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| **Learning Area: Design and Technologies** | | | | |
| **Unit Plan: Fantastic Force: Make it Float** | | | | |
| **Year level: Foundation to Year 2** | | **Fantastic Force: Make it Float - Target cohort: Year 2** | | |
| In this unit students will explore how everyday objects such as boats are designed, created and move. They will examine how boats meet peoples’ needs. They will investigate how force is used to create movement in everyday objects then will apply this knowledge when drawing, describing and modelling design ideas. They will design a solution for the problem ‘how to create movement’ for their boat. They will engage in guided activities during individual, pairs and small group activities.  Students will:   * Investigate the structure of boats and analyse how they meet a purpose * Generate and refine design ideas * Share information and design ideas through simple drawings, models and verbal descriptions * Produce a model of a boat that demonstrates how force can be used to create movement * Evaluate their design and production processes * Plan simple steps and follow directions to develop design ideas when working individually or collaboratively * Follow safety rules and processes   **Connected Curriculum**  Integration of tasks into other subject areas will support, extend and enhance knowledge and understanding. For example, the Australian Curriculum: Science Achievement standards for each of the three year levels describes skills aligned to this unit of work. (ACARA, 2015)  Foundation Year - students [describe](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) the properties and behaviour of familiar objects.  Year One – students [describe](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) objects and events that they encounter in their everyday lives, and the effects of interacting with materials and objects. Students [respond](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Respond) to questions, make predictions, and participate in guided investigations of everyday phenomena.  Year Two - By the end of Year 2, students [describe](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) changes to objects, materials and living things. Students [pose](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Pose) and [respond](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Respond) to questions about their experiences and [predict](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Predict) outcomes of investigations.  They [record](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Record) and [represent](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Represent) observations and communicate ideas in a variety of ways.  **Relevant prior curriculum**  This unit is targeted at **Year 2** in particular but is designed to be adapted for implementation anywhere within the Foundation to Year 2 band. Prior knowledge is considered within the introductory lessons. Students are given opportunity to connect to and build on understanding and skills from experiences at home or other settings.  Students will be engaging with teaching and learning that is working towards curriculum in the Years 3 – 4 Band. For example,  Investigate how forces and the properties of materials affect the behaviour of a [product](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=product) or [system](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=system) [(ACTDEK011)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDEK011)  Generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques[(ACTDEP015)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDEP015) | | | | |
| **Australian Curriculum: Design and Technologies – Foundation to Year 2 Band Description** | | | | |
| Learning in Design and Technologies builds on concepts, skills and processes developed in the Early Years Learning Framework, revisiting, strengthening and extending these as needed.  By the end of Year 2 students will have had the opportunity to create designed solutions at least once in each of the following technologies contexts: Engineering principles and systems*;*Food and fibre production and Food specialisations; and Materials and technologies specialisations. Students should have opportunities to experience designing and producing products, services and environments. This may occur through integrated learning.  In Foundation to Year 2 students explore and investigate technologies − materials, systems, components, tools and equipment − including their purpose and how they meet personal and social needs within local settings. Students develop an understanding of how society and environmental sustainability factors influence design and technologies decisions. Students evaluate designed solutions using questions such as ‘How does it work?’, ‘What purpose does it meet?’, ‘Who will use it?’, ‘What do I like about it?’ or ‘How can it be improved?’ They begin to consider the impact of their decisions and of technologies on others and the environment including in relation to preferred futures.  They reflect on their participation in a design process. This involves students developing new perspectives, and engaging in different forms of evaluating and critiquing products, services and environments based on personal preferences.  Using a range of technologies including a variety of graphical representation techniques to communicate, students draw, model and explain design ideas; label drawings; draw objects as two-dimensional images from different views; draw products and simple environments and verbalise design ideas.  They plan (with teacher support) simple steps and follow directions to complete their own or group design ideas or projects, and manage their own role within team projects. Students are aware of others around them and the need to work safely and collaboratively when making designed solutions  (ACARA, 2015). | | | | |
| **Digital Technologies Knowledge and Understanding** | | | **Digital Technologies Processes and Production Skills** | |
| Selected Content Description:  Generate, develop and record design ideas through describing, drawing and modelling [(ACTDEP006)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDEP006) | | | Complementary Content description:  Explore how [technologies](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=technologies) use forces to create movement in products [(ACTDEK002)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDEK002) | |
| **Foundation to Year 2 Achievement Standard** | | | | |
| In this unit of work student learning will be assessed against the following Achievement Standard:  By the end of Year 2, students [describe](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) the purpose of familiar products, services and environments and how they meet the needs of users and affect others and environments. They [identify](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Identify) the features and uses of technologies for each of the prescribed technologies contexts.  With guidance, students create designed solutions for each of the prescribed technologies contexts. They [describe](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) given needs or opportunities. Students create and [evaluate](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Evaluate) their ideas and designed solutions based on personal preferences. They communicate [design](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Design) ideas for their designed products, services and environments using modelling and simple drawings. Following sequenced steps, students [demonstrate](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Demonstrate) safe use of tools and equipment when producing designed solutions. (ACARA, 2015) | | | | |
| **General Capabilities:** Engagement with the general capabilities supports young Australians to live and work successfully in the twenty-first century (ACARA, 2012).  ‘In the Australian Curriculum, capability encompasses knowledge, skills, behaviours and dispositions. Students develop capability when they apply knowledge and skills confidently, effectively and appropriately in complex and changing circumstances, in their learning at school and in their lives outside school’ (ACARA, 2012).  This unit engages with the following capabilities. Further information can be obtained from the [*General Capabilities* of the *Australian Curriculum*](http://www.australiancurriculum.edu.au/generalcapabilities/overview/introduction)and the General Capabilities section in the [*Australian Curriculum: Technologies*](http://www.australiancurriculum.edu.au/generalcapabilities/overview/learning-area-specific-advice) | | | | |
| **Literacy**   * Comprehending and composing texts through listening, reading and viewing * Text, word, grammar and visual knowledge | **Numeracy**   * Recognising and using patterns and relationships * Using spatial reasoning | | | **Information and communication technology**   * Investigating, creating and communicating with ICTs |
| **Critical and creative thinking**   * Inquiring – identifying, exploring and organizing information and ideas * Generating ideas, possibilities and actions * Reflecting on thinking and processes * Analysing, synthesizing and evaluating reasoning and procedures | **Personal and social capability**   * Self-management * Social management | | | **Ethical understanding**   * Reasoning in decision making and actions * Understanding ethical concepts and issues |
| Sequence of teaching and learning: Each lesson 45 to 60 minutes | | | | |
| Lesson 1 – 2 (45 to 60 minutes per lesson) | Making it float – introduce design brief, connect learning and assessment, show examples and images to students, activate prior knowledge, break into activity pairs | | | Student Resources: Project book  Teacher resource: IWB, PowerPoint, Whiteboard |
| Lesson 3 – 4 (45 to 60 minutes per lesson) | Exploring boats, their purpose and design features, view and create design plans | | | Student Resources: Project book  Teacher resource: IWB, PowerPoint, Whiteboard |
| Lesson 5 – 6 (45 to 60 minutes per lesson) | Create and produce model, experiment with data, record observations using a range of media as whole class and individually | | | Student Resources: Project book, computer, camera, printer, materials for project  Teacher resource: IWB, PowerPoint, Whiteboard |
| Lesson 7 (45 to 60 minutes) | Reflection | | | Activity in Project book |
| Feedback | Differentiation: See *Supportive learning environment: Catering for diversity* document  Active feedback partnerships between teacher, students and parents to determine what students already know, how they are progressing and to identify further support requirements  Provide ongoing, timely, instructive and purposeful feedback  Relate feedback to developing skills in Design and Technologies knowledge and understanding | | | |
| Assessment | | | | |
| Formative assessment:  Monitor student learning throughout the teaching and learning process to determine progress and learning needs (Informal - observational checklists, annotated work, one-on-one conferencing, self-reflection, Fantastic Force: Making it Float portfolio of work samples, review of student’s work)  Look for learning in areas such as:   * [describing](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Describe) the purpose of familiar products and how they meet the needs of users. * creating and [evaluating](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Evaluate) ideas and designing solutions based on personal preferences. * Communicating [design](http://www.australiancurriculum.edu.au/glossary/popup?a=F10AS&t=Design) ideas for their designed products, services and environments using modelling and simple drawings * Following sequenced steps * Safe use of tools and equipment when producing designed solutions. * Planning simple steps and following directions to develop design ideas when working individually or collaboratively   Summative Assessment: Design, plan and create model boat that is propelled by force. Rubric guides student understanding of task requirements | | | | |
| Helpful Websites:  Australian Institute for Teaching and School Leadership (<http://www.aitsl.edu.au/australian-professional-standards-for-teachers>)  [Cybersafety policy](http://behaviour.education.qld.gov.au/cybersafety/school-staff/Pages/policy.aspx)  Health and Safety Risk Management (<http://education.qld.gov.au/health/safety/managing/risk.html>)  Longman English Dictionary Online (<http://www.ldoceonline.com/>)  All images used to create the resources were sourced from openclipart (<https://openclipart.org/>) | | | | |
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