

CHALLENGE TASKS 2022 QUICK GUIDE



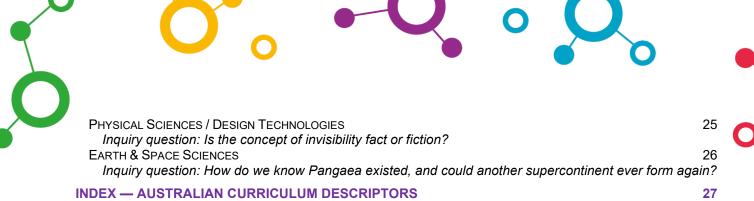
0.





Table of Contents

YEAR 4	1
PHYSICAL SCIENCES Inquiry question: Which marble would win the Marble Olympics?	1
CHEMICAL SCIENCES	2
Inquiry question: How can we keep our ice-cream cool? EARTH AND SPACE SCIENCES Inquiry question: What causes changes to the Earth's surface and how can we minimise the impact?	3
YEAR 5	4
BIOLOGICAL SCIENCES	4
Inquiry question: What is the best beak shape? CHEMICAL SCIENCES / DESIGN TECHNOLOGIES	5
Inquiry question: DIY – how can we innovate?	
Physical Sciences / Design Technologies Inquiry question: How do scientists use light to help solve problems?	6
EARTH & SPACE SCIENCE / BIOLOGICAL SCIENCES	7
Inquiry question: Why is Earth the best planet in our solar system to sustain life?	
YEAR 6	8
BIOLOGICAL SCIENCES Inquiry question: How can agriculture, conservation and biodiversity be balanced?	8
EARTH & SPACE SCIENCES / DESIGN TECHNOLOGIES	9
Inquiry question: How do seismologists measure earthquakes? CHEMICAL SCIENCES	10
Inquiry question: How will you know if your snack is fit for an extreme environment?	
BIOLOGICAL SCIENCES / PHYSICAL SCIENCES / DESIGN TECHNOLOGIES Inquiry question: How can we live more sustainably?	11
Physical Sciences / Design Technologies	12
Inquiry question: How can we generate electrical energy in a more sustainable way? BIOLOGICAL SCIENCES / MATHEMATICS	13
Inquiry question: What is the best seed shape?	
BIOLOGICAL SCIENCES Inquiry question: How could plants be used to determine water quality?	14
YEAR 7	15
BIOLOGICAL SCIENCES	15
Inquiry question: When is a bug not a bug?	40
Physical Sciences / Mathematics Inquiry question: How can energy efficiency be improved in your local community?	16
PHYSICAL SCIENCES / MATHEMATICS	17
Inquiry question: Which launch angle gives the longest horizontal distance? CHEMICAL SCIENCES / DESIGN TECHNOLOGIES	18
Inquiry question: How are separation methods used in industry and how could we improve them?	
YEAR 8	19
BIOLOGICAL SCIENCES	19
Inquiry question: How will single-celled organisms survive in changing aquatic environments? Physical Sciences	20
Inquiry question: How does energy change form? EARTH & SPACE SCIENCES	21
Inquiry question: How do rocks help us to understand our planet and other solar bodies, and make	۷ ۱
viable decisions about their management? CHEMICAL SCIENCES	22
Inquiry question: Why is water so wondrous?	22
YEAR 9	23
CHEMICAL SCIENCES / BIOLOGICAL SCIENCES	23
Inquiry question: How will increasing atmospheric carbon dioxide levels affect plant growth? CHEMICAL SCIENCES Inquiry question: Do chemical reactions always release energy?	24





Year 4 – Marvellous Marbles

Physical Sciences

Inquiry question: Which marble would win the Marble Olympics?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this Wonder of Science (WoS) Challenge Task addresses the following **SCIENCE** descriptor(s):

 Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate how forces and the properties of materials affect the behaviour of a product or system (ACTDEK011)
- Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (ACTDEK013)
- Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to produce designed solutions (ACTDEP014)
- Generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques (ACTDEP015)
- Select and use materials, components, tools, equipment, and techniques and use safe work practices to make designed solutions (ACTDEP016)
- Plan a sequence of production steps when making designed solutions individually and collaboratively (ACTDEP018)

- Create symmetrical patterns, pictures and shapes with and without digital technologies (ACMMG091)
- Compare angles and classify them as equal to, greater than, or less than, a right angle (ACMMG089)
- Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)



Year 4 - Materials Matter

Chemical Sciences

Inquiry question: How can we keep our ice-cream cool?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this Wonder of Science (WoS) Challenge Task addresses the following **SCIENCE** descriptor(s):

 Natural and processed materials have a range of physical properties that can influence their use (ACSSU074)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)
- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)
- Select appropriate materials, components, tools, equipment, and techniques and apply safe procedures to make designed solutions (ACTDEP026)
- Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes, and solutions (ACTDEP027)

- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)



Year 4 - Erosion

Earth and space sciences

Inquiry question: What causes changes to the Earth's surface and how can we minimise the impact?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this Wonder of Science (WoS) Challenge Task addresses the following **SCIENCE** descriptor(s):

• Earth's surface changes over time as a result of natural processes and human activity (ACSSU075)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Recognise the role of people in design and technologies occupations and explore factors, including sustainability that impact on the design of products, services, and environments to meet community needs (ACTDEK010)
- Investigate the suitability of materials, systems, components, tools, and equipment for a range of purposes (ACTDEK013)
- Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to produce designed solutions (ACTDEP014)
- Select and use materials, components, tools, equipment, and techniques and use safe work practices to make designed solutions (ACTDEP016)
- Evaluate design ideas, processes and solutions based on criteria for success developed with guidance and including care for the environment (ACTDEP017)
- Plan a sequence of production steps when making designed solutions individually and collaboratively (ACTDEP018)

- Use scaled instruments to measure and compare lengths, masses, capacities, and temperatures (ACMMG084)
- Use simple scales, legends, and directions to interpret information contained in basic maps (ACMMG090)
- Compare angles and classify them as equal to, greater than, or less than, a right angle (ACMMG089)



Year 5 - Adaptations

Biological Sciences

Inquiry question: What is the best beak shape?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this Wonder of Science (WoS) Challenge Task addresses the following **SCIENCE** descriptor(s):

• Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)
- Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)

MATHEMATICS

- Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)
- Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)
- Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)
- Describe and interpret different data sets in context (ACMSP120)

CROSS-CURRICULUM PRIORITY

Sustainability & Aboriginal and Torres Strait Islander Histories and Cultures

- Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (OI.3)
- Investigating Aboriginal and Torres Strait Islander peoples' knowledge of the adaptations of certain species and how those adaptations can be made the most of (OI.3)



Year 5 - Solids, Liquids and Gases - Materials

Chemical Sciences / Design Technologies

Inquiry question: DIY - how can we innovate?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

 Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

 Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

- Apply the enlargement transformation to familiar two-dimensional shapes and explore the properties
 of the resulting image compared with the original (ACMMG115)
- Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)
- Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)
- Construct displays, including column graphs, dot plots, and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)
- Describe and interpret different datasets in context (ACMSP120)



Year 5 - Light

Physical Sciences / Design Technologies

Inquiry question: How do scientists use light to help solve problems?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

 Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)
- Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)
- Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed
- Solutions (ACTDEP024)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

- Solve problems involving division by a one-digit number, including those that result in a remainder (ACMNA101)
- Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMNA291)
- Find unknown quantities in number sentences involving multiplication and division and identify equivalent number sentences involving multiplication and division (ACMNA121)
- Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)
- Compare 12- and 24- hour time systems and convert between them (ACMMG110)
- Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)



Year 5 - Planet Earth

Earth & Space Science / Biological Sciences

Inquiry question: Why is Earth the best planet in our solar system to sustain life?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021)
- Acquire, store, and validate diverse types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)

- Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)
- Solve problems involving multiplication of large numbers by one or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)
- Solve problems involving division by a one-digit number, including those that result in a remainder (ACMNA101)
- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)
- Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)
- Describe and interpret different data sets in context (ACMSP120)



Year 6 – Conservation (5 & 6 composite class option)

Biological Sciences

Inquiry question: How can agriculture, conservation and biodiversity be balanced?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Living things have structural features and adaptations that help them to survive in their environment (ACSSU043 –Year 5)
- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094 –Year 6)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)
- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

MATHEMATICS

- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118– Year 5)
- Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119–Year 5)
- Describe and interpret different data sets in context (ACMSP120–Year 5)
- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147–Year 6)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148–Year 6)

CROSS-CURRICULUM PRIORITIES

Sustainability & Aboriginal and Torres Strait Islander Histories and Cultures

- Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (OI.3)
- Investigating Aboriginal and Torres Strait Islander peoples' knowledge of the adaptations of certain species and how those adaptations can be exploited (OI.3)



Year 6 – Earthquakes

Earth & Space Sciences / Design Technologies

Inquiry question: How do seismologists measure earthquakes?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• Sudden geological changes or extreme weather conditions can affect Earth's surface (ACSSU096)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)
- Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)
- Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)



Year 6 – Extreme Snack

Chemical Sciences

Inquiry question: How will you know if your snack is fit for an extreme environment?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• Sudden geological changes or extreme weather conditions can affect Earth's surface (ACSSU096)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)
- Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)
- Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)



Year 6 – Living Sustainably

Biological Sciences / Physical Sciences / Design Technologies

Inquiry question: How can we live more sustainably?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)
- Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)
- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021)
- Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

MATHEMATICS

- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)
- Make connections between equivalent fractions, decimals, and percentages (ACMNA131)

CROSS-CURRICULUM PRIORITY

Sustainability & Aboriginal and Torres Strait Islander Histories and Cultures

- Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (OI.3)
- Aboriginal and Torres Strait Island communities maintain a special connection to and responsibility for Country/Place (OI.2)
- Aboriginal and Torres Strait Islander Peoples have holistic belief systems and are spiritually and intellectually connected to the land, sea, sky, and waterways (OI.3)



Year 6 – Sustainable Electrical Energy

Physical Sciences / Design Technologies

Inquiry question: How can we generate electrical energy in a more sustainable way?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097)

This task is also an opportunity for students to learn and demonstrate aspects of:

DESIGN TECHNOLOGIES

- Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)
- Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021)
- Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

MATHEMATICS

 Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)

CROSS-CURRICULUM PRIORITY

Sustainability

 Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (O.13).



Year 6 – Seed Shape

Biological Sciences / Mathematics

Inquiry question: What is the best seed shape?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

 Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

- Convert between common metric units of length, mass and capacity (ACMMG136)
- Connect volume and capacity and their units of measurements (ACMMG138)
- Compare observed frequencies across experiments with expected frequencies (ACMSP146)
- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data represented in digital media and elsewhere (ACMSP148)



Year 6 – Plant growth/Water quality

Biological Sciences

Inquiry question: How could plants be used to determine water quality?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)
- Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)



Year 7 – Taxonomy/Classification

Biological Sciences

Inquiry question: When is a bug not a bug?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Classification helps organise the diverse group of organisms (ACSSU111)
- Interactions between organisms, including the effects of human activities can be represented by food chains and food webs (ACSSU112)
- Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Design a user interface for a digital system (ACTDIP018)
- Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)
- Critique needs or opportunities for designing and investigating materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)

- Connect fractions, decimals and percentages and carry out simple conversion (ACMNA157)
- Recognise and solve problems involving simple ratios (ACMNA173)



Year 7 – Energy Efficiency

Physical Sciences / Mathematics

Inquiry question: How can energy efficiency be improved in your local community?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116)
- Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)
- Select and justify choices of materials, components, tools, equipment and techniques to effectively and safely make designed solutions (ACTDEP037)
- Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (ACTDEP038)

- Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)
- Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)
- Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)
- Describe and interpret data displays using median, mean and range (ACMSP172)
- Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)
- Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)



Year 7 - Launch Angle (Rockets)

Physical Sciences / Mathematics

Inquiry question: Which launch angle gives the longest horizontal distance?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Change to an object's motion is caused by unbalanced forces acting on the object (ACSSU117)
- Earth's gravity pulls objects towards the centre of the Earth (ACSSU118)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (ACTDEK034)
- Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025)

- Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)
- Describe and interpret data displays using median, mean and range (ACMSP172)



Year 7 - Magical Mixtures

Chemical Sciences / Design Technologies

Inquiry question: How are separation methods used in industry and how could we improve them?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (ACSSU113)
- Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032)
- Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (ACTDEK034)
- Analyse how characteristics and properties of food determine preparation techniques and presentation when designing solutions for healthy eating (ACTDEK033)

MATHEMATICS

• Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies (ACMNA158)



Year 8 - Cell Survivors (Breathing under water)

Biological Sciences

Inquiry question: How will single-celled organisms survive in changing aquatic environments?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Cells are the basic units of living things; they have specialised structures and functions (ACSSU149)
- Multicellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce (ACSSU150)
- Properties of the different states of matter can be explained in terms of the motion and arrangement of particles (ACSSU151)
- Differences between elements, compounds and mixtures can be described at a particle level (ACSSU152)
- Chemical change involves substances reacting to form new substances (ACSSE225)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

 Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)

MATHEMATICS

• Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)



Year 8 - Energy Change

Physical Sciences

Inquiry question: How does energy change form?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

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

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)
- Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (ACTDEK034)

MATHEMATICS

• Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182)



Year 8 - Rocks

Earth & Space Sciences

Inquiry question: How do rocks help us to understand our planet and other solar bodies, and make viable decisions about their management?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

• Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)
- Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032)

- Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and' (ACMSP205)
- Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292)
- Investigate techniques for collecting data, including census, sampling and observation (ACMSP284)



Year 8 – Wonderous Water

Chemical Sciences

Inquiry question: Why is water so wondrous?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- The properties of the different states of matter can be explained in terms of the motion and arrangement of particle (ACSSU151)
- People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)
- Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (ACTDEK034)

- Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and' (ACMSP205)
- Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)



Year 9 – Carbon Dioxide and Plant Growth

Chemical Sciences / Biological Sciences

Inquiry question: How will increasing atmospheric carbon dioxide levels affect plant growth?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)
- Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (ACSIS165)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)
- Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (ACTDEK041)
- Investigate and make judgments on the ethical and sustainable production and marketing of food and fibre (ACTDEK044)

- Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)
- Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (AMSP283)



Year 9 – Chemical Energy

Chemical Sciences

Inquiry question: Do chemical reactions always release energy?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

 Chemical reactions, including combustion and the reaction of acids, are important to both non-living and living systems, and involve energy transfer (ACSSU179)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions (ACTDEK043)
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions (ACTDEK046)

- Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)
- Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)



Year 9 - Invisibility

Physical Sciences / Design Technologies

Inquiry question: Is the concept of invisibility fact or fiction?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

 Energy transfer through different mediums can be explained using wave and particle models (ACSSU182)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions (ACTDEK043)
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions (ACTDEK046)
- Investigate and make judgments, within a range of technologies specialisations, on how technologies can be combined to create designed solutions (ACTDEK047)

- Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collet data directly and from secondary sources (ACMSP228)
- Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)



Year 9 – Plate Tectonics

Earth & Space Sciences

Inquiry question: How do we know Pangaea existed, and could another supercontinent ever form again?

AUSTRALIAN CURRICULUM CONTENT ALIGNMENT

In addition to being an opportunity to develop *Science Inquiry Skills* and understanding of *Science as a Human Endeavour*, this WoS Challenge Task addresses the following **SCIENCE** descriptor(s):

- The theory of plate tectonics explains global patterns of geological activity and continental movement (ACSSU180)
- Energy transfer through different mediums can be explained using wave and particle models (ACSSU182)

This task is also an opportunity for students to learn and demonstrate aspects of:

TECHNOLOGIES

- Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions (ACTDEK043)
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions (ACTDEK046)
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication (ACTDEP049)
- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes (ACTDEP052)

- Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)
- Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi-modal' (ACMSP282)
- Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)





		ACSSU097	11, 12
		ACSSU111	15
A		ACSSU112	15
		ACSSU113	18
ACMMG084	3	ACSSU116	16
ACMMG089	1, 3	ACSSU117	17
ACMMG099	3	ACSSU118	17
ACMMG090 ACMMG091	1	ACSSU149	19
ACMMG108	6	ACSSU150	19
ACMMG110	6	ACSSU151	19, 22
	1.6	ACSSU152	19
ACMMG112	4, 6	ACSSU153	21
ACMMG114	4, 5	ACSSU155	20
ACMMG115	5	ACSSU176	23
ACMMG136	13	ACSSU179	24
ACMMG138	13	ACSSU180	26
ACMNA098	7	ACSSU182	25, 26
ACMNA100	7	ACTDEK010	3
ACMNA101	6, 7	ACTDEK011	1
ACMNA121	6	ACTDEK013	1, 3
ACMNA131	11	ACTDEK019	8, 11, 12
ACMNA157	15	ACTDEK021	7, 8, 11, 12
ACMNA158	18	ACTDEK023	2, 4, 5, 11, 12, 13
ACMNA173	15	ACTDEK029	19, 21, 22
ACMNA175	16	ACTDEK031	16, 20
ACMNA176	16	ACTDEK032	18, 21
ACMNA182	20	ACTDEK033	18
ACMNA187	19, 22	ACTDEK034	17, 18, 20, 22
ACMNA291	6	ACTDEK040	23
ACMSP094	1	ACTDEK041	23
ACMSP118	4, 5, 7, 8	ACTDEK043	24, 25, 26
ACMSP119	4, 5, 7, 8	ACTDEK044	23
ACMSP120	4, 5, 7, 8	ACTDEK046	24, 25, 26
ACMSP146	13	ACTDEK047	25
ACMSP147	2, 8, 9, 10, 11, 12, 13, 14	ACTDEP014	1, 3
ACMSP148	2, 8, 9, 10, 11, 13, 14	ACTDEP015	1, 3
ACMSP169	16	ACTDEP016	1, 3
ACMSP170	16	ACTDEP018	1, 3
ACMSP171	16, 17	ACTDEP024	2, 6, 9, 10, 15
ACMSP172	16, 17	ACTDEP026	2, 6, 9, 10
ACMSP205	21, 22	ACTDEP027	2, 6, 8, 9, 10, 14
ACMSP228	23, 24, 25, 26	ACTDEP028	2, 6, 9, 10, 14
ACMSP282	26	ACTDEP037	16
ACMSP283	24, 25, 26	ACTDEP038	16
ACMSP284	21	ACTDEP049	26
ACMSP292	21	ACTDEP052	26
ACSHE119	15	ACTDIP016	4, 7
ACSHE120	16, 18	ACTDIP018	15
ACSHE136	22	ACTDIP020	15
ACSIS165	23	ACTDIP025	17
ACSSE225	19	AMSP283	23
ACSSU043	4, 8	7 41101 200	20
ACSSU074	2		
ACSSU075	3	0	
ACSSU076	1	0	
ACSSU077	5		
ACSSU078	7	0.13	12
ACSSU080	6	OI.2	11
ACSSU094	8, 11, 13, 14	OI.3	4, 8, 9, 11
ACSSU096	9, 10		



Contact details

Wonder of Science

T +61 7 **3443 1194**

E wonderofscience@uq.edu.au

W www.wonderofscience.com.au

Wonder of Science

UQ Graduate School | Level 6, Building 62

The University of Queensland

Brisbane Queensland 4072

