

### Designer shoe

#### TASK:

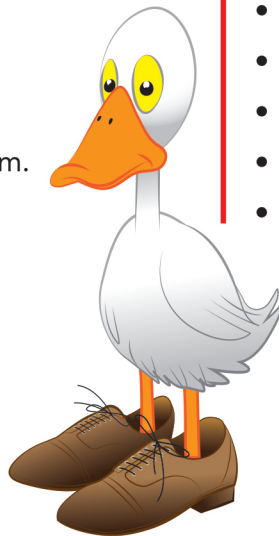
Design and create a shoe based on the features of a duck's foot.

#### CRITERIA:

- The shoe design must be based on the characteristics of a duck's foot.
- The shoe should be no longer than 25 cm.
- It should be wearable.
- Only one shoe needs to be made.

#### SUGGESTED MATERIALS:

- fabric/lycra
- plastic sheets
- straws
- rubber
- foam
- stockings



# Biological sciences

## Designer shoe

- Find out about the features of ducks' feet and how they help ducks move.
- Draw a diagram of the shoe design and label the features. List which materials you plan to use to make it.
- Collect the materials you will need, including whatever you will make and decorate your shoe with. You may bring materials in from home.
- Create the shoe to look like your plan.
- Check that the shoe meets the criteria.
- Give a presentation explaining how the shoe was made and what features of a duck's foot were included. Use this information to 'sell' your shoe to the class.



### Mini parachute

#### TASK:

Create a parachute for a small toy figurine.

#### CRITERIA:

- The figurine should be approximately 10 cm or smaller.
- The aim is to make the landing as soft and slow as possible.
- Make three parachutes from different materials to test.



#### SUGGESTED MATERIALS:

- various test materials such as tissue paper, fabric scraps, newspaper, cellophane, feathers
- timer
- toy figurine

### Mini parachute

- Research the design of parachutes and what materials are used to make them.
- Draw a diagram of what your parachute will look like and plan which three materials you will test.
- Collect the materials you will need, including any that you predict will create a soft, slow landing, a toy figurine and a timer.
- Create the three parachutes to look like your plan.
- Check that the parachutes meet the criteria.
- Give a presentation explaining the design of your parachute and which material you discovered worked the best.



### Weight demonstrator

#### TASK:

Design and create a weight demonstrator that shows what a 50-kg person on Earth weighs on the moon and other planets.

#### CRITERIA:

- Use a calculator to determine the weights on other planets, such as the one found here:
- The person must be physically represented by creating a weight for each of the eight planets, as well as the moon.
- Each weight should be made to look like a person, and should be labelled with the planet's name.



#### SUGGESTED MATERIALS:

- recycled materials
- card
- fabric
- various weighted objects such as dry beans, rice etc.
- digital scales



### Weight demonstrator

- Find out about the eight planets in the solar system. Research how gravitational pull is related to weight and whether a planet's size affects weight.
- Plan and draw a diagram of what the 'person' will look like, and list the materials needed to recreate the weights. Draw a table to record the calculated weights.
- Collect the materials you will need, including recycled items, card, fabric, various items that can act as weights and digital scales.
- Create the 'people' to look and weigh as planned.
- Check that the weight demonstrator meets the criteria.
- Give a presentation to the class explaining how much a 50-kg person weighs on each planet and the moon, and how this is demonstrated.



### Robot artist

#### TASK:

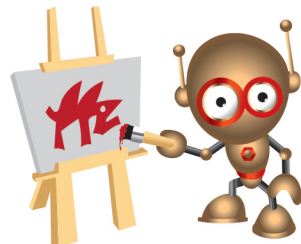
Design and create a simple robot that can draw a pattern as it moves.

#### CRITERIA:

- Three markers must be attached to an upside-down cup, like a tripod.
- The DC motor should be inserted into a piece of an eraser, which will create a 'wobble effect'.
- The wires from the motor should be attached to the negative and positive sides of the coin cell battery correctly.
- The battery and motor should be securely attached to the upside-down cup.
- A piece of card must be placed under the robot so it can wobble and move to create the artwork.

#### SUGGESTED MATERIALS:

- cup
- 3 markers
- tape
- 3V coin cell battery
- DC motor
- eraser
- piece of card



# Physical sciences

## Project 1

### Robot artist

- Research how a simple circuit works from a DC motor to a battery source. Explore other simple battery-powered robots.
- Plan and draw a diagram of the robot artist, as well as a plan of how the DC motor will be attached to the battery.
- Collect the materials you will need, including a cup, 3 markers, tape, a 3V coin cell battery, a DC motor, eraser and a piece of card.
- Create the robot artist to look like your plan.
- Check that the robot artist meets the criteria.
- Display your finished artwork to the class and explain how the battery powered the robot to create the art. Discuss any changes made to the robot in order to get it to move more or become more 'wiggly'.

