

Bouncing Balls Science Experiment





Learning Objective

To investigate forces and how a ball bounces depends on variables and the momentum of transferred energy.

Curriculum Links

Science: ACSSU076 Investigating the effect of forces on the behaviour of an object through actions such as throwing, dropping, bouncing and rolling.

English- Literacy Interacting with others: ACELY1687 Interpret ideas and information in spoken texts and listen for key points in order to carry out tasks and use information to share and extend ideas and information

Mathematics Statistics and probability: ACMSP092 Describe possible everyday events and order their chances of occurring



Forces

We use force to move something.

Force is needed to stop or start objects moving. Force can make things go faster or slower.

For anything to make force it must have energy. The wind uses energy to blow the leaves, the sun uses energy to shine and we use energy to walk around.

When you kick a ball you are exerting force in a specific direction. That is the direction the ball will travel. Also, the harder you kick the ball the stronger the force you place on it and the further it will go.



Gravity

The heaviest object closest to us is Earth, so everything is pulled towards it. Without gravity everything on Earth would fly off into space.





Bouncing Balls Science Experiment

Bouncing Balls

You will need:

- tennis ball
- basketball
- smooth surface outside to bounce the balls
- ruler (optional)



Steps:

1. Decide a height you want to drop the basketball and tennis ball from. Use the ruler to measure the height. If you don't have a ruler, use a person to mark a height e.g. waist or shoulders.
2. Drop one ball at a time from the height you have chosen. Watch how high each ball bounces.
3. Next, place the tennis ball on top of the basketball and drop them together from the same height. Watch how high each ball bounces again.



Variations:

1. Replace the tennis ball with an object that doesn't normally bounce. Put the object on top of the basketball and see if it bounces.
2. Use different balls and bounce them from different heights.
3. Try the experiment on different outdoor surfaces.
4. Video your balls bouncing and watch them back in slow motion.

Explanation:



Gravity makes the balls fall to the ground when they are dropped. When a ball bounces, it has momentum and energy. When the two balls are bouncing together, the energy from the basketball transfers to the tennis ball. This makes the tennis ball bounce off with even more energy.

In order to answer these questions, complete the Bouncing Balls Science Experiment.





Fair Testing

Have a discussion: How can you make the testing fair?
Think about the variables:



A **variable** is anything that can be kept the same (controlled), changed (independent), or measured (dependent) in an experiment.



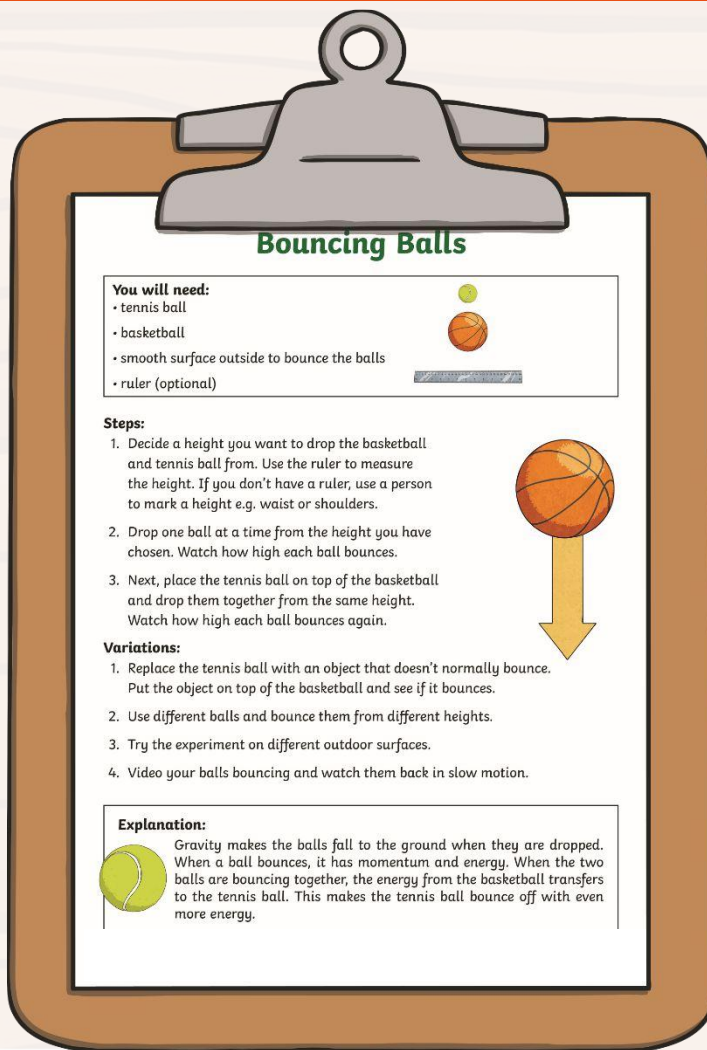
Variables

Investigate how high a ball will bounce

Independent Can be changed	Dependent Can be measured	Controlled Kept the same
The surface the ball is bounced on.	How high the ball will bounce.	The way we measure using centimetres on a ruler.




Now complete the experiment.



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Ball Forces Explained

Gravity pulls the ball down to the ground and the air resistance slows it down. The ground does not need to be touching the ball to apply the force.



The greater the mass of the ball, the more force it will take to accelerate the ball.

For every action, there is an equal and opposite reaction. This means that there are always two forces that are the same. In the example where you bounce the ball there is the force of you dropping the ball, but there is also the same amount of force. This force is in the exact opposite direction.



Ball Experiment

Gravity pulls the balls to the ground. The bigger the ball mass the slower it is accelerated, meaning less bounce.



