

Forces: To Move or Not to Move?

Equipment

- > Balls.
- > Items that might help or hinder motion e.g. ramps, carpet, lining, damp surfaces, shingle, other balls or obstacles.

Achievement objectives

- > Gain an understanding of the nature of physical phenomena from practical investigation and the consideration of scientific models. (Physical World Level 1/2)
- > Explore and establish trends, relationships, and patterns involving physical phenomena. (Physical World Level 3)

Learning outcome

- > Demonstrate and explain that a ball can be moved by either a push or a pull. It doesn't move until something happens to make it move.

Suggested assessment

- > Ask students to report their findings (in the form of a list, a diagram, or a verbal or visual presentation):
- > Name and describe some push or pull factors.
- > Explain what makes a ball move and what stops it moving.
- > Encourage students to keep and refer to their reports so they can add or alter information as they work through further activities.

Notes

- > This lesson is based on *Building Science Concepts*, Book 42.

Before this lesson

- > Students could examine various objects or systems in motion such as trying out a range of activities or gathering pictures of a skateboarder on a skateboard, a person riding a bike or kicking a rugby ball. Discuss ideas on whether the object or system is moving.

After this lesson

- > Students' ideas about gravity could be gathered and they could carry out experiments to investigate the effects of gravity acting on an object.

Teaching and learning

- > Challenge students to find as many ways as possible (perhaps setting a time limit) to make the balls move or to prevent them from moving.
- > Ask students to invent or carry out games that are especially related to the effects of hitting stationary balls or objects e.g. golf, cricket, bowls, T-ball, bat down, skittles and gutter board. Identify the 'push' forces (such as hands, other balls).
- > Encourage students to identify the 'push' forces (such as hands, other balls, wind) and how they combine.
- > Ask students to explain, giving their reasons where possible, what makes the ball move and what stops it moving.

What to watch for

- > Do students understand that a force has to act on a ball to make it move?
- > Can they describe the force?
- > Are students aware that if the opposing forces are balanced, the ball either remains still or moves at a constant speed in a constant direction?
- > During the games, can students predict how the marbles will act and give accurate reasons for their predictions?
- > Can students take more than one force into account when describing any changes in movement they see?

Ways to adapt

- > Explore and identify the effects of gravity and friction on other objects such as a moving skateboard.
- > Refer to *Building Science Concepts*, Book 42 for more ideas.