

# The STEPS Young Engineers Award

STEP 1	LESSON PLAN	WORKSHEET 1
<b>REFERENCE TEACHERS GUIDE CHAPTER 3 STEP 1</b>	<b>Time Required</b> 45 – 60mins	<b>Date</b>
<b>Subject</b> Science and Engineering	<b>Class Level</b>	
<b>Strand</b> Environmental Awareness and Care	<b>Strand Unit</b> Environmental awareness, Science and the environment	
<b>Title</b> THINK – How will you change your world with engineering?		
<b>Objectives</b> Fill out Worksheet 1 and choose the title of the project.		
<b>Skills Required</b> Working scientifically: questioning, observing. Designing and making: exploring, planning		

Learning Objectives	Learning Activities
<p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>Learn about engineering – they will be introduced to engineering and engineering disciplines</li> <li>Learn that engineering is everywhere – they will be able to identify examples of engineering in their everyday life</li> </ul>	<p><b>Engineering Personality Quiz (15mins)</b></p> <p>Students take the Engineering Personality Quiz to find out what type of engineer they might be. This is a fun way to introduce engineering.</p> <p><b>Instructions:</b></p> <p>Hand out a copy of the Engineering Personality Quiz to each student. Give them a few minutes to fill it in. When they have finished discuss the quiz and reveal their Engineering Personalities! Use the Teachers Quiz Guide to help you. Collect the quizzes and keep them in a safe place to send to STEPS when you are submitting your class's entries.</p> <p><b>Discuss:</b></p> <p><b>1. Q3&amp;6 What do your students know about engineering, before they start the competition?</b> How do they relate to engineering? Have they heard of it? How? Would they like to be an engineer one day? Why? (Explain engineering if you feel comfortable doing so)</p>

	<p><b>2. Q4&amp;7 Engineering is everywhere</b> – each picture is an example of engineering. Discuss how we interact with engineering everyday, without noticing. Use the Teachers Quiz Guide to discuss the examples of engineering in the pictures and examples of engineering around us. Can they see examples in the classroom?</p> <p><b>3. Q5 Reveal the Engineering Personalities</b> – which picture appealed to the student most? The corresponding engineering discipline is their personality! E.g. if they selected the chocolate picture, their Engineering Personality is an Agriculture and Food Engineer.</p>
	<p><b>Observation Walk (10 – 20mins)</b></p>
<p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>Learn to think outside the box – they will be encouraged to be imaginative and explore ideas</li> </ul>	<p>Explore examples of engineering in the community.</p> <p><b>Choose one of the following:</b></p> <ol style="list-style-type: none"> <li>Walk in the local community (built environment). Ask the students to play Engineering I-Spy or to try to spot examples of engineering around them. Use the questions below to aid the discussion.</li> <li>Carry out a seated journey – Tell the class to close their eyes and imagine they are on their way to school. Tell them to look around and to try to spot examples of engineering. Use the questions below to aid a discussion.</li> <li>Give homework – Ask them to look around on their way home from school. Count how many examples of engineering they can see. Write 10 examples. Discuss one example using the questions below.</li> </ol> <p><b>Discuss:</b></p> <p>Discuss the examples of engineering they spot with the questions below. There are no right and wrong answers. It is an exercise to get them thinking about engineering, and how engineering is a method of applying science to our world, to benefit and improve our lives.</p> <ul style="list-style-type: none"> <li>- Who benefits from this example of engineering?</li> <li>- What type of engineer might have designed it?</li> <li>- What would life be like without it?</li> <li>- Why do you think it looks like that? (e.g. electricity cables are high and covered in thick material to protect us from dangerous voltage).</li> </ul>
	<p><b>Worksheet 1 (20 – 25mins)</b></p>
<p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>Learn how to critically analyse their ideas – by considering the positives and negatives</li> <li>Learn listening skills – they will learn to listen to others ideas and respond like an engineer</li> </ul>	<p>Start thinking about the competition. Teams fill out Worksheet 1 and name their projects.</p> <p><b>Instructions</b></p> <p>Divide the class into engineering teams of 5 or 6. Hand out a Project Book to each team. Teams fill in the cover page (leaving the title of the project blank initially). They then fill in Worksheet 1 as a team. Once they have chosen their project title ask them to fill it in on the cover. After the lesson, collect the Project Books and keep them safe for STEP 2.</p>

	<p><b>Worksheet 1</b></p> <p><b>Questions 1-3:</b> This question is to get them thinking outside the box to come up with ideas of how they would like to improve their community (or the life of someone in their community like a friend, neighbour, family member etc.). Fill in the table provided. There is a completed example in the table to help.</p> <p><b>Question 4-6:</b> From the three ideas and solutions explored in the first table, they choose the one they will work on as their STEPSYEA Project. To decide on the project the young engineers should consider the positive and negatives of each of the three choices. This could be: <i>“This would be a good project because it would slow down the traffic and make the road safer but it might cause a lot of traffic while it is being built.”</i> Give the project a title and write a brief description of the plan. Write about the possible benefits.</p> <p><b>Question 6-8:</b> Teams think about how they will build their design, as a prototype. Ask them to write a procedure to work out the steps they will need to take to build their design (prototype). They can use the blank pages at the back of the Project Book, or use rough work paper. Answer Q7 &amp; Q8 in the Project Book. Ask them to pick out what they think will be the most difficult part of the project. Discuss this.</p> <p><b>Listening like an Engineer:</b></p> <p>Teams need to learn to listen to each other. They should not be allowed to say “no” or “I don’t like that” instead they should ask questions (and look for justification with reasons). “Have you thought about...?”; “How would you build/achieve that?” “Why do you think that is a good idea?” They must then decide as a team the best idea or solution, based on exploring positives and negatives. Part of being an engineer is learning to make thought-through decisions as a team.</p>
<p><b>Resources</b></p>	<p>Pens &amp; paper</p> <p>Personality Quiz per student</p> <p>Project Book per team</p>
<p><b>Want more fun engineering?</b></p> <p>Thought Experiment</p>	<p>Ask you class “What is time?”. See if they can think outside the box.</p> <p>See Teachers Guide for more information</p>
<p><b>Integration</b></p> <p>English – procedural writing for how they plan to design and build their idea</p> <p>English oral language – verbalising ideas, solutions and methods as a team</p> <p>SPHE – Myself and the wider world</p>	