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# IntoScience topic: Science as a journey of discovery

Science is amazing, fun and challenging. Start your journey of discovery here.

## Science Inquiry Skills

Description: Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]

### Activity: What is science? The Archer

Fire your arrow to hit the targets and improve your technique each time. Can you think of where science is applied here?

**Elaboration:** exploring how gravity affects objects on the surface of the Earth [ACSSU118-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

### Activity: Science is in everything we do

Science is behind everything, including football (soccer)! Consider and investigate the science that is behind different aspects of the game.

**Elaboration:** considering how sports scientists apply knowledge of forces in order to improve performance [AC SHE224-4]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Comparing and contrasting data from a number of sources in order to create a summary of collected data [AC SIS130-2]

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Developing strategies and techniques for effective research using secondary sources, including use of the internet [AC SIS125-4]

## Activity: Fields and heroes of science

A brief look at the basic fields of science: Biology, Chemistry and Physics and some of these fields' heroes of the past.

### Inquiry skills:

Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [AC SIS131]
  - Suggesting improvements to inquiry methods based on experience [AC SIS131-3]

## Activity: Attitudes and approaches to science

The mind is a powerful tool in science. Explore the various attitudes and approaches found in great scientific minds.

### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation [AC SIS124-2]

**General capabilities:** Ethical Behaviour

## Activity: Lab rules and safety precautions

Scientific fieldwork and experiments can be dangerous! Learn important safety rules to manage these risks.

### Inquiry skills:

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Learning and applying specific skills and rules relating to the safe use of scientific equipment [AC SIS125-2]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [AC SIS130-3]

## Activity: Hazard symbols

Hazardous chemicals are labelled clearly for a reason! Master these hazard symbols and learn some safety tips along the way.

### Inquiry skills:

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Learning and applying specific skills and rules relating to the safe use of scientific equipment [AC SIS125-2]

### Activity: Equipment and apparatus

Learn your way around a scientific laboratory by learning to label the lab equipment and apparatus shown here.

#### Inquiry skills:

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [ACSIS125]
  - Learning and applying specific skills and rules relating to the safe use of scientific equipment [ACSIS125-2]

### Activity: Experiment using the scientific method

Investigate a problem or question using the scientific method. Learn the steps of this method including observing, analysing and sharing.

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

Planning and Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [ACSIS131]
  - Identifying and considering indicators of the quality of the data when analysing results [ACSIS131-2]
  - Suggesting improvements to inquiry methods based on experience [ACSIS131-3]

### Activity: Order of the scientific method

Getting things the right way around is always good - especially when it comes to the scientific method.

#### Inquiry skills:

Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [ACSIS131]
  - Identifying and considering indicators of the quality of the data when analysing results [ACSIS131-2]

### Activity: The Basketball Experiment

Dependent, independent and controlled variables are important in science. Understand this by experimenting with a basketball.

#### Inquiry skills:

Planning and Conducting

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [ACSIS126]
  - Recognising the differences between controlled, dependent and independent variables [ACSIS126-1]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-3]

### Activity: Imagination in science

Explore the amazing scientific and technological advances which have been inspired by scientists' imaginations and even science fiction. What does the future hold?

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

**General capabilities:** Critical and Creative Thinking

### Activity: The Archer returns - rethinking method

Apply scientific principles to the Archer activity. Understand angles and draw weight to uncover how a better method can produce better results.

#### Inquiry skills:

Planning and Conducting

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [AC SIS126]
  - Recognising the differences between controlled, dependent and independent variables [AC SIS126-1]

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Using spreadsheets to aid the presentation and simple analysis of data [AC SIS129-2]
  - Describing the trends shown in collected data [AC SIS129-3]

Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [AC SIS131]
  - Identifying and considering indicators of the quality of the data when analysing results [AC SIS131-2]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

# IntoScience topic: Pure substances & mixtures

Identify pure substances from mixtures and delve into solutions and suspensions.

## Chemistry

Description: Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques [ACSSU113]

### Activity: Recognising pure substances from mixtures

Understand the differences between pure substances and mixtures. Explore examples and ways of grouping mixtures.

**Elaboration:** recognising the differences between pure substances and mixtures and identifying examples of each [ACSSU113-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSI130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [ACSI130-4]

**General capabilities:** Literacy, Critical and Creative Thinking

### Activity: What makes a mixture?

Investigate the distinct properties of mixtures and their unchanging components.

**Elaboration:** recognising the differences between pure substances and mixtures and identifying examples of each [ACSSU113-1]

#### Inquiry skills:

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [ACSI125]
  - Developing strategies and techniques for effective research using secondary sources, including use of the internet [ACSI125-4]

Communicating

- Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [ACSI133]
  - Presenting the outcomes of research using effective forms of representation of data or ideas and scientific language that is appropriate for the target audience [ACSI133-1]
  - Using digital technologies to access information and to communicate and collaborate with others on and off site [ACSI133-2]

**General capabilities:** Literacy, Critical and Creative Thinking

### Activity: Examples of pure substances and mixtures

Decide whether each of these items are examples of pure substances or mixtures, and sort them out!

**Elaboration:** recognising the differences between pure substances and mixtures and identifying examples of each [ACSSU113-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Discussing investigation methods with others to share ideas about the quality of the inquiry process [AC SIS130-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Stir it up! Mixtures that are solutions

Some mixtures can be classed as solutions. Which of these do you think are solutions?

**Elaboration:** identifying the solvent and solute in solutions [ACSSU113-2]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Comparing and contrasting data from a number of sources in order to create a summary of collected data [AC SIS130-2]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-4]

### Activity: Solute + Solvent = Solution

Identify solutions and work out which components are the solutes and which are the solvents.

**Elaboration:** identifying the solvent and solute in solutions [ACSSU113-2]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [AC SIS130-3]

**General capabilities:** Literacy, Critical and Creative Thinking

## Activity: What is a suspension?

Explore the fact that suspensions are a different type of mixture where particles are suspended.

**Elaboration:** identifying the solvent and solute in solutions [ACSSU113-2]

### **Inquiry skills:**

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-4]

**General capabilities:** Critical and Creative Thinking

# IntoScience topic: Classification of organisms

Figure out a way to organise millions of living organisms in our amazing world.

## Biology

Description: There are differences within and between groups of organisms; classification helps organise this diversity [ACSSU111]

### Activity: Reasons for classifying

Why do we need to classify organisms? Try grouping according to common characteristics and figure out why!

**Elaboration:** considering the reasons for classifying such as identification and communication [ACSSU111-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation [AC SIS124-2]

### Activity: Guess these organisms

Don't judge a book by its cover. Perhaps appearances are not the best way to group organisms!

**Elaboration:** considering the reasons for classifying such as identification and communication [ACSSU111-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

**General capabilities:** Literacy, Critical and Creative Thinking

**Cross curricula priorities:** Sustainability

## Activity: Taxonomic ranks

Discover each of the taxonomic ranks and how useful they are in understanding how closely species are related to each other.

**Elaboration:** classifying using hierarchical systems such as kingdom, phylum, class, order, family, genus, species [ACSSU111-4]

### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [ACSIS129]
  - Understanding different types of graphical and physical representation and considering their advantages and disadvantages [ACSIS129-1]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [ACSIS130-1]

**General capabilities:** Critical and Creative Thinking

## Activity: Kingdoms of classification

Start at the top! Explore the first level of classification and some organisms that belong to these kingdoms.

**Elaboration:** classifying using hierarchical systems such as kingdom, phylum, class, order, family, genus, species [ACSSU111-4]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [ACSIS130-1]

## Activity: All about plants: Kingdom Plantae

Explore this 'green' kingdom in all its flowering and non-flowering glory!

**Elaboration:** classifying using hierarchical systems such as kingdom, phylum, class, order, family, genus, species [ACSSU111-4]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

## Activity: Classify these plants

Can you work out which plants belong to which groups? You're well on your way to skilled classifying.

**Elaboration:** grouping a variety of organisms on the basis of similarities and differences in particular features [ACSSU111-2]

### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

## Activity: All about animals: Kingdom Animalia

Explore the wild kingdom of animals and their various traits. This helps in organising them into meaningful groups.

**Elaboration:** classifying using hierarchical systems such as kingdom, phylum, class, order, family, genus, species [ACSSU111-4]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

## Activity: Mind your Mendelios!

These cheeky little creatures can show you an important way to view classification.

**Elaboration:** using provided keys to identify organisms surveyed in a local habitat [ACSSU111-6]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-4]

## Activity: Using the dichotomous key to classify organisms

One of the keys to classification is using a dichotomous key! Understand this tool of classification and arrange your own one.

**Elaboration:** using provided keys to identify organisms surveyed in a local habitat [ACSSU111-6]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-4]

## Activity: Create your own dichotomous key

Now for some classroom fun! Create your own dichotomous key using your classmates. Record it in the key template here.

**Elaboration:** using provided keys to identify organisms surveyed in a local habitat [ACSSU111-6]

### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Understanding different types of graphical and physical representation and considering their advantages and disadvantages [AC SIS129-1]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

## Activity: Classification over time

Go on a journey through time with a mysterious creature and uncover significant developments in classification over the years.

**Elaboration:** considering how biological classifications have changed over time [ACSSU111-3]

### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Understanding different types of graphical and physical representation and considering their advantages and disadvantages [AC SIS129-1]

Evaluating

- Use scientific knowledge and findings from investigations to evaluate claims [AC SIS132]
  - Using the evidence provided by scientific investigations to evaluate the claims or conclusions of their peers [AC SIS132-1]

### Activity: Naming the scientific way

Accurate classification relies on conventions for naming organisms which all good scientists should know. Become familiar with the scientific way!

**Elaboration:** using scientific conventions for naming species [ACSSU111-5]

#### Inquiry skills:

Communicating

- Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [AC SIS133]
  - Presenting the outcomes of research using effective forms of representation of data or ideas and scientific language that is appropriate for the target audience [AC SIS133-1]

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

### Activity: What's in a name?

A rose by any other name would be just as beautiful! So what exactly is behind the scientific names of species? Find out and design your own here.

**Elaboration:** using scientific conventions for naming species [ACSSU111-5]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

**General capabilities:** Critical and Creative Thinking

# IntoScience topic: Techniques for separating mixtures

Unmixing mixtures! Explore the many techniques used to separate mixtures.

## Chemistry

Description: Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques [ACSSU113]

### Activity: Physical properties of a substance

It's the physical properties of a substance that allow separation techniques to work. Learn about these properties and more.

**Elaboration:** exploring and comparing separation methods used in the home [ACSSU113-4]

### Activity: Filtration and evaporation

Explore and uncover the principles behind filtration and evaporation and how they can be used, even at home!

**Elaboration:** exploring and comparing separation methods used in the home [ACSSU113-4]

### Activity: Distillation

Learn about simple and fractional distillation as separation techniques.

**Elaboration:** investigating and using a range of physical separation techniques such as filtration, decantation, evaporation, crystallisation, chromatography and distillation [ACSSU113-3]

### Activity: Filtration: Save the fish!

Can you work out how to save the fish from their dirty tank water, using a common separation technique?

**Elaboration:** exploring and comparing separation methods used in the home [ACSSU113-4]

### Inquiry skills:

Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [AC SIS131]
  - Discussing investigation methods with others to share ideas about the quality of the inquiry process [AC SIS131-1]

### Activity: Exploring more separation techniques

There are many interesting separation techniques which have all sorts of applications. Learn about crystallisation, sublimation, magnetic attraction, chromatography and more.

**Elaboration:** investigating and using a range of physical separation techniques such as filtration, decantation, evaporation, crystallisation, chromatography and distillation [ACSSU113-3]

### Activity: The island activity

How would you survive if you were stranded on a deserted island? Use your knowledge of evaporation to save yourself!

**Elaboration:** investigating and using a range of physical separation techniques such as filtration, decantation, evaporation, crystallisation, chromatography and distillation [ACSSU113-3]

# IntoScience topic: Food chains and food webs

Learn about the fascinating interactions between organisms and their environment in an ecosystem.

## Biology

Description: Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions [ACSSU112]

### Activity: Ecosystem interactions

Discover how important ecosystem interactions are to understanding local environments.

**Elaboration:** constructing and interpreting food webs to show relationships between organisms in an environment [ACSSU112-2]

**General capabilities:** Critical and Creative Thinking, Literacy, Intercultural Understanding

**Cross curricula priorities:** Sustainability, Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia

### Activity: Relationships between organisms

Explore the relationships between organisms and some of the ways they adapt to survive in their habitats.

**Elaboration:** constructing and interpreting food webs to show relationships between organisms in an environment [ACSSU112-2]

### Activity: Flow of energy through an ecosystem

Understand the various roles of organisms including producers, consumers and decomposers. Explore how this relates to food and energy in ecosystems.

**Elaboration:** classifying organisms of an environment according to their position in a food chain [ACSSU112-3]

### Activity: Food chains and food webs

Apply your knowledge of ecosystem interactions to understand food chains and the more complex, food webs.

**Elaboration:** using food chains to show feeding relationships in a habitat [ACSSU112-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

### Activity: Impacts of human activities on ecosystems

Explore some human activities which affect local ecosystems and how they might affect food chains or webs.

**Elaboration:** investigating the effect of human activity on local habitats, such as deforestation, agriculture or the introduction of new species [ACSSU112-5]

### Activity: The effect of cane toads

Explore how these creatures were introduced to solve a problem and how this impacted on other living things in the environment.

**Elaboration:** exploring how living things can cause changes to their environment and impact other living things, such as the effect of cane toads [ACSSU112-6]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation [ACSIS124-2]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [ACSIS130-1]

# Into Science topic: Simple machines

Learn about simple machines; these devices save effort and make life easier.

## Physics

Description: Change to an object's motion is caused by unbalanced forces acting on the object [ACSSU117]

### Activity: Gutenberg's effort challenge

Manipulate these simple machines to help Gutenberg test his printing press. Try to do it with as little effort as you can.

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Introducing simple machines

Simple machines are all around us. Understand how each of them make our lives easier in performing everyday tasks.

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [AC SIS130-3]

## Activity: Investigating levers

Levers are so simple, yet can be so effective. Go from balancing a lever to understanding the trade-off with minimum effort!

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [AC SIS130-3]

**General capabilities:** Critical and Creative Thinking

## Activity: Classes of levers

Learn this fundamental lesson by interacting with different types of levers. They all fall into one of these three classes - can you work out which ones?

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

### Inquiry skills:

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Identifying whether the use of their own observations and experiments or the use of other research materials is appropriate for their investigation [AC SIS125-3]

**General capabilities:** Critical and Creative Thinking

## Activity: The pulley problem

Archimedes' claims for the pulley is unbelievable, or is it? Experiment with different pulley systems to explore this and learn to calculate mechanical advantage.

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Describing the trends shown in collected data [AC SIS129-3]

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]

- Using spreadsheets to aid the presentation and simple analysis of data [AC SIS129-2]

**General capabilities:** Numeracy

### **Activity: Simple machines revealed**

Review your knowledge of simple machines by recognising them in each of the scenes to reach Gutenberg's printing press.

**Elaboration:** investigating a simple machine such as lever or pulley system [ACSSU117-3]

#### **Inquiry skills:**

Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Identifying whether the use of their own observations and experiments or the use of other research materials is appropriate for their investigation [AC SIS125-3]

**General capabilities:** Literacy

## IntoScience topic: Familiar forces

Did you know you are affected by forces every day? Learn about these forces and how they affect you.

### Physics

Description: Change to an object's motion is caused by unbalanced forces acting on the object [ACSSU117]

#### Activity: Everyday forces

Understand that forces are used to move objects in many ways. Learn to identify the different ways in which forces are applied to everyday objects.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

#### Activity: Effects of applying forces

Behind every physical action there is a force. Learn to identify the effects of applying forces.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

#### Activity: Balanced forces

There are many instances where forces are balanced. Identify these in everyday situations.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [ACSIS130-3]

### Activity: Unbalanced forces

Explore the gallery of unbalanced forces to view some great examples of these forces in action, as well as hang your own unbalanced forces.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [ACSIS130-3]

### Activity: The friction advantage?

When is there a fraction too much friction? Explore the advantages and disadvantages of frictional forces.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [ACSIS129]
  - Describing the trends shown in collected data [ACSIS129-3]

### Activity: Air resistance

Learn that whilst air resistance can slow objects down, it can be a very useful force if need be.

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACSIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [ACSIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [ACSIS130-3]

**General capabilities:** Critical and Creative Thinking

## Activity: Crash test dummies

This amazing crash test simulator will teach you about the importance of friction for safe vehicle stopping distances. Strap in for the ride!

**Elaboration:** investigating the effects of applying different forces to familiar objects [ACSSU117-1]

### Inquiry skills:

#### Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

#### Planning and Conducting

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [AC SIS126]
  - Recognising the differences between controlled, dependent and independent variables [AC SIS126-1]

#### Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Describing the trends shown in collected data [AC SIS129-3]
  - Using spreadsheets to aid the presentation and simple analysis of data [AC SIS129-2]
- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Comparing and contrasting data from a number of sources in order to create a summary of collected data [AC SIS130-2]

#### Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [AC SIS131]
  - Identifying and considering indicators of the quality of the data when analysing results [AC SIS131-2]

# IntoScience topic: Effects of gravity

Understand how the force of gravity works here on Earth and throughout the universe.

## Physics

Description: Earth's gravity pulls objects towards the centre of the Earth [ACSSU118]

### Activity: Playing with gravity

Ever wanted to know what it's like to play ball on the Moon? Discover this and more, while grounding yourself in some basic knowledge on gravity, mass and weight.

**Elaboration:** considering how gravity keeps planets in orbit around the sun [ACSSU118-2]

#### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Comparing and contrasting data from a number of sources in order to create a summary of collected data [AC SIS130-2]

**General capabilities:** Critical and Creative Thinking

### Activity: Gravity on Earth

Many of us don't really notice gravity a lot here on Earth. Observe how it affects our daily activities, even when we are sitting still!

**Elaboration:** exploring how gravity affects objects on the surface of the Earth [ACSSU118-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

### Activity: Measuring forces

You can measure forces and represent them in diagrams. Explore some basic principles of measuring forces using a spring balance.

**Elaboration:** exploring how gravity affects objects on the surface of the Earth [ACSSU118-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Using spreadsheets to aid the presentation and simple analysis of data [AC SIS129-2]
  - Describing the trends shown in collected data [AC SIS129-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

**General capabilities:** Numeracy

### Activity: Create your own solar system

Gravity holds planets in orbit around the Sun, creating our solar system. Challenge yourself and create your own solar system, taking your understanding of gravity and orbits to a whole new level.

**Elaboration:** exploring how gravity affects objects on the surface of the Earth [ACSSU118-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS129]
  - Describing the trends shown in collected data [AC SIS129-3]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Identifying data which provides evidence to support or negate the hypothesis under investigation [AC SIS130-3]

**General capabilities:** Critical and Creative Thinking

# IntoScience topic: Earth, Moon and Sun

Movements of the Earth, Moon and Sun, and how this affects what we see in nature.

## Earth and Space

Description: Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon [ACSSU115]

### Activity: Earth, Moon and Sun movements

Explore the movements of the Earth, Moon and Sun.

**Elaboration:** modelling the relative movements of the Earth, sun and moon and how natural phenomena such as solar and lunar eclipses and phases of the moon occur [ACSSU115-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

### Activity: Phases of the moon

Become an Astrophotographer! Discover the phases of the Moon, and their meanings.

**Elaboration:** investigating natural phenomena such as lunar and solar eclipses, seasons and phases of the moon [ACSSU115-1]

#### Inquiry skills:

Planning and Conducting

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [AC SIS126]
  - Using a digital camera to record observations and compare images using information technologies [AC SIS126-2]

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

**General capabilities:** Literacy, Critical and Creative Thinking, Numeracy

## IntoScience topic: The water cycle

Learn about the water cycle, the processes involved and investigate how natural and human influences impact it.

### Earth and space sciences

Water is an important resource that cycles through the environment [ACSSU222]

#### Activity: Water cycle processes

Explore the processes which make up the water cycle. Consider how water changes state as it moves through the cycle.

**Elaboration:** considering the water cycle in terms of changes of state of water [ACSSU222-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Using diagrammatic representations to convey abstract ideas and to simplify complex situations [AC SIS130-1]

**General capabilities:** Critical and creative thinking

#### Activity: Factors that affect the water cycle

Re-trace the footsteps and analyse data from a group of scientists on a global expedition to uncover the factors that affect the water cycle. Where in the world did the scientists go?

**Elaboration:** investigating factors that influence the water cycle in nature [ACSSU222-2]

#### Inquiry skills:

Evaluating

- Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [AC SIS131]
  - Identifying and considering indicators of the quality of the data when analysing results [AC SIS131-2]
  - Suggesting improvements to inquiry methods based on experience [AC SIS131-3]
- Use scientific knowledge and findings from investigations to evaluate claims [AC SIS132]
  - Using the evidence provided by scientific investigations to evaluate the claims or conclusions of their peers [AC SIS132-1]

**General capabilities:** Critical and creative thinking

### Activity: Human impacts on the water cycle

Human management of water impacts the water cycle. Explore and investigate the main culprits and send a message to the future.

**Elaboration:** exploring how human management of water impacts on the water cycle [ACSSU222-3]

#### Inquiry skills:

##### Communicating

- Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [AC SIS133]
  - Presenting the outcomes of research using effective forms of representation of data or ideas and scientific language that is appropriate for the target audience [AC SIS133-1]

##### Planning and Conducting

- Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [AC SIS125]
  - Developing strategies and techniques for effective research using secondary sources, including use of the internet [AC SIS125-4]

##### Processing and Analysing Data and Information

- Summarise data, from student's own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS130]
  - Referring to relevant evidence when presenting conclusions drawn from an investigation [AC SIS130-4]

**General capabilities:** Critical and creative thinking, Ethical behaviour

**Cross-curricula priorities:** Sustainability

### Activity: The Aswan Dam case study

Explore Egypt's Aswan Dam as a case study of how humans impact the water cycle and the environment, while aiming to benefit communities.

**Elaboration:** exploring how human management of water impacts on the water cycle [ACSSU222-3]

#### Inquiry skills:

##### Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation [AC SIS124-2]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

**General capabilities:** Critical and creative thinking, Ethical behaviour

**Cross-curricula priorities:** Sustainability

## IntoScience topic: Renewable and non-renewable resources

Explore renewable and non-renewable resources and compare the advantages and disadvantages of these sources of energy.

### Earth and space sciences

Some of Earth's resources are renewable, but others are non-renewable [ACSSU116]

### Activity: Energy Island

Investigate renewable and non-renewable resources. Explore Energy Island, showcasing the many ways humans make electricity.

**Elaboration:** comparing renewable and non-renewable energy sources, including how they are used in a range of situations [ACSSU116-3]

### Inquiry skills:

Questioning and Predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS124]
  - Using information and knowledge from previous investigations to predict the expected results from an investigation [AC SIS124-3]

**General capabilities:** Critical and creative thinking

**Cross-curricula priorities:** Sustainability

# IntoScience topic: States of matter

Investigate solids, liquids and gases and explore The Particle Model of Matter

## Chemical sciences

The properties of the different states of matter can be explained in terms of the motion and arrangement of particles [ACSSU151]

### Activity: Particle matters

Investigate how particles move in solids, liquids and gases at the Particle Party! Get to know the Particle Model of Matter.

**Elaboration:** modelling the arrangement of particles in solids, liquids and gases [ACSSU151-2]

#### Inquiry skills:

Questioning and predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACIS139]
  - Using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation [ACIS139-3]

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [ACIS144]
  - Explaining the strengths and limitations of representations such as physical models, diagrams and simulations in terms of the attributes of systems included or not included [ACSSU144-2]
- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

**General capabilities:** Critical and Creative Thinking

### Activity: Compressing matter

Can you compress solids, liquids or gases? What if they are heated or cooled? Use this syringe demonstration for a deeper understanding of matter.

**Elaboration:** modelling the arrangement of particles in solids, liquids and gases [ACSSU151-2]

#### Inquiry skills:

Questioning and predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [ACIS139]
  - Using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation [ACIS139-3]

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

**General capabilities:** Critical and Creative Thinking

### Activity: Changing states

Delve into how solids, liquids and gases can change state. Observe particle views of these processes and some global examples.

**Elaboration:** modelling the arrangement of particles in solids, liquids and gases [ACSSU151-2]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

### Activity: Diffusion in the lab

These colourful lab experiment videos investigate the phenomenon of diffusion. Understand how temperature affects particle energy and the rate of diffusion.

**Elaboration:** using the particle model to explain observed phenomena linking the energy of particles to temperature changes [ACSSU151-3]

#### Inquiry skills:

Questioning and predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS139]
  - Using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation [AC SIS139-3]

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

### Activity: Expansion experiments

These experiments demonstrate expansion of solids, liquids and gases when heated. Can you help explain this?

**Elaboration:** using the particle model to explain observed phenomena linking the energy of particles to temperature changes [ACSSU151-3]

#### Inquiry skills:

Questioning and predicting

- Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [AC SIS139]
  - Using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation [AC SIS139-3]

## Activity: The Particle Model Examiner

The Particle Model Examiner reports some strange occurrences resulting from a recent heatwave. Can you help explain what's happening?

**Elaboration:** using the particle model to explain observed phenomena linking the energy of particles to temperature changes [ACSSU151-3]

### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

Evaluating

- Use scientific knowledge and findings from investigations to evaluate claims [AC SIS234]
  - Identifying the scientific evidence available to evaluate claims [AC SIS234-1]

Communicating

- Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [AC SIS148]
  - Selecting and using appropriate language and representations to communicate science ideas within a specified text type and for a specified audience [AC SIS148-2]

**General capabilities:** Critical and Creative Thinking

## Activity: Using models in science

Models represent reality and can be useful in science. Investigate how and why scientific models are used.

**Elaboration:** explaining why a model for the structure of matter is needed [ACSSU151-1]

### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [AC SIS144]
  - Explaining the strengths and limitations of representations such as physical models, diagrams and simulations in terms of the attributes of systems included or not included [ACSSU144-2]

# IntoScience topic: Cells

Explore these amazing units of life by investigating different cell types, their parts and functions, and how they reproduce.

## Biological sciences

Cells are the basic units of living things and have specialised structures and functions [ACSSU149]

### Activity: Characteristics of living things

What are the seven characteristics common to all living things? Use the pictures, create the words and solve the puzzle.

**Elaboration:** identifying structures within cells and describing their function [ACSSU149-3]

**General capabilities:** Literacy, Critical and Creative Thinking

### Activity: Introduction to microscopes

Explore the world up close and learn how to use a compound light microscope. Master this virtual microscope and everything becomes clear!

**Elaboration:** examining a variety of cells using a light microscope, by digital technology or by viewing a simulation [ACSSU149-1]

#### Inquiry skills:

Planning and Conducting

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [AC SIS141]
  - Using specialised equipment to increase the accuracy of measurement within an investigation [AC SIS141-2]

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

### Activity: Building blocks of life

Discover the building blocks of life. Reveal how these smallest units of life come together through the cell hierarchy to make living, functioning organisms.

**Elaboration:** recognising that some organisms consist of a single cell [ACSSU149-4]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

### Activity: Cell explorer

Identify the structures and functions of animal, plant, fungi and prokaryotic cells. Then rebuild the cells!

**Elaboration:** identifying structures within cells and describing their function [ACSSU149-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Comparing plant and animal cells

What do plant and animal cells have in common? How do they differ? Compare these cell types and learn how to distinguish them.

**Elaboration:** distinguishing plant cells from animal or fungal cells [ACSSU149-2]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Cell division

Cells don't live forever! Fortunately before they die, they can reproduce. Learn the different types of cell division: budding, binary fission, mitosis and meiosis.

**Elaboration:** recognising that cells reproduce via cell division [ACSSU149-5]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

### Activity: Mitosis

Understand how this incredible part of the cell cycle creates new cells for growth and repair. Take a hands-on approach to learn the phases of mitosis.

**Elaboration:** describing mitosis as cell division for growth and repair [ACSSU149-6]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

## IntoScience topic: Forms of energy

Investigate types of kinetic and potential energy and how they can be transferred or transformed.

### Physical sciences

Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems [ACSSU155]

#### Activity: Kinetic and potential energy

Explore the main types of kinetic and potential energies, and recognise them in everyday situations.

**Elaboration:** recognising that kinetic energy is the energy possessed by moving bodies [ACSSU155-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

**General capabilities:** Numeracy

#### Activity: Energy transformations

Investigate how energy can be transferred from one object to another, or transformed into different types of energy. Learn how to present energy transformations in flow diagrams.

**Elaboration:** using flow diagrams to illustrate changes between different forms of energy [ACSSU155-5]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

#### Activity: Conduction, convection and radiation

Explore the three ways heat can be transferred: conduction, convection and radiation. Learn about some examples of heat transfer from everyday life.

**Elaboration:** recognising that heat energy is often produced as a by-product of energy transfer, such as brakes on a car and light globes [ACSSU155-4]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [AC SIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

### Activity: Energy efficiency

Many energy transformations are very inefficient. Recognise how much energy can be wasted as heat by looking at a car's efficiency.

**Elaboration:** recognising that heat energy is often produced as a by-product of energy transfer, such as brakes on a car and light globes [ACSSU155-4]

#### Inquiry skills:

Communicating

- Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [ACIS148]
  - Selecting and using appropriate language and representations to communicate science ideas within a specified text type and for a specified audience [ACIS148-2]

**General capabilities:** Numeracy

### Activity: Home energy challenge

Investigate how energy can be transferred from one object to another, or transformed into different types of energy. Learn how to present energy transformations in flow diagrams.

**Elaboration:** investigating different forms of energy in terms of the effects they cause, such as gravitational potential causing objects to fall and heat energy transferred between materials that have a different temperature [ACSSU155-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACIS145]
  - Drawing conclusions based on a range of evidence including primary and secondary sources [ACSSU145-2]

Evaluating

- Use scientific knowledge and findings from investigations to evaluate claims [ACIS234]
  - Identifying the scientific evidence available to evaluate claims [ACIS234-1]
  - deciding whether or not to accept claims based on scientific evidence [ACIS234-2]

**Cross curricula priorities:** Sustainability

# IntoScience topic: Elements, compounds and mixtures

Understand elements, compounds and mixtures while getting to know the periodic table.

## Chemical sciences

Differences between elements, compounds and mixtures can be described at a particle level [ACSSU152]

### Activity: Classification of matter

What exactly is an element, a compound or a mixture? Is a metal a pure substance? Analyse real-world samples to understand how matter is classified.

**Elaboration:** modelling the arrangement of particles in elements and compounds [ACSSU152-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Changing models of the atom

From ancient times to today, our understanding of the basic unit of matter, the atom, has changed dramatically. Take a journey through time to see how the atomic model has transformed.

**Elaboration:** modelling the arrangement of particles in elements and compounds [ACSSU152-1]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

### Activity: Structure of the atom

Discover what atoms are made up of and how to represent them correctly. Challenge yourself to write the electron configurations of the first 18 elements.

**Elaboration:** recognising that elements and simple compounds can be represented by symbols and formulas [ACSSU152-2]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACSIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Introduction to the periodic table

Welcome to the periodic table! This important reference contains the ingredients to all matter in the universe. Get to know the groups, periods and special names given to certain elements.

**Elaboration:** locating elements on the periodic table [ACSSU152-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [ACIS144]
  - describing measures of central tendency and identifying outliers for quantitative data [ACSSU144-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Properties and uses of elements

A meteorite has caused problems, but can it also be a solution? Experiment with the elements to uncover properties of metals and non-metals and find out if the meteorite might be useful.

**Elaboration:** locating elements on the periodic table [ACSSU152-3]

#### Inquiry skills:

Processing and Analysing Data and Information

- Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [ACIS144]
  - describing measures of central tendency and identifying outliers for quantitative data [ACSSU144-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Comparing compounds

Investigate how and why atoms bond together to form compounds. The two classes of compounds, ionic and covalent, have quite different properties. Can you tell which is which?

**Elaboration:** recognising that elements and simple compounds can be represented by symbols and formulas [ACSSU152-2]

#### Inquiry skills:

Processing and Analysing Data and Information

- Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [ACIS145]
  - Constructing tables, graphs, keys and models to represent relationships and trends in collected data [ACSSU145-1]

**General capabilities:** Critical and Creative Thinking

### Activity: Naming compounds

Decipher what seems like a whole new language by learning how to name compounds made of only two elements. Master the name game and prove your chemical talent!

**Elaboration:** recognising that elements and simple compounds can be represented by symbols and formulas [ACSSU152-2]

#### **Inquiry skills:**

Evaluating

- Use scientific knowledge and findings from investigations to evaluate claims [ACSIS234]
  - Identifying the scientific evidence available to evaluate claims [ACSIS234-1]
  - deciding whether or not to accept claims based on scientific evidence [ACSIS234-2]

**General capabilities:** Critical and Creative Thinking