Eco Centre project

Year 7-10

The Development of an Eco Centre area within the school grounds. Establishment of a billabong eco-system

Timeline:

Year 1-2

- Establishment of a billabong eco-systems
- Development of a system for watering – automated maintenance

Year 2-3

- Development of a data-logging system monitoring trends over time
- Continuation of eco-system maintenance
- Introduction of a recycling centre – both organic and inorganic

Year 3 Onwards – Potential

- Introduction of weather station monitoring system to connect with data logging through phone apps etc. – remote control?
- Design sustainable work wear to use when maintaining the area

Resources Required:

- A suitable area of the school for the project

Teacher & Timetabling Approach:

- Potential to be run within semester electives and tied to core curriculum (Maths)
- Requires specialist PD/Systems, Environmental Science and Maths teachers

Curriculum Benchmarking:

THE BILLABONG:

Design & Technology Levels 7/8

- **Technologies & Society**: Examine & prioritise competing factors including social, ethical, economic and sustainability considerations in the development of technologies & designed solutions to meet community needs for preferred futures
- **Food & Fibre Production**: Analyse how food and fibre are produced when creating managed environments and how these can become more sustainable

Design & Technology Levels 9/10

- **Technologies & Society**: 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
Technologies & Society: Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions

Materials & Technologies Specialisations: Investigate and make judgements on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions

Creating Designed Solutions – Investigating: Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas

Creating Designed Solutions - Producing: Work flexibly to safety test, select, justify and use appropriate technologies & processes to make designed solutions

Science Levels 7/8

Science Understanding – Science as a Human Endeavour: Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across disciplines and practice of science

Science Understanding – Science as a Human Endeavour: Science & technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations

Biological Sciences: There are differences between groups of organisms; classification helps organise this diversity

Biological Sciences: Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce

Chemical Sciences: Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques

Physical Sciences: Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another

Science Inquiry Skills- Recording & Processing: Construct & use a range of representations including graphs, keys and models to record and summarise data from students’ own investigations and secondary sources, and to represent and analyse patterns and relationships

Science Inquiry Skills- Analysing & Evaluating: Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions

Science Inquiry Skills- Analysing & Evaluating: Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method

Science Levels 9/10

Science Understanding – Science as a Human Endeavour: Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community

Biological Sciences: Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes in their environment

Biological Sciences: Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems

Chemical Science: Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed

Earth & Space Science: Global systems, including the carbon cycle, rely on interactions involving the atmosphere, biosphere, hydrosphere and lithosphere
Science Inquiry Skills - Communicating: Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations

Mathematics Measurement & Geometry Level 8
- Using Units of Measurements: Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites
- Using Units of Measurements: Solve problems involving duration, including using 12- and 24-hour time within a single time zone
- Geometric Reasoning: Develop the conditions for the congruence of triangles

Mathematics Number & Algebra Level 8
- Linear & Non-Linear Relationships: Plot linear relationships on the Cartesian plane with and without the use of digital technologies

Mathematics Measurement & Geometry Level 9
- Using Units of Measurements: Calculate the surface area and volume of cylinders and solve related problems
- Geometric Reasoning: Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar

Mathematics Measurement & Geometry Level 10
- Geometric Reasoning: Formulate proofs involving congruent triangles and angle properties
- Geometric Reasoning: Solve simple trigonometric equations

THE MONITORING SYSTEM

Design & Technology Levels 7/8
- Technologies Contexts – Engineering Principles & Systems: Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions
- Technologies & Society: Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups
- Materials & Technologies Specialisations: Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment
- Creating Designed Solutions – Investigating: Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas

Design & Technology Levels 9/10
- Technologies Contexts – Engineering Principles & Systems: Investigate and make judgements on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions
- **Food & Fibre Production**: Investigate and make judgements on the ethical and sustainable production and marketing of food and fibre
- **Food Specialisations**: Investigate and make judgements on how the principles of food safety, preservation, preparation, presentation sensory perceptions influence the creation of food solutions for healthy eating
- **Creating Design Solutions – Investigating**: Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to create designed solutions

**Science Levels 9/10**
- **Physical Sciences**: Electric circuits can be designed for diverse purposes using different components; the operation of circuits can be explained by the concepts of voltage and current

**Mathematics Measurement & Geometry Level 8**
- **Geometric Reasoning**: Develop the conditions for the congruence of triangles

**Mathematics Number & Algebra Level 8**
- **Linear & Non-Linear Relationships**: Plot graphs of non-liner real life data with and without the use of digital technologies, and interpret and analyse these graphs

**Mathematics Number & Algebra Level 9**
- **Patterns & Algebra**: Apply set structures to solve real-world problems

**Digital Technologies Level 7/8**
- **Creating Digital Solutions**: Design the user experience of a digital system, generating, evaluation and communicating alternative designs
- **Creating Digital Solutions**: Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language
- **Creating Digital Solutions**: Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability

**THE RECYCLING CENTRE**

**Design & Technology Levels 7/8**
- **Food & Fibre Production**: Analyse how food and fibre are produced when creating managed environments and how these can become more sustainable
- **Creating Designed Solutions – Investigating**: Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas
- **Creating Designed Solutions – Producing**: Effectively & safely use a broad range of materials, components, tools, equipment & techniques to produce designed solutions
Design & Technology Levels 9/10
- **Creating Designed Solutions – Investigating**: Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas
- **Creating Designed Solutions – Producing**: Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions

Science Levels 7/8
- **Science Understanding – Science as a Human Endeavour**: Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across disciplines and practice of science
- **Science Understanding – Science as a Human Endeavour**: Science & technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations

Science Levels 9/10
- **Science Understanding – Science as a Human Endeavour**: Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community
- **Science Understanding – Science as a Human Endeavour**: Advances in Scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries

Mathematics Measurement & Geometry Level 8
- **Using Units of Measurements**: Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites
- **Using Units of Measurements**: Solve problems involving duration, including using 12- and 24-hour time within a single time zone
- **Geometric Reasoning**: Develop the conditions for the congruence of triangles

Mathematics Number and Algebra Level 8
- **Real Numbers**: Solve problems involving the use of percentages, including percentage increases and decreases and percentage error, with and without digital technologies
- **Money & Financial Mathematics**: Solve problems involving profit and loss, with and without digital technologies

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