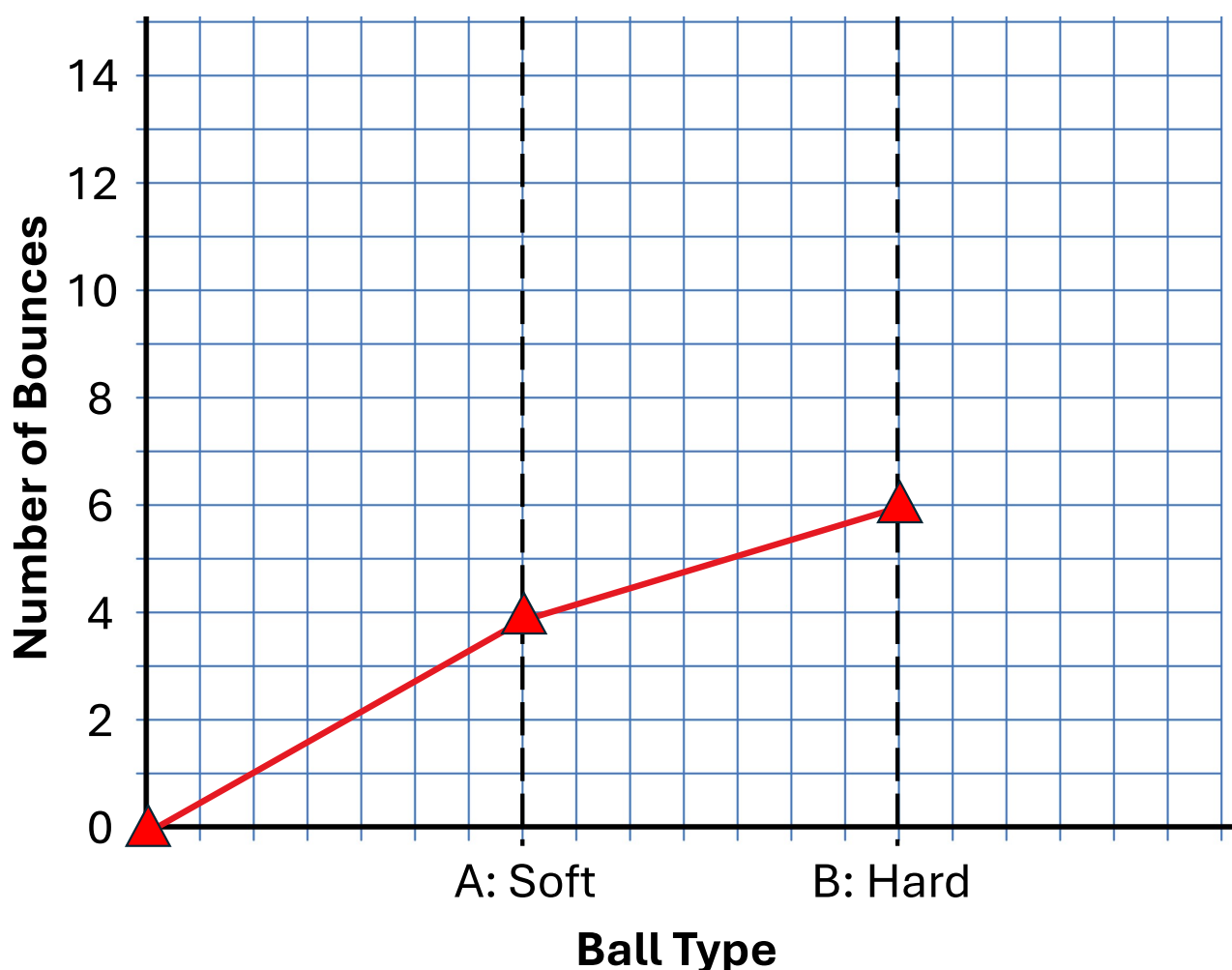
Ball	Drop 1	Drop 2	Drop 3	Drop 4	Drop 5	Average (Mean)

An example experiment has been done at Ashton Gate on the pitch, and plotted on the graph. Can you plot your data on the same graph?

Students are reminded how to plot data points and draw a line of best fit on the graph.

1. Mark your average for each ball type you tested using a **x**.
2. Remember, we go along the the bottom of the graph for the ball type, and up the side of the graph to mark the number of bounces your team counted.
3. How many bounces would you expect if there was no air in the ball?
4. Mark this on the graph using a **x**.
5. We can now draw a line of best fit through our marked **x** data points.

Surface	Marker
Ashton Gate Stadium Pitch	
.....	
.....	



Students may need assuring that they can draw over the current line, and that only the crosses are to be used in their line of best fit.

Now let's have a think about why this happens, there are some words below that you can use to help you answer the questions on this page.

Energy

Gravity

Friction

Air Resistance

Hardness

Inflation

Explain how the inflation of the ball affects the number of bounces?

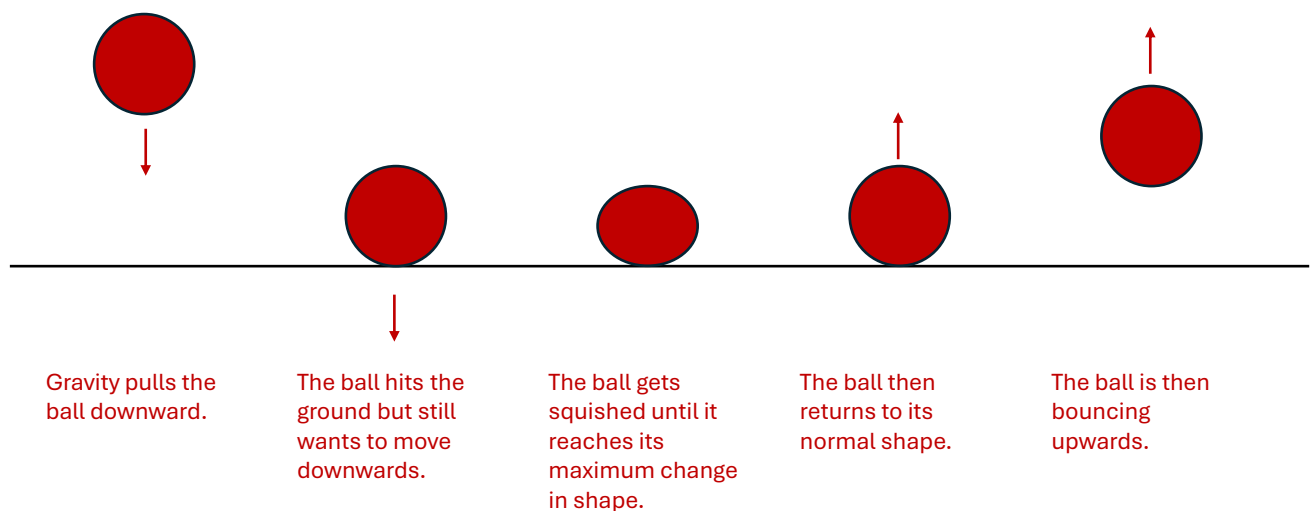
Students should recognise that the less the ball is inflated, the fewer the bounces.

Students may also recognise that there is a greater difference between having no inflation and some inflation than there is between a medium inflation and a high inflation.

Can you predict which ball would be best to score a penalty with? Explain your answer.

The best ball to score a penalty with would be the hardest ball, as it changes shape the least and so the energy from the footballer's kick goes into moving the ball.

Sketch and label what happens to the ball when it hits the ground. Why do you think this happens?



Gravity pulls the ball downward, against air resistance.

The ball hits the ground and some energy is lost to sound and heat but it still wants to move.

The ball gets squished until it reaches its maximum change in shape.

The ball then returns to its normal shape.

The ball is then bouncing upwards, working against air resistance and gravity.

Why do you think the surface changes how much the ball bounces? What surface do you think the team should play on?

The softer the surface, the more the surface will change shape when the ball hits it. This means that softer surfaces absorb more energy and will therefore result in fewer bounces of the ball compared to a hard surface.