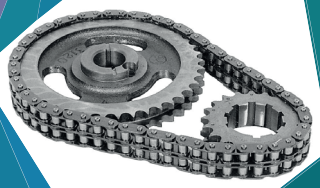
Making Primary Science Assessment Work



Assessing Forces -
Teacher's information Key stage 2

EduKent
discover the advantage

The Big Idea

There are a range of forces that can act upon objects, and some of these forces can have a greater effect when a mechanism is used.

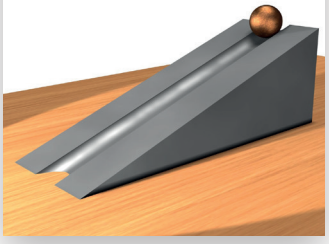
Programme of Study

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.










Possible evidence of children's learning

1. Children's books

- This topic lends itself well to a range of enquiries. As such, children will have many opportunities to use scientific forms of recording; tables, bar graphs and line graphs.
- There could be plentiful opportunities for predictions and conclusions to enquiries, including fair tests
- There could be written methods that children have developed, probably including the identification of dependent and independent variables.
- Drawing of objects and the forces acting between them could be drawn in children's books. Children could offer explanations as to the effects of the different forces.
- Children could stick in photos, or draw mechanisms that they have constructed. They could include explanations as to the effects of these mechanisms.

2. Big books

- Photos from the world outside of the school showing the forces being studied and the mechanisms being explored can be stuck in the book, along with children's explanations as to what is happening.
- Results, conclusions and evaluations from enquiries could be placed in this book.
- As a result of outcomes from enquiries, children could generate further questions that could also be placed in this book.

3. IT

- Groups of children can produce presentations, including video, explaining forces and the effects of different mechanisms.

4. Models

- Children could make products that illustrate the different forces; e.g. parachutes, cars on surfaces, boats in water, etc.
- Children could design and build a range of products to illustrate the workings of the different mechanisms. These could include fairground rides, pop-up books, pulleys for wells, drawbridges, water mills, etc.

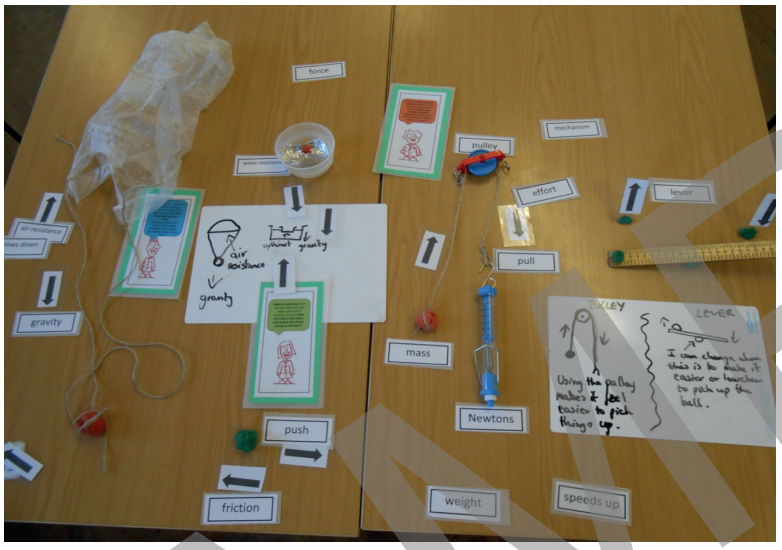
Probing questions for the teacher

- If I were to lift an object into the air and then let go, what would happen and why?
- How could we slow down the rate at which an object is pulled towards Earth? Can you explain which forces are acting upon the object?
- Which forces are acting on a boat as it travels through the water?
- Can you explain the effect on the force required to lift an object when a mechanism like a pulley or lever is used?
- Can you explain what happens to the force required to move the back wheel on a bike when we use the gears?

Possible tasks for TCM (Tactile Concept Map)

Resources required (This list is for each group. Suggest using no more than three children in a group)

- Key word cards
- Blank pieces of card
- Arrows
- Pencil
- Plasticine
- Plastic bag
- String
- Foil
- Tub of water
- Pulley
- Ruler (can be used as a lever)



1. Question Card 1 - The children could roll some of the plasticine into a ball. They could then pick up this ball and let go. Using some of the other resources (e.g. plastic bag and string) they could try to slow down how quickly the ball falls. They could draw what happens, and explain the forces acting on the ball (and parachute).
2. Question Card 2 - The children could make a small boat from the foil. They could place it in the water and push it around. Finally, they could draw the boat in the water, and explain the forces acting on the boat.
3. Challenge Card 3 - The children could be challenged to make a pulley, and a lever to pick up the plasticine ball. In both instances, they could measure the amount of effort required compared to lifting it without either a pulley or a lever.
4. Sorting cards. (PowerPoint). Each group of children can be given a paper copy of the slide headings and each of the statement cards. The children must place each of the statements under the heading that they think fits.

Teacher assessment grid for ongoing assessment of achievements

Learning expectations	Group 1 (lower ability)	Group 2 (average ability)	Group 3 (higher ability)	Comments
Can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.				
Can identify the effects of air resistance, water resistance and friction, that act between moving surfaces.				
Can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.				

Children's attainment in Forces

Children below the learning expectations	Children above the learning expectations

Children attaining above these expectations could be:

- Using Newtons (N) as a measurement of force.
- Identifying a range of different forces acting upon objects in many different situations.
- Predicting the outcome when changing one or more of the forces acting upon an object.
- Predicting the effect of a lever, pulley or gear on a force being applied.
- Explaining how the mechanisms work in a range of real life situations.
- Explaining how gears, pulleys and levers could be altered in such a way that it would increase or decrease the effect of the force applied to them.