



2017 CHALLENGE TASKS



OVERVIEW

WONDER
OF
SCIENCE



2017 Wonder of Science CHALLENGE TASKS	AUSTRALIAN CURRICULUM - CONTENT DESCRIPTIONS
Year 5	Each challenge task provides opportunities for students to demonstrate evidence against the Year 5 <i>Achievement Standard</i> ; to develop and demonstrate skills and knowledge across the <i>Science Inquiry Skills</i> ; and the content descriptions below:
<p><i>What is the best beak shape?</i> Investigate adaptation and the process of natural selection to determine the best beak shape for a bird in a particular environment.</p>	<p>Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)</p> <p>Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE098)</p>
<p><i>What planet/s other than Earth might sustain life?</i> Investigate the Solar System and compare the features of Earth with other planets.</p>	<p>The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078)</p> <p>Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives (ACSHE083)</p>
<p><i>Slime is slippery and sticky, but why is it often also described as 'sensational'?</i> Investigate the different properties of materials and how they behave in different ways.</p>	<p>Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077)</p> <p>Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACSIS086)</p>



New task: How do scientists use light to help solve problems?

Build and test a simple device to demonstrate your understanding of reflection and refraction.

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

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

What behaviours make an animal unique?

Years 5 and 6. Investigate the behaviours of a chosen animal to learn about how it interacts with others of the same species, as well as other living beings, and with the environment.

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

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

Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (AC SIS090)

Teacher / student choice



2017 Wonder of Science CHALLENGE TASKS	AUSTRALIAN CURRICULUM - CONTENT DESCRIPTIONS
Year 6	Each challenge task provides opportunities for students to demonstrate evidence against the Year 6 <i>Achievement Standard</i> ; to develop and demonstrate skills and knowledge across the <i>Science Inquiry Skills</i> ; and the content descriptions below:
<p><i>What is the best seed shape?</i> Determine the best shaped seed to enhance distribution in a particular environment. Investigate mass, volume, density and seed shapes.</p>	<p>The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094)</p> <p>Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE098)</p>
<p><i>Can duckweed be used to determine water quality?</i> Investigate duckweed growth in different levels of water quality, and if duckweed can be used to test for water contaminants.</p>	<p>The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094)</p> <p>Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE098)</p> <p>Scientific knowledge is used to inform personal and community decisions (ACSHE220)</p>
<p><i>How do seismologists measure earthquakes?</i> Build and test a device that could be used to measure an earthquake.</p>	<p>Sudden geological changes or extreme weather conditions can affect Earth's surface (ACSSU096)</p> <p>Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives (ACSHE100)</p>



New task: Extreme snack - how will you know whether your snack is fit for an extreme environment?

Develop a recipe for a snack that would withstand extreme climatic conditions.

Changes to materials can be reversible or irreversible (ACSSU095)

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)

What behaviours make an animal unique?

Years 5 and 6. Investigate the behaviours of a chosen animal to learn about how it interacts with others of the same species, as well as other living beings, and with the environment.

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

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

Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (ACSIS090)

Teacher / student choice



2017 Wonder of Science CHALLENGE TASKS	AUSTRALIAN CURRICULUM - CONTENT DESCRIPTIONS
Year 7	Each challenge task provides opportunities for students to demonstrate evidence against the Year 7 <i>Achievement Standard</i> ; to develop and demonstrate skills and knowledge across the <i>Science Inquiry Skills</i> ; and the content descriptions below:
<p>New task: When is a bug not a bug? If you discovered an insect-like creature in your backyard, that is nothing like you've seen before, how do you find out if it is a new species?</p>	<p>Classification helps organise the diverse group of organisms (ACSSU111)</p> <p>Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119)</p>
<p>What launch angle gives the longest horizontal distance? Investigate gravity and unbalanced forces to determine the launch angle of a satellite that will best enable the satellite to travel to a predetermined destination.</p>	<p>Change to an object's motion is caused by unbalanced forces acting on the object (ACSSU117)</p> <p>Earth's gravity pulls objects towards the centre of the Earth (ACSSU118)</p> <p>Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE120)</p>
<p>What is an eclipse? Investigate the relative position of the Earth, Sun and Moon to explain this and other phenomena like why the Moon appears larger when it is near the horizon.</p>	<p>Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon (ACSSU115)</p> <p>Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world (ACSHE119)</p>



Magical mixtures – helpful or harmful?

Investigate everyday mixtures and separation techniques. Apply this understanding to industrial separation methods to evaluate how their use might impact society and the environment?

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (ACSSU113)

Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE120)

People use understanding and skills from across the disciplines of science in their occupations (ACSHE224)

New task: How can energy efficiency be improved in your local community?

Investigate electrical energy consumption in your community to make suggestions on efficiency improvements; including consideration of renewable technologies.

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)

Teacher / student choice



2017 Wonder of Science CHALLENGE TASKS	AUSTRALIAN CURRICULUM - CONTENT DESCRIPTIONS
Year 8	Each challenge task provides opportunities for students to demonstrate evidence against the Year 8 <i>Achievement Standard</i> ; to develop and demonstrate skills and knowledge across the <i>Science Inquiry Skills</i> ; and the content descriptions below:
<p><i>How do rocks help us to understand our planet and make viable decisions about its management?</i> Investigate local soil quality to determine the general environmental health of the area and to determine its suitability for development.</p>	<p>Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)</p> <p>People use understanding and skills from across the disciplines of science in their occupations (ACSHE227)</p> <p>Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management (ACSHE136)</p>
<p><i>Why is water so wondrous?</i> Investigate a phenomenon that occurs due to hydrogen bonding and the molecular structure of water (e.g. surface tension, supercooling and snap freezing, freezing point depression, miscibility, solubility).</p>	<p>The properties of the different states of matter can be explained in terms of the motion and arrangement of particles (ACSSU151)</p> <p>People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)</p>



How much energy is needed to 'loop the loop'?

Investigate the drop height required on a roller coaster to have a marble complete one loop considering the conversion of potential energy to kinetic energy.

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

Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE135)

Teacher / student choice



2017 Wonder of Science CHALLENGE TASKS	AUSTRALIAN CURRICULUM - CONTENT DESCRIPTIONS
Year 9	Each challenge task provides opportunities for students to demonstrate evidence against the Year 9 <i>Achievement Standard</i> ; to develop and demonstrate skills and knowledge across the <i>Science Inquiry Skills</i> ; and the content descriptions below:
<p>How will increasing carbon dioxide levels affect plant growth? Students investigate how carbon dioxide affects the growth of plants.</p>	<p>Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)</p> <p>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 (AC SIS165)</p>
<p>Invisibility – fact or fiction? Investigate the science of invisibility cloaks or stealth technology to develop a scientific response to the question.</p>	<p>Energy transfer through different mediums can be explained using wave and particle models (ACSSU182)</p> <p>Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (ACSHE158)</p> <p>The values and needs of contemporary society can influence the focus of scientific research (ACSHE228)</p>



How does the study of plate tectonics contribute to our understanding of global geological activity?

Create a model of plate movements using data on the Pacific area to predict plate locations over a selected timespan.

The theory of plate tectonics explains global patterns of geological activity and continental movement (ACSSU180)

Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community (ACSHE157)

People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions (ACSHE160)

How can you demonstrate energy transfer as a result of chemical reactions using products in the home?

Devise a method for measuring the energy output of chemical reactions using household products.

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

Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities (ACSHE161)

Teacher / student choice