Level

F	1	2	3	4	5	6	B6

Ways of moving

Strand
Energy and Change

Key concept
The forces acting on objects influence their motion, shape, behaviour and energy.

Purpose

Activities in this module are designed to help students understand that objects move and behave in different ways. Students have opportunities to:

- observe and collect information about objects that move and behave in different ways;
- handle materials and investigate the movement of different objects;
- analyse what affects the ways in which things move;
- communicate their understandings of how objects move and behave in different ways.

Overview of activities

The following table shows the activities in this module and the way in which these are organised in **introductory**, **developmental** and **culminating** phases.

Introductory ►	Developmental ►	Culminating
Movement re-enactments	Things move when we …	Making something that moves
Moving while playing games	Exploring shape	
Live animals in the classroom	Direction	

QUEENSLAND SCHOOL CURRICULUM COUNCIL

Core learning outcomes

This module focuses on the following core learning outcomes from the Years 1 to 10 Science Syllabus:

Energy and Change

1.1 Students collect information about the ways that objects of different shapes and sizes move.

2.1 Students demonstrate different ways that forces (including push and pull) change the shape and motion of objects.

Activities in this module also provide opportunities for students to demonstrate a level of understanding before Level 1.

Core content

This module incorporates the following core content from the syllabus:

Energy and Change

Motion and forces

- floating, sinking, rolling, sliding, falling
- pushing/pulling

Assessment strategy

Suggestions for gathering information about student learning are provided in each of the activities in this module. Once sufficient information has been collected, judgments can be made about students' demonstrations of outcomes. Typical demonstrations of this module's intended outcomes are provided here to indicate the pattern of behaviour to look for when making judgments.

Energy and Change

Foundation Level

Students are developing an understanding of the ways that things move and behave and can communicate some of these ideas.

Students may:

- push and pull objects to make them move;
- move their bodies in various ways;
- explore ways of changing the shape of objects — for example, squeezing, pushing, dropping.

Energy and Change

1.1 Students collect information about the ways that objects of different shapes and sizes move.

Students may:

- make observations and identify when an object moves or changes shape;
- describe moving objects they observe, using appropriate vocabulary;
- describe movements performed (for example, kick, slide, roll) verbally, with drawings, or in writing;
- predict what may happen when objects of different shapes and sizes move;
- observe demonstrations of how students and objects move;
- experiment with making things move;
- communicate their observations through discussion, mime and drawing.

Energy and Change

2.1 Students demonstrate different ways that forces (including push and pull) change the shape and motion of objects.

Students may:

- generalise that, when something moves or changes shape, it is due to a push or pull;
- describe components in sequence of a bigger action (for example, kick: lift leg, move foot forward);
- predict the direction in which an object may move when a push or pull is applied;
- construct meaning about forces and their effects.

Background information

Current scientific conceptions

Forces acting on objects

A force is a push or a pull and can cause things to:

- speed up or slow down;
- start moving or stop moving;
- change direction;
- change shape.

The greater the force on an object (the bigger the push or pull) the greater will be the effect. When opposing forces acting upon an object are equal, there will be no resultant change in the motion of the object; however, the shape of the object may be changed. For example, a balloon pressed equally on opposite sides may not change its relative position but may change shape.

Understanding the concept of force

Young students are active investigators and are eager to learn about their immediate environment. When students begin to study scientific concepts concerning forces, they may often find that they are discussing qualities and concepts that are not immediately obvious or easily detected with human senses. For example:

- forces cannot be seen; it is only their effects that can be detected;
- some forces cannot be felt directly;
- in some situations forces are present, but the source of the force cannot be seen;
- a push or pull does not involve only one force but a pair of forces ('action' and 'reaction') acting in opposing directions;
- sometimes only one of the effects of a number of forces acting can be seen, felt or measured.

Students' prior understandings

Students' prior understandings may differ from current scientific conceptions in a range of ways.

Some students may think that:

- forces exist 'in' or 'on' objects;
- objects 'use up' or 'run out of' force;
- force is something used by someone to make you do things.

Teachers can help students build on their prior understandings by encouraging them to observe people and objects moving in everyday situations. Young children are very active in the games they play. If the focus is on situations that are familiar to students, they will be able to describe in simple terms the motion of objects and people. Through re-enactments students will be able to experience what a push or pull feels like; this should assist them to construct new understandings.

It is important for students to realise that in any situation there are always forces acting. Even when we are standing still, or an object is resting on a table, there are still forces operating. Concepts such as 'equal and opposite forces', 'gravity' and 'friction' may be difficult to explain, so activities need to focus on what students are able to see or feel — that is, the **effects** of forces. Explain that if an object moves or changes shape then one force must be greater than another.

Terminology

Terms associated with forces, motion and energy are essential to the activities in this module — for example:

air resistance	forwards	push
backwards	friction	ramp
changing direction	gravity	simple machines
changing shape	lever	speed
changing speed	load	travel
energy	opposite	wheel
equal	pull	work
force	pulley	

Students may already be familiar with some of these terms, and understand their meanings and use in scientific contexts. If so, the activities in this module will provide opportunities for them to evaluate current usage. If not, these activities will provide opportunities for students to develop their understandings.

School authority policies

Teachers need to be aware of and observe school authority policies that may be relevant to this module.

Safety policies are of particular relevance to the activities that follow. It is essential that demonstrations and student activities are conducted according to procedures developed through appropriate risk assessments at the school.

In this module, teachers need to consider safety issues relating to:

- exposure to the sun during outdoor activities;
- moving heavy objects;
- activities that involve climbing outdoor equipment, playing games and investigating falling objects.

Teachers also need to consider policies relating to the ethical care and use of animals in the learning environment.

Support materials and references

Bryant-Mole, K. 1996, *Forces*, Science All Around Me series, Heinemann Library, Oxford.

Education Queensland 1997, *The Care and Use of Animals in Schools: Policy and Guidelines*, Brisbane.

Farrow, Steve 1996, *The Really Useful Science Book: A Framework of Knowledge for Primary Teachers*, Falmer Press, London.

Ginns, I. (ed.) 1993, *All about Forces*, Science Alive series, Mimosa Publications, Melbourne. The series comprises *All About Forces*, *Down*, *Nature's Forces*, *Gripping and Slipping*, *Work and Machines*.

Monaghan, B. (ed.) 1991, *Look! Book 2 — Australian Science and Technology*, Longman Cheshire, Melbourne.

Queensland Department of Education
1982, *Primary Science Sourcebook: Activities for Teaching Science in Year 1*, Brisbane.
1982, *Primary Science Sourcebook: Activities for Teaching Science in Year 2*, Brisbane.
1996, *Aspects of Science Management: A Reference Manual for Schools*, Brisbane.

Wenham, Martin 1995, *Understanding Primary Science: Ideas, Concepts and Explanations*, Paul Chapman Publishing, London.

Organisations

Living Eggs
181 King Street
Buderim 4556
Tel: 1800 673 447
Fax: (07) 5477 0030
Website: http://www.livingeggs.com.au
Email: info@livingeggs.com.au

This company will lend out an incubator and supply embryo eggs three to four days from hatching under their Ready Hatch program. (This service is available in Brisbane, at the Gold Coast and Sunshine Coast, and in Sydney, Melbourne and Adelaide only.)

Queensland Museum
Education Loan Section
78 Grey Street
South Brisbane
PO Box 3300
South Brisbane 4101
Tel: (07) 3840 7606 or (07) 3840 7170
Fax: (07) 3840 7610
Website: http://www.qmuseum.qld.gov.au
Email: loans@qm.qld.gov.au

The museum will lend Theme Kits containing preserved animals to schools throughout Queensland. Living animals are available for loan to schools within easy access to South Brisbane only; animals must be returned the same day. The museum recommends that inquiries be made by telephone well before activities are to be presented.

Queensland Sciencentre
PO Box 426
Brisbane Albert Street, Q 4002
Tel: (07) 3220 0166
Fax: (07) 3220 0113
Website: http://www.sciencentre.qld.gov.au
Email: info@sciencentre.qld.gov.au

Facilities at the Sciencentre provide opportunities to explore force and motion phenomena with novel machines. Agricultural shows, entertainment fairs and workshops with special purpose tools may provide similar opportunities and experiences.

ACTIVITY

Movement re-enactments

Introductory

Focus

This activity provides opportunities for students to reflect on their past experiences of how people, other organisms, and objects move and to share their knowledge and understanding.

Materials

- Resource Sheet 1, 'People and things moving'
- photographs and drawings of people, animals and objects moving
- large sheets of paper
- video showing in detail movement of living things (optional)

Teaching considerations

Create spaces for students to work in groups of no more than four. Allow enough space for them to make large body movements.

Copy and enlarge the illustrations on Resource Sheet 1 or use clip art or pictures from magazines, newspapers and advertising brochures showing people and things moving. Suggested subjects include:

- basketball player in wheelchair
- bats
- bike rider
- boat
- car
- dancer (Aboriginal or Torres Strait Islander, ballet, flamenco, disco)
- frog
- possum
- rollerblader
- runner
- soccer player
- students making sandcastles
- student on a trampoline
- students washing the dog

Ensure that there are several pictures for the members of each group.

The large sheets of paper on which lists of movements are recorded should be kept for use in future activities.

Show a video of animals moving. Use the slow motion facility to help students see the movements in detail.

The first part of the activity is based on movements associated with dancing. If students have no experience of dancing, use a sport with which they are familiar as an alternative stimulus.

Working scientifically

Time: 60 minutes

Making and judging observations

Improvising and performing

▶ Guided by the teacher, students consider the different movements a dancer could make. Movements suggested are listed on the board. One student models being a dancer. The following questions are suggested to guide students' thinking and to prompt the model dancer:

- How do dancers move their arms and hands?
- When the dancers are standing still, in what position are their feet?
- When they are dancing, what parts of the dancers' feet touch the ground?

▶ Working in small groups, students explore what they already know about movement. They:

- select a picture;
- list what they know about the movements that this person, animal or object makes;
- pretend to be that person, animal or object and then add more movement ideas to their list;
- select one of these movements to mime to the class.

The following are some questions that could help students with this activity. Most can be adapted to suit pictures featuring either people, animals or objects:

- Does this person move quickly or slowly? Describe the way the person moves. Suggest why the person moves in this way.
- When moving, does this person make any other things move? How does the person do this?
- In what other ways could this person move when doing the same activity?
- What does the animal use to help it to move?
- Why does the animal move?
- What do we name the way that the animal moves?
- What makes the object move?
- Is the object able to move by itself? How does it move and why?
- What could be done to make the object move in a different way or in a different direction?

▶ Students prepare a presentation about the movements featured in their pictures. Each group identifies the person, animal or object and the specific action — for example, 'We are platypuses foraging for food'; and the smaller movements that combine to make the 'whole action'.

▶ Each group presents its findings to the class. Students' responses to the task and to the questions are listed on the board or on a large sheet of paper.

Additional learning

▶ Students view videos showing movements and behaviours of a variety of animals. They discuss the different types of movements made by the animals and relate these movements to animals' sizes and shapes.

Gathering information about student learning

Sources of information could include:

- students' contributions to discussions;
- students' presentations;
- class list of movement words.

ACTIVITY

Moving while playing games

Introductory

Focus

This activity provides opportunities for students to observe the different movements and actions that occur in the games they create and play.

Materials

For the class:

- marker pen and large sheets of paper for word bank

For each group:

- equipment for selected game

Teaching considerations

To acknowledge that students learn while they play, develop activities around games and sports they already engage in. To promote learning, encourage students to pause in their play and make observations of their actions.

Games could include water play, hopscotch, climbing on playground equipment, cricket, grip ball, marbles, playing with blocks, puppetry, kite flying, cars and ramps, and role-play in various places and situations — for example, at home, at the hairdresser, in a shop, on a spaceship, in a bakery, on the telephone.

Create or add to the students' word bank by recording, for future reference, lists of words used to describe movement.

Working scientifically

Time: 45 minutes

Making observations
Playing
Exploring and elaborating ideas

▶ Guided by the teacher, groups of students take turns to observe the movements and actions of their classmates playing games. Focusing on one student, they discuss questions such as:

- What action or movement can you see?
- What do the hands do when the student is _____ (for example, climbing)?
- Do both hands move together?
- What do the feet do when the student is _____ (for example, jumping)?
- What part of the body is on the slide when the student goes down?
- What is the trunk of the student's body doing during this activity?
- What parts of the foot are on the ground when the student is walking slowly? When running quickly?

▶ All students take turns at playing the games observed so that, as well as seeing the movements, all students feel them in their bodies.

▶ Guided by the teacher, discuss the movements observed in different activities. Words used to describe movements are recorded on large sheets of paper.

Additional learning

► Students:

- record their own list of movements for their specific game (in words or drawings);
- try out other groups' games and add to their original list of movements;
- draw a picture (or a series of drawings showing the sequence of motions) of an object that can move and describe or label what they have drawn.

Gathering information about student learning

Sources of information could include:

- students' contributions to discussions.

ACTIVITY

Live animals in the classroom

Introductory

Focus

This activity provides opportunities for students to observe a live animal moving.

Materials

The following are suggested ways of providing opportunities for students to observe live animals:

- borrowing animals through the Queensland Museum's lending service and/or chickens or hatchings eggs from Living Eggs (see 'Support materials and references', pp. 5–6);
- visiting a zoo or a farm approved for school excursions;
- asking a student to bring a pet to school for the day;
- having classroom pets (e.g fish, tadpoles or frogs).

Teaching considerations

Students may need to make several observations of different animals before being able to construct understandings about how the shapes of different body parts relate to different kinds of movement. Before being able to make the observations necessary for this activity, some students may need encouragement to overcome their fear of the unknown and to feel comfortable about handling live animals.

Refer to school authority policies relating to the care and use of animals in schools.

Safety

Inform students about safe practices for investigating and handling animals — for example:

- Handle animals in a safe, gentle and non-threatening way.
- Minimise disturbance to animals.

Working scientifically

Time: 15 minutes plus time over several days for informal observation

Exploring phenomena
Making observations
Making comparisons
Exploring and elaborating ideas

▶ Students observe an animal over several days. They are encouraged to:

- watch the way it moves and observe how the animal uses different body parts as it moves;
- handle the animal and feel it move.

▶ They discuss their experiences and recount them to peers and parents or carers.

Gathering information about student learning

Sources of information could include:

- students' observations of animals.

ACTIVITY

Things move when we …

Developmental

Focus

This activity provides opportunities for students to develop their understandings of how to move things.

Materials

- wooden drama box or cardboard box big enough for a child to sit in
- long rope
- large open area
- chart paper and pens for each group
- wheelbarrow

Teaching consideration

Part of this activity is based on material in *Primary Science Sourcebook: Activities for Teaching Science in Year 1*, p. 39. Refer to this material for further ideas on pushing and pulling.

Working scientifically

Time: 40–50 minutes

Exploring phenomena
Making links
Creating presentations
Creating diagrams
Describing

▶ Students work in small groups for about 10 minutes to create a poster that shows different ways they can make something move — for example, **kicking** a ball, **pushing** a chair, **lifting** a pencil.

▶ Guided by the teacher, students explore ways of moving a wooden drama box that has been placed on the floor or ground. A cardboard box with something in it to stabilise it could be substituted for the wooden box. Students carry out the following actions:

- one or more students **push** until the box slides easily along the floor or ground;
- tie a rope around the box and **pull** on the rope to move it.

▶ Students repeat their attempts to move the box, this time with two students sitting inside it. If a cardboard box is used, only one student should sit in it.

▶ Students discuss their experiences of trying to move the box. Questions to guide discussion could include:

- Was it easier to move the box when it was empty or when the student was sitting in it?
- Which was heavier — the empty box or the one with the student in it?
- Is it easier to move a lighter box or a heavier box?
- Which was easier — pushing the box to start it moving or pulling the box?

▶ Students explore movement using a wheelbarrow. They wheel the barrow with nothing in it and then load it with sand and wheel it around. They compare the two experiences.

Questions to assist students' thinking could include:

- What makes the wheelbarrow move?
- Is it easier to make the wheelbarrow move when it is full or when it is empty?
- Why do people use wheelbarrows?

▶ Students make links between the two parts of the activity. They discuss the question: 'What could we have done to the boxes to make them easier to move?'.

▶ Students return to the posters created at the beginning of the activity. They:

- select one of their ideas about ways to move things;
- prepare a demonstration to show the class the required movement or action;
- explore the flow of movement and the different stages of the movement;
- discuss what they could feel at different stages of the movement.
- draw a diagram of the movement or action;
- add arrows to the diagram to show the push or pull points.

▶ Students display their diagrams for future reference.

Additional learning

▶ Students brainstorm a list of objects that move. They sort the objects that move into two categories: objects that move as a result of being pushed, and objects that move as a result of being pulled.

Gathering information about student learning

Sources of information could include:

- students' charts;
- students' contributions to the investigation and discussion about it;
- students' diagrams showing the pushes and pulls.

ACTIVITY

Exploring shape

Developmental

Focus

This activity provides opportunities for students to develop their understandings of how the shape of something affects the way it moves.

Materials

- Resource Sheet 2, 'Predict, Observe, Explain'
- modelling clay or similar compound
- container filled with water
- sheets of newspaper
- a sandpit and a concreted area
- a board from which a student can step into the sand or onto the concrete

For investigating rolling and sliding:

- blocks of various shapes (cylinder, cone, cube, pyramid, rectangular prism, sphere)
- objects of various shapes and materials (cubed dice, drink container, tennis ball, toothpaste box)

Teaching considerations

Plan a series of sessions so that students can participate in all the investigations over a period of time, or students could try several investigations over two or three days and report their results to other students.

Consider using a Predict, Observe, Explain strategy (see Resource Sheet 2) as one way of encouraging students to think about the activity, to link their experiences of the different activities and to record the outcomes of their investigations.

Add everyday objects to the assortment of shapes used to test rolling and sliding.

Refer to *Primary Science Sourcebook: Activities for Teaching Science in Year 2*, Part A, pp. 54–55, for further information about the shape of an object and its ability to roll.

Building on past experience

Young students feel empowered as learners by revisiting a previous experience or activity and knowing something about what is happening; by teaching or showing others how that activity is done; and by trying out the same concept or process in a different situation.

In the introductory activities of this module, students were encouraged to become more aware of the smaller parts of a larger action or movement. Now they can explore new ideas and build on past experiences of objects in motion. Students should be able to:

- construct new knowledge and understandings about how change of shape can change the motion of an object;
- predict from its shape how an object may move — for example, slide or roll; float or sink in water; float or drop in air.

Comparing the motion of objects

When comparing the motion of two objects of different shape, ensure that they have approximately the same mass. For example, the motion of a round pencil could be compared with that of a small wooden ruler, but the motion of a drinking straw could not meaningfully be compared with that of a house brick.

Working scientifically

Time: 3 x 40 minutes

Exploring phenomena
Handling materials
Looking for patterns and meanings
Playing
Predicting
Seeking reasons

▶ Students take a ball of modelling clay or similar compound and investigate how they can change its shape. Questions to guide students' thinking and investigations could include:

- What are you doing to make the ball change shape?
- How does pushing the ball change its shape?
- Compare the effect of pushing the ball from one direction and then from two directions.
- How does pulling the ball change its shape?
- Compare the effect of pulling the ball from one direction and then from two directions.
- Close your eyes and push or pull the clay to make its shape change. How does that feel? Could you 'see' the shape that you produced before you opened your eyes?

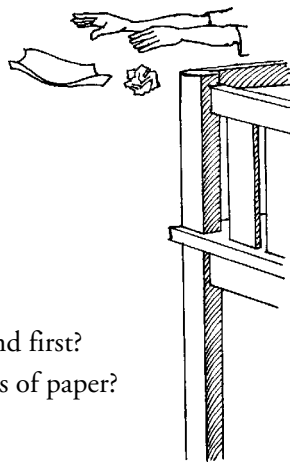
▶ Students make two clay balls. They leave one as a sphere, shape the other into a cube and try to roll the two shapes across a smooth level surface. They describe how the two shapes moved and suggest reasons for the observed differences in movement.

▶ Using an array of objects of different shapes, students explore further how the shape of an object can affect its ability to roll or slide.

▶ Students take a ball of modelling clay and test whether it will float in water. They investigate ways of changing the shape of the modelling clay to see if they can make it float. Questions to guide thinking could include:

- What are some of the ways we could change the shape of this ball of modelling clay?
- Which of the new shapes do you think would float?
- Why do you think that?

▶ Students take two sheets of paper of equal size and shape. They scrunch up one sheet into a ball, leaving the other sheet flat. Students then predict which of the two pieces of paper will reach the ground first after being dropped from a moderate height — for example, from the top of playground equipment (see illustration). Dropping the two objects from this height gives time for young students to observe the results. Questions to guide students' thinking could include:



- Which of the pieces of paper landed on the ground first?
- Was there any difference in mass of the two pieces of paper?
- Describe how the scrunched-up paper fell.
- Describe how the flat sheet of paper fell.
- Why do you think they fell in different ways?

▶ Students visit the sandpit to investigate the displacement of sand after:

- stepping from a board onto raked, level sand;
- jumping from a board onto raked, level sand.

► Students visit a concreted area and observe the result after:

- stepping from a board onto the concrete.

► Students compare the effects on the sand and on the concrete of their stepping or jumping onto those surfaces. Questions to guide discussion could include:

- What changes to the sand could you see after you stepped onto it?
- What changes could you see after you stepped onto the concrete?
- Why were you able to move the sand but were not able to move the concrete?
- Did jumping onto the sand have a different effect from stepping onto it? Why or not?

Gathering information about student learning

Sources of information could include:

- students' observations;
- students' contributions to discussions.

ACTIVITY

Direction

Developmental

Focus

This activity provides opportunities for students to investigate the reasons that objects move in different directions.

Materials

For the class:

- wooden stirrers, cards, wooden blocks, rulers — for making model tower

Stop, start, change direction:

- board and blocks of wood to make a ramp
- toy cars of various sizes
- tissue paper
- balls of different sizes (tennis ball, table tennis ball, basketball)
- balls of different shapes (soccer ball, rugby ball, Aussie Rules ball)
- medicine ball

Up and down:

- globe of the Earth
- a selection of balls of different textures (sponge ball, tennis ball, spiky ball, rubber ball, basketball, soft fabric ball)

Rocket:

- balloons
- string
- straws
- adhesive tape

Teaching considerations

Resource Sheet 2

Consider using a Predict, Observe, Explain strategy (see Resource Sheet 2) as one way of encouraging students to think about the tasks, to link their experiences of the different tasks and to record the outcomes of their investigations. Also encourage students to explore and to construct new knowledge rather than simply to follow directions.

In this activity each section of 'Working scientifically' is a separate task. The first task in each section should be completed by all students. The other tasks could be optional, with students reporting and sharing findings with the class.

Match students for the task where they push against each others' feet so that both equal and unequal forces are experienced.

Students could be introduced to the idea of a fair test when comparing the bounce of balls. They could take some simple measurements and record results for discussion in class.

Some parts of this activity are based on material in *Primary Science Sourcebook: Activities for Teaching Science in Year 1*, pp. 40–41; and *Primary Science Sourcebook: Activities for Teaching Science in Year 2*, pp. 57, 60. Refer to this material for further ideas on equal, unequal and opposing forces, lifting, falling, and up and down.

Concept

Even when an object is stationary there is always more than one force acting on it. Students should be led to recognise that at least one force is always required to make things move and that the force(s) may be applied in a variety of ways.

Working scientifically

Time: 4 x 30 minutes

Making and judging observations
Predicting
Reflecting and considering
Explaining ideas and decisions

Equal and unequal forces

▶ Students are matched for strength as far as possible. They sit in pairs facing each other with their legs extended and feet touching. One by one, students predict what will happen when they push with their feet against the other. They test their predictions and discuss observations and explanations. Students then form unevenly matched pairs and repeat the procedure. They compare the results of the two different events.

▶ Students build a tower or other construction using blocks or various solids and planes — for example, wooden stirrers, rulers and cards. They discuss what they built and how they made it stable. They also discuss the consequences of rearranging the components of their construction.

Stop, start, change direction

▶ Students observe toy cars of different sizes travelling down a ramp. They discuss ways of stopping the cars on the ramp. Some questions to guide investigations could include:

- How can the cars be stopped?
- Will holding tissue paper across the ramp stop them?
- How many layers of tissue paper are needed to stop each car?
- What happens to the tissue paper when a car does not stop?
- What do you predict will happen when the slope of the ramp is increased?
- What actually happens?

▶ Students investigate the ways in which balls of different sizes and shapes roll down a slope. They could consider:

- which balls roll farther;
- what happens when objects are placed in the path of the rolling ball;
- whether or not the ball rolls down the slope in a straight line;
- which balls change direction most when they hit objects in their paths;
- how easy it is to predict the way that the ball would move or the direction in which it would travel.

▶ In groups, students roll balls of different sizes and shapes at a flat wall so that the balls are deflected from it. Students discuss their observations and any inferences that can be drawn from these. They observe the effect of varying the speed and the angle at which the ball is rolled towards the wall.

▶ In groups, students investigate differences observed when rolling and deflecting a medicine ball and a basketball. They redirect the balls without stopping them.

Follow-up discussion questions could include:

- Which ball is easier to roll?
- What can a person do to change the direction in which a ball is rolling?
- Which ball is it easier to change the direction of — the basketball or medicine ball?
- Why do you think this is?

Up and down

▶ Students, led by the teacher, discuss what is 'up' and what is 'down' in relation to the surface of a globe of the Earth. Each student makes a clay 'person' and attaches it by its feet at various spots on the surface of the globe. Students born in different countries can place their 'person' on the country of their birth. 'People' are also placed at the North and South Poles.

▶ Students discuss the way the model 'people' are pointing and how real people in these positions would be oriented in relation to each other. They compare 'up' and 'down' in various places over the globe and are led to the generalisation that 'down' is towards the centre of the Earth and 'up' is away from the Earth.

▶ Students go into the playground to explore a variety of ways of launching a ball into the air. After initial trials they come together to share the methods they have tried and then test new ways of making the balls airborne.

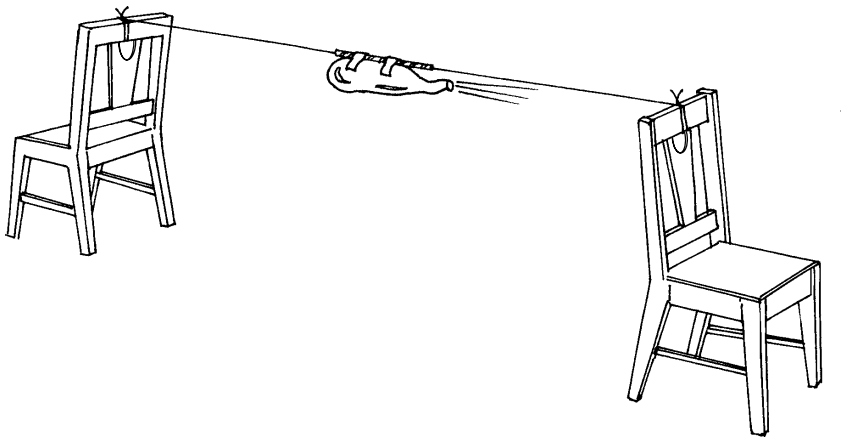
▶ Led by the teacher, students discuss what is needed to make things move up off the ground. They discuss ways of lifting heavy things, such as by using machines or magnets.

▶ Students explore bouncing balls of different types. Questions to guide students' thinking and observation could include:

- Which ball bounced best? How do you know this?
- Why do you think some balls do not bounce well?
- Could you rank the balls in order with the best bouncer first?

Rockets

▶ Students use the diagram below to make and then test a monorail balloon 'rocket'. They discuss why the balloon 'rocket' moves and ways of making it move faster or slower.



Gathering information about student learning

Sources of information could include:

- students' observations;
- students' sharing of information;
- students' construction of the balloon rocket;
- students' contributions to discussions.

ACTIVITY

Making something that moves

Culminating

Focus

This activity provides opportunities for students to demonstrate their understandings of the ways that objects of different shapes and sizes move.

Materials

- balloons
- blocks
- boxes
- cardboard
- construction toys
- fabrics
- paper bags
- paper punch
- pivot pins
- string
- train set

Teaching considerations

Provide a large variety of materials that students can use to create their models. Suggested models could include a mobile, a moving toy or a car.

Working scientifically

Time: 45 minutes working; 45 minutes for class presentations

Handling materials
Playing
Constructing models
Describing
Discussing thinking
Explaining ideas and decisions

▶ Students:

- design and make something that moves;
- describe something about how the object moves;
- explain why it moves in that way.

▶ Students submit a brief report (drawings, words or both) with the model to show their understanding of:

- how objects move in different ways;
- what affects the way that things move.

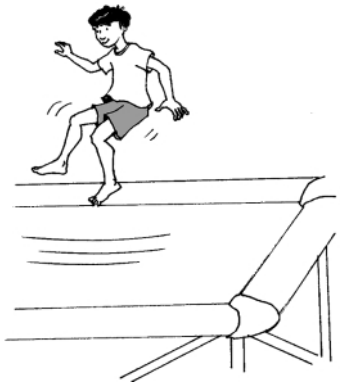
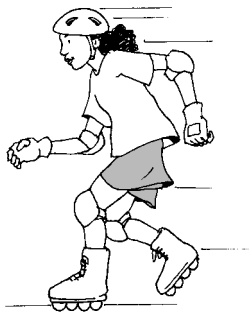
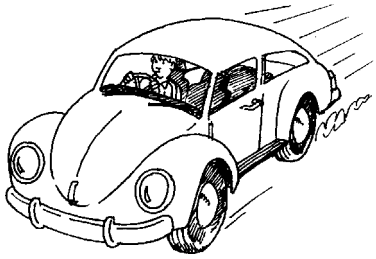
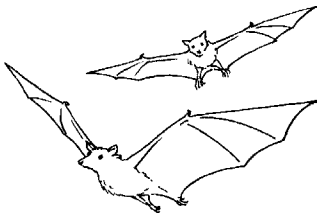
Gathering information about student learning

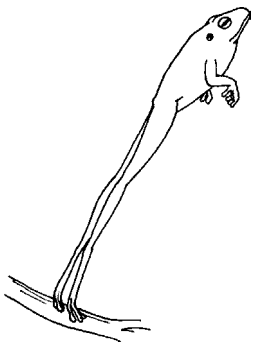
Sources of information could include:

- individual or group presentations to the class;
- the moving models made by the students;
- students' reports.

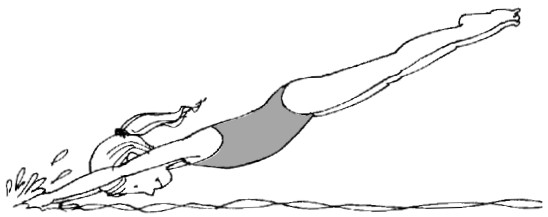
People and things moving

Resource Sheet 1







Predict, Observe, Explain

Predict what will happen.

Observe — draw what you see happening.

Explain.

By _____

Acknowledgments

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Queensland Department of Education for material from *Primary Science Sourcebook: Activities for Teaching Science in Year 1* and *Primary Science Sourcebook: Activities for Teaching Science in Year 2*.

This sourcebook module should be read in conjunction with the following Queensland School Curriculum Council materials:

Years 1 to 10 Science Syllabus

Years 1 to 10 Science Sourcebook: Guidelines

Science Initial In-service Materials

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