



Te Kura

TE AHO O TE KURA POUNAMU
THE CORRESPONDENCE SCHOOL



Being a scientist

Doing your own science investigation

INT209
CURRICULUM LEVEL 2-3



INT209



INTRODUCTION

SUPERVISOR'S GUIDE

In this resource, students will start to understand what science is and how scientists work.

This resource is to guide you through a science investigation with your student, to develop the skills of investigation.

This will lead to your student's own investigation. The actual topic will be something your student is really interested in and wants to know more about. Your teacher can guide you in selecting your topic if you find it difficult to decide.

It is important that you, the supervisor, read this whole resource prior to working with your student. This will give you an understanding of the process and outcome.

SCIENCE IS:

- » a way of investigating, understanding and explaining our natural, physical world and the wider universe.

TO DO THIS INVESTIGATION YOUR STUDENT NEEDS TO BE ABLE TO:

TUNE IN...

- » *Ask a question about a topic that can be investigated.*

FIND OUT...

- » *Gather evidence by planning and carrying out a simple investigation to answer a question.*

SORT OUT...

- » *Describe what was found out by critiquing evidence and interpreting information (data), i.e. make sense of things like models, graphs, charts, diagrams as well as written texts.*



MAKE A CONCLUSION...

- » *Use gathered evidence and findings to suggest a possible explanation.*

TAKE ACTION...

- » *Use and apply what they know about science to 'real life' situations.*
- » *Present their findings.*

DURING THIS WORK YOU WILL GUIDE YOUR STUDENT TO:

- » choose an aspect of science they'd like to investigate
- » think about the best way to do the investigation
- » gather evidence and information
- » use evidence to support their ideas
- » think about what the evidence is telling them
- » record their findings and how to best present them to others.

YOU WILL NEED:

- » the science 'starter activities' resource INT209A
- » a learning journal (this may be a scrap book/exercise book or an electronic learning journal)
- » pens, paper and other equipment you might need for your investigation
- » camera or other device for recording images/video
- » scissors to cut around tables and templates included in this resource
- » to read the safety rules.

SAFETY

SUPERVISORS:

Please ensure that experiments are closely supervised, as many of them involve heating and cooling materials.

STUDENTS:

Always work with an adult.

Read and follow all the instructions carefully.

Do not put any substances in your mouth.

Read the labels on all substances you use for safety warnings and contents.

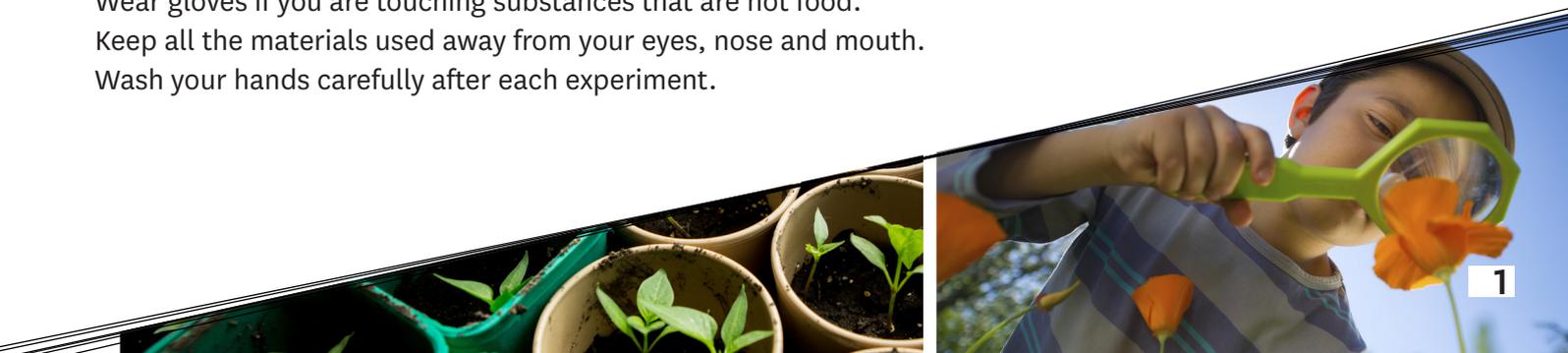
Take care with any heated materials.

Wear gloves if heating materials.

Wear gloves if you are touching substances that are not food.

Keep all the materials used away from your eyes, nose and mouth.

Wash your hands carefully after each experiment.





LEARNING OUTCOME

Carry out science investigations using a variety of approaches.

LEARNING INTENTIONS

I am learning to:

- » ask a question about a topic that can be investigated
- » make predictions
- » gather evidence by planning and carrying out a simple investigation (explore and observe carefully)
- » record observations and findings (i.e. models, graphs, charts, diagrams as well as written texts)
- » describe what was found out by critiquing evidence and interpreting information
- » use gathered evidence and findings to suggest a possible explanation
- » link my science knowledge to the everyday world.

KEY COMPETENCIES

Key competencies are skills, knowledge and values that help you to live, learn and work independently and with others.

THE KEY COMPETENCIES YOU WILL FOCUS ON IN THIS TOPIC ARE:

- » managing self
- » using language, symbols and texts
- » thinking.

YOU COULD:

- » talk about the key competencies with your supervisor
- » write examples of how you are using the key competencies in your scrapbook or learning journal
- » tell your teacher about how well you are working.



TIMETABLE GUIDE

FIRST WEEK

Over the course of a week view the introductory DVD and complete at least five of the science 'starter' activities and write your observations and comments on the recording sheet.

Make sure that you complete at least one 'starter' activity from each of the four science strands (these are found on the top left corner of each starter activity):

- » Living world
- » Physical world
- » Material world
- » Planet Earth and beyond.

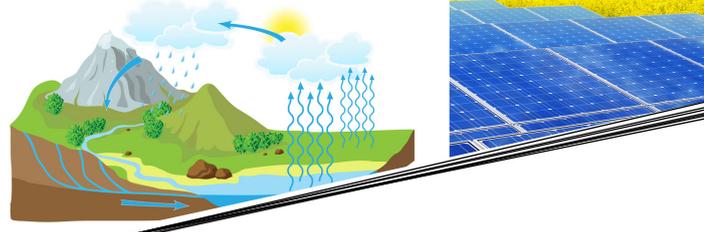
Keep these starter activities somewhere safe to use again later.

SECOND AND THIRD WEEKS (or more time if needed) – conduct your own investigation. This is when you will plan, gather your information, process and interpret it.

FINAL WEEK

Prepare your scientific report and present your findings.





LET'S GET STARTED

WEEK ONE

Watch the introductory DVD.

Choose at least five of the starter activities (INT209A). These are to get you thinking like a scientist, and learn some of the skills you will need for your own investigation.

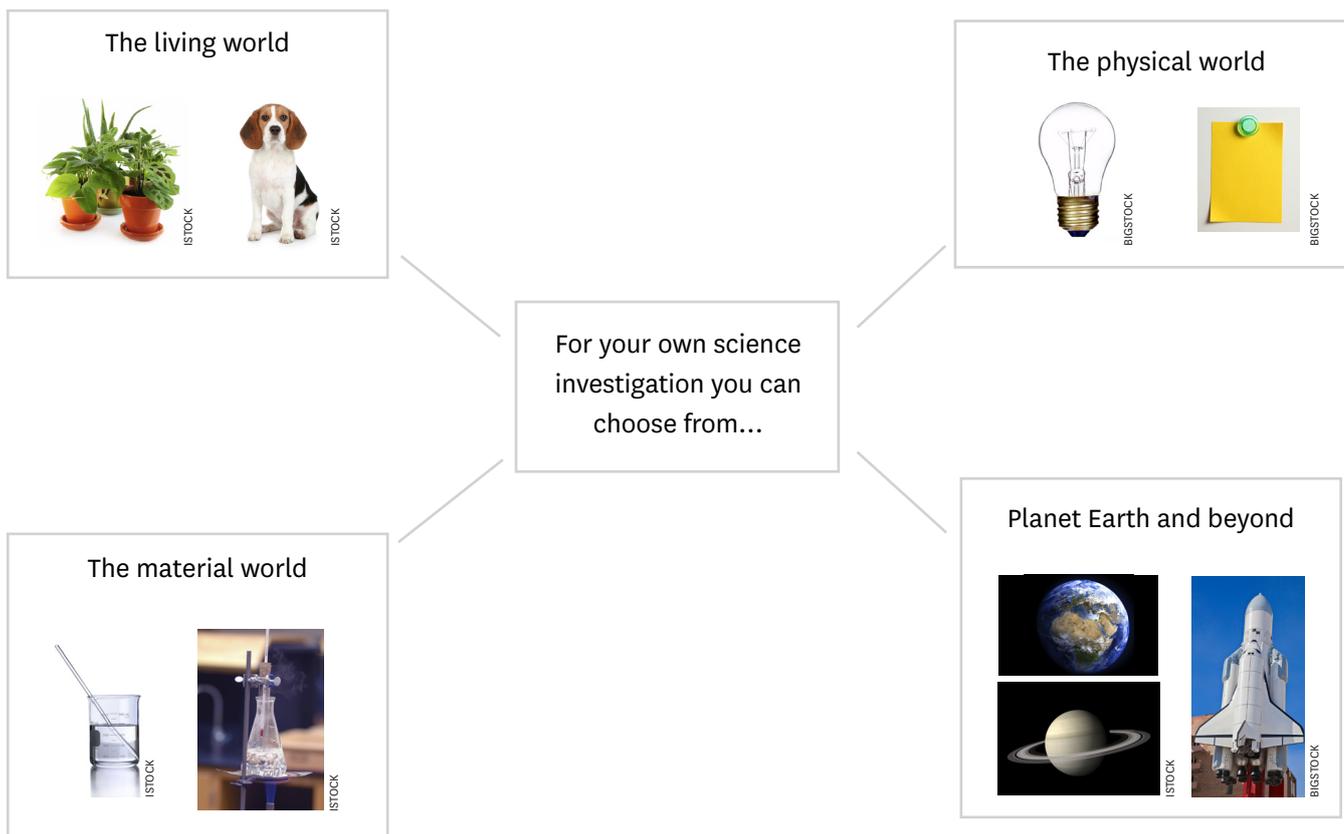
Choose one to do each day, fill in and cut out the recording sheets.

WEEK TWO-THREE

YOUR OWN INVESTIGATION

Your investigation will be about something you're interested in and want to know more about.

Here are some examples of topics you might like to investigate in each of the science strands.



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THE LIVING WORLD:

Plants, growing things, animals and other living creatures, habitats, the sea shore, the local environment, life cycles.

Examples of topics to investigate could be:

- » What do seeds need to grow and where do they grow best?
- » How does my worm farm work?
- » The life cycle of an insect or animal.



PLANET EARTH AND BEYOND:

Water, air, rocks, soil and the cycles associated with these; the moon and the sun and their effects on heat and light, other planets, space travel, distances in space.

Examples of a question to investigate could be:

- » Why does it rain?
- » How are shadows formed?
- » Why do we have day and night?
- » How does the moon affect the tide?

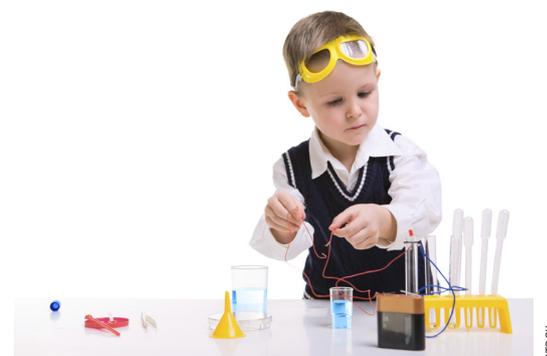


THE PHYSICAL WORLD:

Electricity, magnetism, light, sound, heat, forces, sources of energy.

Examples of a question could be:

- » What things float and what things sink? Why?
- » What things are attracted to magnets? (What things will a magnet pick up?)
- » How can you make things heat up or cool down?
- » Is the effect of gravity the same on different objects?





THE MATERIAL WORLD:

The physical and chemical properties of common materials and their uses (includes things like heating, cooling, mixing, turning solids into liquids or liquids into gases).

Examples of a question to investigate could be:

- » What types of materials are waterproof?
- » What materials will keep an ice-block frozen for the longest period of time?
- » I need to build a ramp for my toy car – which materials on the ramp will make the car go more quickly or slowly?
- » Why do some materials conduct heat better than others?

It's time to start thinking about a topic that you will investigate.

Write some ideas in your learning journal.



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BIGSTOCK

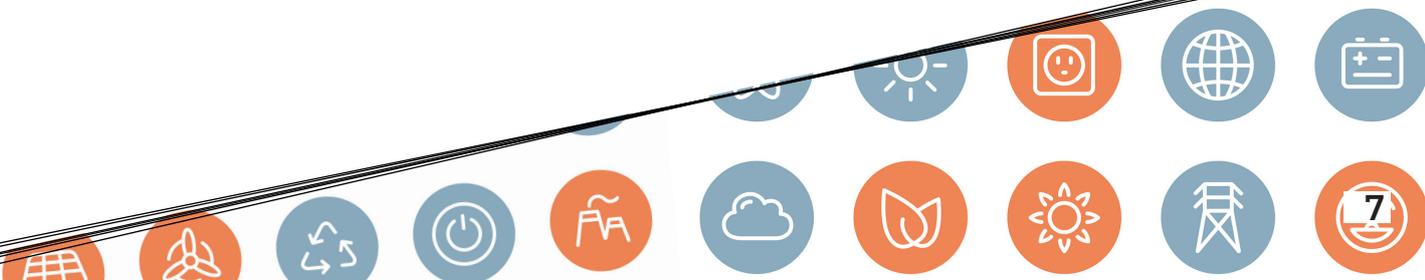
SCIENCE INVESTIGATION

WHAT DOES AN INQUIRY LOOK LIKE?

An inquiry learning project has a number of stages to work through. Read and follow the stages from the diagram.



When you carry out an inquiry, you ask questions about a topic you want to investigate. You gather information to answer your question, and use the information to present your findings to others.





Use the questions below to guide your student's investigation.

SUPERVISOR NOTE

Read through these lead discussion questions prior to beginning your student's own investigation.

The questions are a guide for you to develop your student's thinking about their own investigation.

The key to your student's own investigation is that it is about something that interests them and something they want to find out about.

- **BE CURIOUS**
 - » What topic have you decided to investigate?
- **CHANGE MY IDEAS**
 - » What are you trying to find out? What are you investigating?
- **ASK QUESTIONS**
 - » Do you have a question you want to find out about?
- **BE OPEN MINDED**
 - » What are you going to do?
- **THINK CRITICALLY**
 - » How are you going to do the investigation? Think carefully about this.
- **WORK SAFELY**
 - » What do you need?
- **OBSERVE**
 - » Is there anything you need to measure or look out for?



USE EVIDENCE

- » Think about how you will record what you measure or what you see. You might find it useful to write your results in a table.



PREDICT

- » What do you expect to happen?
- » What do you think you will see?



EXPLAIN

- » Why do you think this?

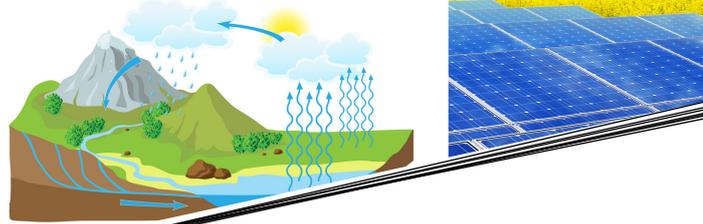




PLANNING TEMPLATE (CUT OUT AND PASTE INTO YOUR LEARNING JOURNAL)

What am I investigating?	
What do I know already?	
What do I want to find out?	
How am I going to do my investigation? How am I going to gather my information?	
What do I need to carry out my investigation?	
What do I expect to find out or what do I expect to happen?	
How will I record what I have observed/found out/learnt?	





CARRY OUT THE INVESTIGATION – WEEKS 2 AND 3

Write the heading, **Gathering Information** in your learning journal. Refer to your planning template and carry out your investigation.

Record what you observe/find out/learn.

SUPERVISOR NOTE

The questions are a guide for you to develop your student's thinking about their own investigation.



OBSERVE, ASK QUESTIONS, THINK CRITICALLY

- » What did you see?
- » Was it what you expected?
- » Can you see any patterns in what you saw or what you measured?



EXPLAIN, SHARE IDEAS, USE EVIDENCE, USE SCIENTIFIC WORDS

- » What have you found out? Can you explain what you have found out?



BE OPEN MINDED, CHANGE MY IDEAS, TAKE ACTION

- » If you did the investigation again would you do anything differently?



ASK QUESTIONS, THINK CRITICALLY

- » Could you make it more accurate?





PROCESSING AND INTERPRETING TEMPLATE

(Cut out and paste into your learning journal)

SUPERVISOR NOTE

Help your student to think about what happened and/or what they found out. Thinking back (reflecting) about what they did and what this means is an important part of the investigation.

What happened/what did you find out?

Was your investigation successful?

How could you have improved it?

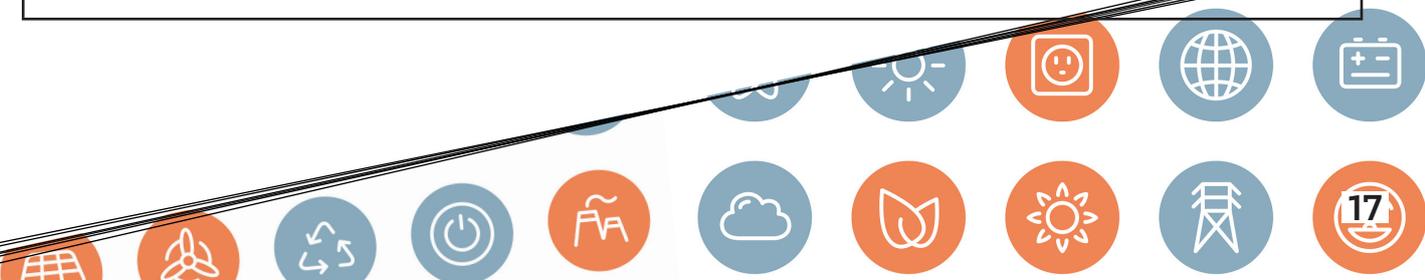




Is there something you could/should have done differently?

Did anything surprise you?

Any other comments





REPORTING MY INVESTIGATION

Introduction

The question you are going to investigate or your hypothesis.

Methods

How you tested your hypothesis/ details of how you carried out your investigation and why you did it in that particular way.

Results

What you found out (could be in table form – presented in an easy to read way).







Discussion

Consider whether what you found out answers your question.

Did anything surprise you?

What were the limitations of your investigation?

What would you do differently next time?

What would the next step in continuing your investigation be?

Presentation

Create a presentation about your investigation to share with others. Use the information recorded here. Include photos or other relevant material.





ASSESSMENT

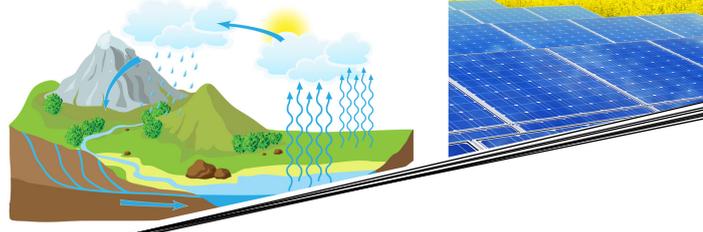
Please complete the assessment and evaluation with your student.

Highlight the boxes that best match your student's learning.

Add any comments to help with the assessments.

I CAN	NOT ATTEMPTED	HAD A GO	SUCCEEDED	DID VERY WELL	DID AN EXCELLENT JOB
Complete and record at least one science 'starter' activity from each strand.		I completed some of the starter activities and recorded my observations.	I completed and recorded my observations from at least one science 'starter' activity from each strand.	I completed and recorded my observations from more than one science 'starter' activity from each strand.	I completed more than five starter activities, recorded my observations and understood some of the science involved.
Plan an investigation about something you're interested in and want to know more about.		I had a go at planning an investigation about something I am interested in and want to know more about.	I planned an investigation about something I am interested in and want to know more about.	I planned an investigation and asked questions about something I am interested in and want to know more about.	I planned an investigation, asked questions and gathered information about something I am interested in and want to know more about.
Explain what you have found out.		I had a go at explaining what I found out.	I explained what I found out.	I explained what I found out with some detail.	I explained what I found out in a way that clearly shows I understand some of the science involved.
Present information to tell others about your investigation.		I presented some information to tell others about my investigation.	I presented information to tell others about my investigation.	I presented information in an interesting way to tell others about my investigation.	I presented information in an interesting way to tell others about my investigation and asked for feedback.





STUDENT COMMENT

Something new I learned in this unit was

SOMETHING I WOULD LIKE MY TEACHER TO COMMENT ON

SUPERVISOR COMMENT

Your student appreciates that scientists:

- » ask questions about the world
- » make careful observations
- » think about and evaluate evidence
- » make decisions based on evidence.

Teacher comment

STUDENTS SEND BACK:

INT201A with the completed 'starter' activity recording sheets.

Your learning journal which will include:

- » the completed pages from this resource
- » your presentation (or this may be digital).

Any videos or photos you took.





GLOSSARY

Investigate	Carry out a systematic or formal inquiry to discover and examine the facts to establish the truth.
Explain	A statement or account that makes something clear.
Evidence	The available facts or information that indicate whether a belief or suggestion is true.
Data	Facts and statistics collected together for reference or analysis.
Critique	A detailed analysis and assessment of something.
Interpret	Explain the meaning of information or actions.
Chart	A sheet of information in the form of a table, graph, or diagram.
Diagram	A simplified drawing showing the appearance, structure, or workings of something.
Template	A file that is a starting point for a new document.
Living World	The Living World strand involves the study of living things and how they interact with each other and the environment.
Physical World	The Physical World strand provides explanations for a wide range of physical phenomena, including light, sound, heat, electricity, magnetism, waves, forces, and motion.
Material World	The Material World strand involves the study of matter and the changes it undergoes.
Planet Earth & Beyond	Planet Earth and Beyond strand involves the study of Earth systems (land, air, water), the other parts of the solar system, and the universe beyond.
Thinking Critically	Being able to judge and analyse a topic.
Hypothesis	A proposed explanation made on the basis of limited evidence as a starting point for further investigation.





ACKNOWLEDGEMENTS

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