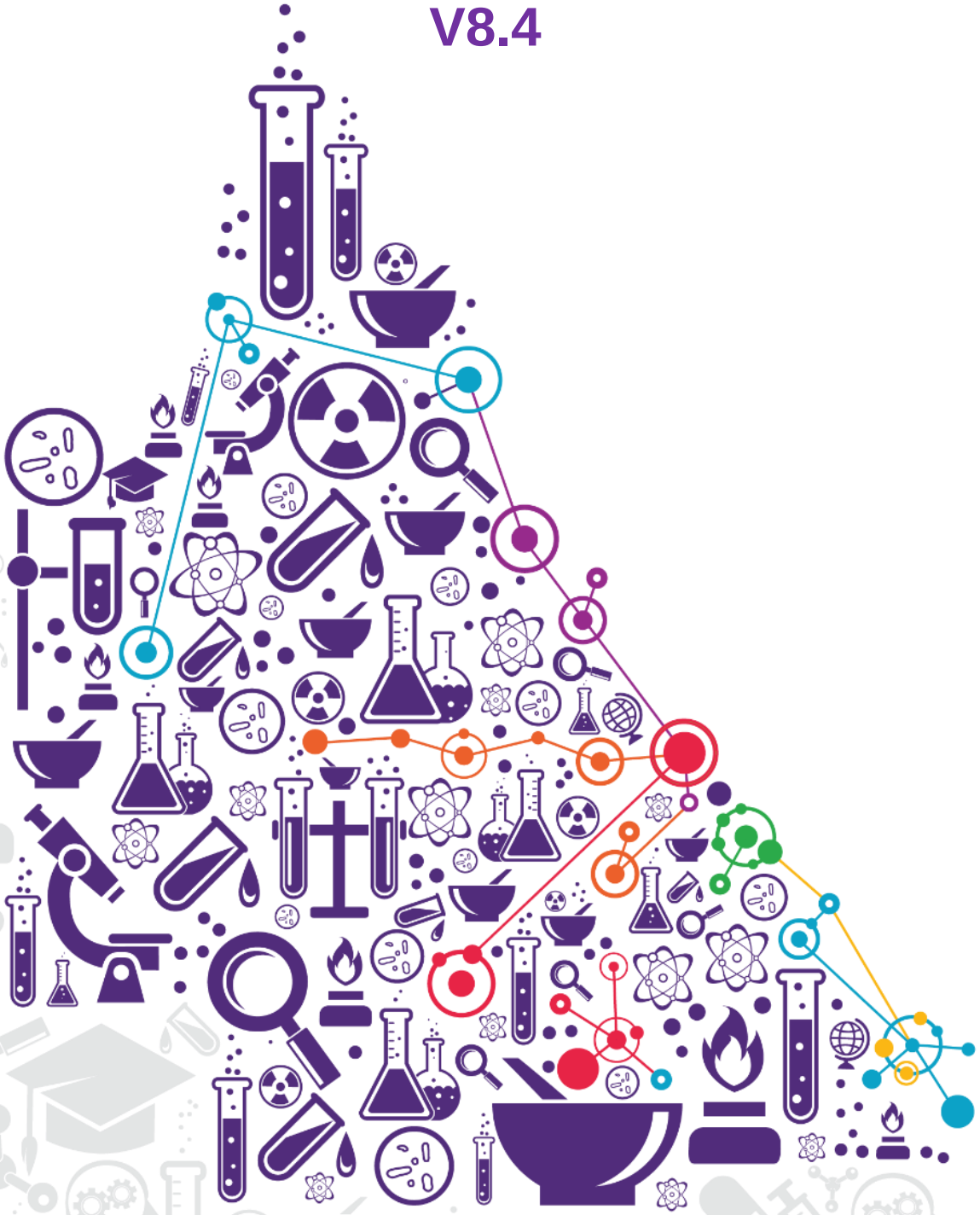
WONDER OF SCIENCE

CHALLENGE TASKS 2024 QUICK GUIDE

V8.4



FOSTERING A STEM CULTURE

Table of Contents

Year 9

Please use the Challenge Task Quick Guide to select desired Challenge Task(s) for your school and note these on your School Involvement Form. Should you not find a suitable task for your context, please contact Wonder of Science to further discuss creating or tailoring a Challenge Task to your school.

Check out our new special tasks: Year 6 task 'Socks for Science' on page 15 – available from Term 3, 2023, Year 8 'Rio Tinto Rocks and Minerals' on page 22 – available now, and Year 9 'Avoid Island' on page 28 – available now. If interested, please reach out to receive further details.

Wonder of Science will progressively be updating Challenge Tasks to align to V9.0 of the Australian Curriculum. Please let us know if you're planning to use V9.0 this year and if so, what tasks you're selecting, so that these can be prioritised.

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)

MATHEMATICS

- 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)

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)

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)

MATHEMATICS

- 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)

MATHEMATICS

- 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)

MATHEMATICS

- 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)

MATHEMATICS

- 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)

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)

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):

- *Changes to materials can be reversible or irreversible* (ACSSU095)

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)

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)

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)

MATHEMATICS

- 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)

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)

Year 6 – Socks for Science

Biological Sciences

Inquiry question: What are the best conditions to encourage microbial activity in soil?

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

- 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)
- Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)

MATHEMATICS

- Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
- Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
- Convert between common metric units of length, mass and capacity (ACMMG136)
- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)

Socks for Science was developed in collaboration with Soils for Science and is an Australian-first citizen science program dedicated to finding new antibiotics needed in the fight against the scourge of drug-resistant infections, better known as superbugs.

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)

MATHEMATICS

- 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)

MATHEMATICS

- 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, including Earth's gravitational attraction, acting on the object* (ACSSU117)

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)

MATHEMATICS

- 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* (ACSSU225)

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 – Rio Tinto Rocks and Minerals

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)

MATHEMATICS

- 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)

Special Challenge Task developed with Rio Tinto

This Year 8 Rocks and Minerals task was developed in consultation with our partners at Rio Tinto.

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):

- *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)

MATHEMATICS

- 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)
- *Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment* (ACSSU175)
- *Chemical reactions, including combustion and the reactions of acids, are important in 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

- 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)

MATHEMATICS

- 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)
- *Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed* (ACSSU178)

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)

MATHEMATICS

- 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)

MATHEMATICS

- 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)

MATHEMATICS

- 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)

Year 9 – Avoid Island: Sustainable Island Management

Biological Sciences

Inquiry question: How can we sustainably manage islands, like Avoid Island, in the Great Barrier Reef?

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):

- *Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment (ACSSU175)*
- *Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)*

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

MATHEMATICS

- 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)

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)
- Aboriginal and Torres Strait Islander communities maintain a special connection to and responsibility for Country/Place.
- Aboriginal and Torres Strait Islander Peoples have holistic belief systems and are spiritually and intellectually connected to the land, sea, sky and waterways.

Pilot Challenge Task developed in partnership with:

QTFN Queensland Trust for Nature

Koinmerburra Aboriginal Corporation

Great Barrier Reef Foundation

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