STEAM MACHINES

USE THE FORCE!

LEVEL

Level 3 – Level 4

ACTIVITY DESCRIPTION

Students conduct a test to establish how friction affects speed. They learn about force, motion, gravity and friction. Students investigate how a toy car or train will travel across different surfaces.

THEME

- Force and Motion
- Gravity and Friction

MATERIALS REQUIRED

- Access to three difference surfaces. Example: concrete, carpet, tiles, wooden deck.
- 1 metre measuring tape or ruler
- Toy car or toy train
- Piece of timber to act as a ramp

INSTRUCTIONS

Discuss questions with students around the concept of force.

What is a force? What is a contact force? What is a non-contact force? What is friction? Where are forces acting in my everyday life?

Introduce the concept of friction with students. Explore friction (forces working against each other) through pushing an object across different surfaces. Explain how the application of additional forces to objects upset balance and cause motion.

For example, kicking a ball, knocking down dominoes. Explore everyday situations where friction is an advantage and where it is a disadvantage.

Explore the concept of measuring forces and explain that forces have a unit of measurement (Newton: N), just as distance can also be measured and has a unit of measurement (metres: m; centimetres: cm).

Introduce the experiment to the students. Your task is to roll a toy car down a ramp onto three different services. You will measure the distance the car travels with a ruler or tape measure. The experiment needs to be a fair test. Before students begin their investigation they make a prediction of what they expect the outcome to be on the worksheet provided.

Discuss the factors that have to be considered to ensure the investigation is a fair test, i.e. what will change, what will be measured and what will be the same.

Students then undertake their experiments. On completion discuss the following worksheet questions to draw conclusions.

On which surface did the toy car travel the greatest distance?

Was your prediction correct?

How does friction affect the distance a toy car can travel?

SUGGESTIONS FOR ASSESSMENT

Ability to make predictions, successfully conduct an experiment, record results, and draw conclusions.

BACKGROUND INFORMATION

DEFINITIONS

Force is a push or pull between objects which may cause one or both objects to change speed and/or the direction of their motion (i.e., accelerate) or change their shape.

Motion means that something is moving. In science, motion is a change in position compared to a place or an object that is not moving.

Friction is a force that exists whenever two things move over or rub against each other.

Gravity is an invisible force that pulls objects toward each other. Earth's gravity is what keeps you on the ground and what makes things fall. Albert Einstein described gravity as a curve in space that wraps around an object, such as a star or a planet.

CURRICULUM LINKS

SCIENCE

With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge (VCSIS065)

Suggest ways to plan and conduct investigations to find answers to questions including consideration of the elements of fair tests (VCSIS066)

Safely use appropriate materials, tools, equipment and technologies (VCSIS067)

Use formal measurements in the collection and recording of observations (VCSIS068)

Use a range of methods including tables and column graphs to represent data and to identify patterns and trends (VCSIS069)

Compare results with predictions, suggesting possible reasons for findings (VCSIS070)

FRICTION EXPERIMENT

Name:

My prediction:

SURFACE	TEST 1 – DISTANCE TRAVELLED IN CM	TEST 2 - DISTANCE TRAVELLED IN CM	TEST 3 – DISTANCE TRAVELLED IN CM

On which surface did the toy car travel the greatest distance?

Was your prediction correct?

How does friction affect the distance a toy car can travel?