### Year 2 Design Technologies Unit Overview

**Whatever floats your boat!**

#### Foundation to Year 2 Design & Technologies Band Plan

<table>
<thead>
<tr>
<th>Foundation to Year 2 Band Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning in Design and Technologies builds on concepts, skills and processes developed in the Early Year Learning Framework, revisiting, strengthening and extending these as needed.</td>
</tr>
</tbody>
</table>

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, 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 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 in 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 designs.
Ideas or projects, and manage their own role within team projects. Students are aware of others around and the need to work safely and collaboratively when making designed solutions.

<table>
<thead>
<tr>
<th>Content Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)</td>
</tr>
<tr>
<td>Explore the characteristics and properties of materials and components that are used to produce design solutions (ACTDEK004)</td>
</tr>
</tbody>
</table>

**Overarching Unit Objective**

Students will explore the effective design of solid structures (e.g., wall). Students will utilise recycled materials to construct a structure that holds the weight of an object (humpty dumpty).

<table>
<thead>
<tr>
<th>Content Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)</td>
</tr>
<tr>
<td>Explore how plants and animals are grown for food, clothing and shelter and how food is selected and prepared for healthy eating (ACTDEK003)</td>
</tr>
</tbody>
</table>

**Overarching Unit Objective**

Students will explore and investigate healthy food options and where they are sourced locally. Students will work collaboratively to design, prepare and evaluate a healthy afternoon snack for eating.

<table>
<thead>
<tr>
<th>Content Descriptors</th>
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</thead>
<tbody>
<tr>
<td>Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)</td>
</tr>
<tr>
<td>Explore how technologies use forces to create movement in products (ACTDEK002)</td>
</tr>
</tbody>
</table>

**Overarching Unit Objective**

...
Students will investigate toys designs that move with force. Students will utilise this knowledge to collaborate and design, create and evaluate a toy that will move a certain distance.
**Year 2 Design and Technologies Learning Area Plan**

**TOPIC:** Whatever Floats Your Boat!

**Description:**
Students will have the opportunity to create a range of design solutions through guided play with recyclable materials. The unit ‘Whatever Floats Your Boat’ encourages students to utilise design skills to explore how technologies use forces to create movement in products. Students will work collaboratively to design, create, and evaluate a toy boat that will move a certain distance. Students will utilise prior knowledge of Science concepts, including; how push and pull affects how an object moves or changes shape.

**TECHNOLOGY**

**Foundation to Year 2 Design & Technologies Achievement Standard**

By the end of Year 2, students describe the purpose of familiar products, services and environments and how they meet a range of present needs. They list the features of technologies that influence design decisions and how digital systems are used.

Students identify needs, opportunities or problems and describe them. They collect, sort and display familiar items from a range of sources and recognise patterns in data. Students record design ideas using techniques in labelled drawings, lists and sequenced instructions. They design solutions to simple problems using a sequence of steps and decisions. With guidance, students produce designed solutions for each of the prescribed technology contexts. Students evaluate their ideas, information and solutions on the basis of personal preferences and provided criteria including care for the environment. They safely create solutions and communicate ideas, information face-to-face and online.

**SCIENCE**

**Year 2 Science Achievement Standard**

By the end of Year 2, students describe changes to objects, materials and living things. They identify that changes are

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materials and resources have different uses and describe examples of where science is used in people’s lives.

Students pose and respond to questions about their experiences and predict outcomes of investigations. They use informal measurements to make and compare observations. They record and represent observations and communicate ideas in a variety of ways.

Design & Technologies Knowledge & Understanding

- Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)
- Explore how technologies use forces to create movement in products (ACTDEK002)

Design & Technologies Processes & Production Skills

- Explore needs or opportunities for designing, and the technologies needed to realise designed solutions (ACTDEP005)
- Generate, develop and record design ideas through describing, drawing and modelling (ACTDEP006)
- Use materials, components, tools, equipment and techniques to safely make designed solutions (ACTDEP007)
- Use personal preferences to evaluate the success of design ideas, processes and solutions including their care for environment (ACTDEP008)
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<table>
<thead>
<tr>
<th>Curriculum Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Understanding: Physical Sciences</td>
<td>- A push or a pull affects how an object moves or changes shape (ACSSU033)</td>
</tr>
</tbody>
</table>

**ASSESSMENT OF LEARNING:**
Students will work collaboratively to design, create and evaluate a toy boat that will move a certain distance to solve a problem. Students will complete a design booklet over the duration of the unit.

**DEVELOPING INQUIRING AND REFLECTIVE LEARNERS**

- Identity Contributor
- Effective Communicator
- Designer and Creator
- Active Investigator
- Quality Producer
<table>
<thead>
<tr>
<th>Curricula</th>
<th>☐ Catholic Ethos</th>
<th>☐ Social Emotional Learning</th>
<th>☐ Inclusive Education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐ Aboriginal and Torres Strait Islander Histories and Cultures</td>
<td>☐ Asia and Australia’s Engagement with Asia</td>
<td>☐ Sustainability Education</td>
</tr>
<tr>
<td>General</td>
<td>☐ Literacy</td>
<td>☐ Numeracy</td>
<td>☐ Information and Communication Technology</td>
</tr>
<tr>
<td>Abilities</td>
<td>☐ Critical and Creative Thinking</td>
<td>☐ Ethical Behaviour</td>
<td>☐ Personal and Social Capabilities</td>
</tr>
<tr>
<td>Other LA’s</td>
<td>Science and History</td>
<td></td>
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</tr>
</tbody>
</table>

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7
LEARNING AND TEACHING STRATEGIES

<table>
<thead>
<tr>
<th>ATTENTIONS</th>
<th>SUCCESS CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I can:</td>
</tr>
<tr>
<td></td>
<td>● Work in a ‘Design Squad’ to complete an experiment.</td>
</tr>
<tr>
<td></td>
<td>● Use vocabulary to explain what is happening in the experiment.</td>
</tr>
<tr>
<td></td>
<td>● Add key words to a word wall and glossary.</td>
</tr>
</tbody>
</table>

**Engage → Explore → Explain → Elaborate → Evaluate**

**Resources**

- **Student Resources:**
  - Student journals
  - Blue tac
  - Tub of water

- **Teacher Resources:**
  - Youtube clip: How do boats float – Fun Kids Inspiring Engineer [https://www.youtube.com/watch?v=32kbMMt-3-s](https://www.youtube.com/watch?v=32kbMMt-3-s)

**Assessment Opportunities**

- Formative Assessment: Observation of language used as children engage with the experiment.
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Features of a procedure text: goal, needs (materials), steps and section.

**What is happening during each section?**

**LANGUAGE**
- Blu tac, float, water, sink, density, stable, design, engineer, challenge, create, build, model, test, mould, shape, process, materials, needs, steps, picture, reflection, evaluate

**LEARNING AND TEACHING STRATEGIES**

<table>
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<tr>
<th>1</th>
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<th>3</th>
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<th>5</th>
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<th>7</th>
<th>8</th>
<th>9</th>
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</thead>
</table>

**INTENTIONS**
- Familiarise with the design challenge.
- Brainstorm into Design Squad groups and begin brainstorming.
- Generate a series of design options, considering functionality and materials.

**SUCCESS CRITERIA**
- I can:
  - Explain what is expected in the design challenge.
  - Work effectively in my Design Squad group.
  - Use my knowledge of materials and design to create a range of design models for a boat that will move.

**The Design Challenge**

- **Engage → Explore → Explain → Elaborate → Evaluate**

**RESOURCES**

**Student Resources:**
- A4 Paper
- Markers
- Design Booklet (Appendix #1)

**Teacher Resources:**
- Popsicle sticks

**The Cairns Cookie Company**

- The Cairns Cookie Company transports their cookies from their factory in Cairns Catholic Education Services
their distribution centre in T.I (Thursday Island). Since the route is over 300 km it is important to ship as many cookies as possible each trip. Their largest and heaviest delivery was damaged in a recent storm, and they need to replace it with another model that will support the weight of all the cookies.

**Range** - A representative from the Cairns Cookie Company has contacted you to test the range of your model of a boat that will support enough weight to transport their cookies to T.I (Thursday Island).

**Materials** - You must construct your model boat using the following materials: popsicle sticks, aluminium foil and PVA Glue. You may also use any of the following optional materials: plastic straws, corks, paper. Remember that a big part of this task is to create a model that will support weight and be economical to build. Use materials you want to use wisely! The optional materials are expensive!

Your boat must be cost efficient to build. You have a budget of $_________ to build your boat. Using the cost of materials below, calculate the cost. Wood (popsicle sticks) = $1 each Sheet Metal (aluminium foil) = $25/sheet Welding materials (glue) = Reinforcements (plastic straws) = $25 each Buoys (corks) = $50 each Tape (masking tape) = $10/metre

Ask her to allocate a budget to suit their class.

**Brainstorming Session:**

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<table>
<thead>
<tr>
<th>Materials</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Aluminium foil</td>
<td>$25</td>
</tr>
<tr>
<td>PVA Glue</td>
<td>$10</td>
</tr>
<tr>
<td>Plastic straws</td>
<td>$25</td>
</tr>
<tr>
<td>Corks</td>
<td>$50</td>
</tr>
<tr>
<td>Paper</td>
<td>$10</td>
</tr>
</tbody>
</table>

**ASSESSMENT OPPORTUNITIES**

Summative Assessment: Design a model boat using the given materials and calculate the cost. Each student should submit a written report with calculations and a budget plan.
Can you think would be the best for this challenge? Provide students with an opportunity to have an individual brainstorming session. Prompt students to come up with design ideas. Challenge students to think of crazy, weird and innovative ideas.

Each student with a blank piece of paper. Fold the paper it into 4 quadrants. On each side of the page have them draw their 8 different potential designs. Each student should then pick their favourite design to bring back to their ‘Design Squad’.

**Brainstorming Session:***

Review each member’s ideas and see if they can generate any new ideas. Once their ideas generated, each team determines as a group which design and they would like to use.

**Voting:**

Each ‘Design Squad’ idea to the whole class.

**VOCABULARY**

- glue
- floating
- water
- sink
- density
- stable
- design
- engineer
- challenge
- create
- build
- model
- test
- mould
- shape
- share
- review
- revise
- problem
- materials
- cost
- estimate
- budget
### LEARNING AND TEACHING STRATEGIES

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<tr>
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<th>1</th>
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<th>9</th>
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**ATTENTIONS**

- Get into Design Squad groups and begin building design.
- Evaluate design during the building phase.

**SUCCESS CRITERIA**

- I can:
  - Work in Design Squad to build model boat.
  - Re-evaluate design as they test their model.
  - Record ideas in Design Booklet.

#### Phase

- Lead groups have time to build their watercrafts; it is recommended that they float in the water to make rapid changes. Resources could be set up at the classroom in tubs with the allocated price tags for each item.
- Teacher to set an appropriate time frame to complete building phase.

- Find out which creations will sink and which will swim! Each Design Squad will build their model boat. Take photos of all designs to add to classroom display. Make a recording what designs sink or float as a whole class.

#### RESOURCES

**Student Resources:**
- Design Booklet
- Popsicle sticks
- Aluminium foil
- PVA Glue
- Plastic straws
- Corks
- Paper
- Buckets for resources w/labels
- Packet of cookies for testing

**Teacher Resources:**
- Digital Camera/iPad
- Whiteboard
### LEARNING AND TEACHING STRATEGIES

<table>
<thead>
<tr>
<th>Phase</th>
<th>Intentions</th>
<th>Success Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I can:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Explain what was successful/unsuccessful during design process</td>
<td></td>
</tr>
</tbody>
</table>

**NTENTIONS**

1. Work on their boat designs as individuals

**SUCCESS CRITERIA**

1. I can:
   - Explain what was successful/unsuccessful during the design process

#### RESOURCES

**Student Resources:**
- Design Booklet (Appendix #1)

**Teacher Resources:**
- Markers

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13
worked and what didn’t?

Did each student do things differently in the future?

did what happened the first time they tested their watercraft?

did their watercraft change from the initial design?

did materials worked best?

did when more weight (cookies) were added?

did the hardest or most fun part of the challenge?

**ASSESSMENT OPPORTUNITIES**

Summative Assessment: D Booklet (Appendix #1)

**VOCABULARY**

balsa, float, water, sink, density, stable, design, engineer, challenge, create, build, model, test, mould, shape, share, review, revise, problem, materials, cost, estimate, budget
### Learning and Teaching Strategies

<table>
<thead>
<tr>
<th>Intentions</th>
<th>Success Criteria</th>
</tr>
</thead>
</table>
| Demonstrate their learning through a sharing session with parent audiences. | I can:  
- Teach someone how to design a model boat.  
- Teach someone how to choose appropriate materials to build a boat for a specific purpose. |
- Key language when verbalising their knowledge. |

#### Resources

**Student Resources:**
- iPads/Digital Camera

**Teacher Resources:**
- Blu tac, float, water, sink, density, stable, design, engineer, challenge, create, build, model, test, mould, shape, share, observe, revise, problem, materials, cost, estimate, budget

#### Assessment Opportunities

<table>
<thead>
<tr>
<th>Student Resources:</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPads/Digital Camera</td>
</tr>
</tbody>
</table>

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### Educational Modifications

<table>
<thead>
<tr>
<th>ACM ACCOMMODATIONS</th>
<th>FOR WHOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
</tr>
<tr>
<td>Placed in low- distraction area</td>
<td></td>
</tr>
<tr>
<td>Positive peer models</td>
<td></td>
</tr>
<tr>
<td>Groups / cooperative learning</td>
<td></td>
</tr>
<tr>
<td>Read of tables</td>
<td></td>
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<tr>
<td>Centre</td>
<td></td>
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<tr>
<td>Out</td>
<td></td>
</tr>
<tr>
<td>Student when giving instruction</td>
<td></td>
</tr>
<tr>
<td>Classroom for safe visibility, accessibility</td>
<td></td>
</tr>
<tr>
<td>Movement</td>
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</table>

<table>
<thead>
<tr>
<th>SESSION OF LESSONS</th>
<th>FOR WHOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load, reduce assignments or give assignments</td>
<td></td>
</tr>
<tr>
<td>Works with oral presentation</td>
<td></td>
</tr>
<tr>
<td>Uses student outlines or study guides</td>
<td></td>
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<tr>
<td>Year lesson revisits/reviews</td>
<td></td>
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<tr>
<td>Instructions (marker or highlighter tape)</td>
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<tr>
<td>Behavioural objectives</td>
<td></td>
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<tr>
<td>To repeat instructions for clarification</td>
<td></td>
</tr>
<tr>
<td>Ending</td>
<td></td>
</tr>
<tr>
<td>Impact game-like materials</td>
<td></td>
</tr>
<tr>
<td>Length often</td>
<td></td>
</tr>
<tr>
<td>Effort put forth</td>
<td></td>
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<tr>
<td>FAITH AND VISION</td>
<td>FOR WHOM</td>
</tr>
<tr>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Vision for student to stay on task, monitor task/topic</td>
<td></td>
</tr>
<tr>
<td>Use/face and dark ink</td>
<td></td>
</tr>
<tr>
<td>Format simple</td>
<td></td>
</tr>
<tr>
<td>Preparing prompts</td>
<td></td>
</tr>
<tr>
<td>Sections clearly marked</td>
<td></td>
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<tr>
<td>lations from paper</td>
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</tbody>
</table>

**EVALUATION PROCEDURES**

- Number of items
- Completely similar questions
- Oral testing
- Staff administer test
- Present to type or use word processing
- ng criteria based on individual
-ading option

**FOR WHOM**

-ent the means to record
- Note taker e.g. Aide
- Get a copy of notes
- e for periodic review of student’s notes (stated, word processed)

**FOR WHOM**

- ar to plan assignments
- ment notebook or work checklist
- ary
<table>
<thead>
<tr>
<th>Service</th>
<th>For Whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help organise desk during class</td>
<td></td>
</tr>
<tr>
<td>Begin to organise for the day</td>
<td></td>
</tr>
<tr>
<td>Check-in to organise for PM</td>
<td></td>
</tr>
<tr>
<td>Put to organise for homework</td>
<td></td>
</tr>
<tr>
<td>Duplicate set of classroom material for the</td>
<td></td>
</tr>
<tr>
<td>Student/school contract</td>
<td></td>
</tr>
<tr>
<td>Time management</td>
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</tr>
</tbody>
</table>

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Module 5 Support

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18