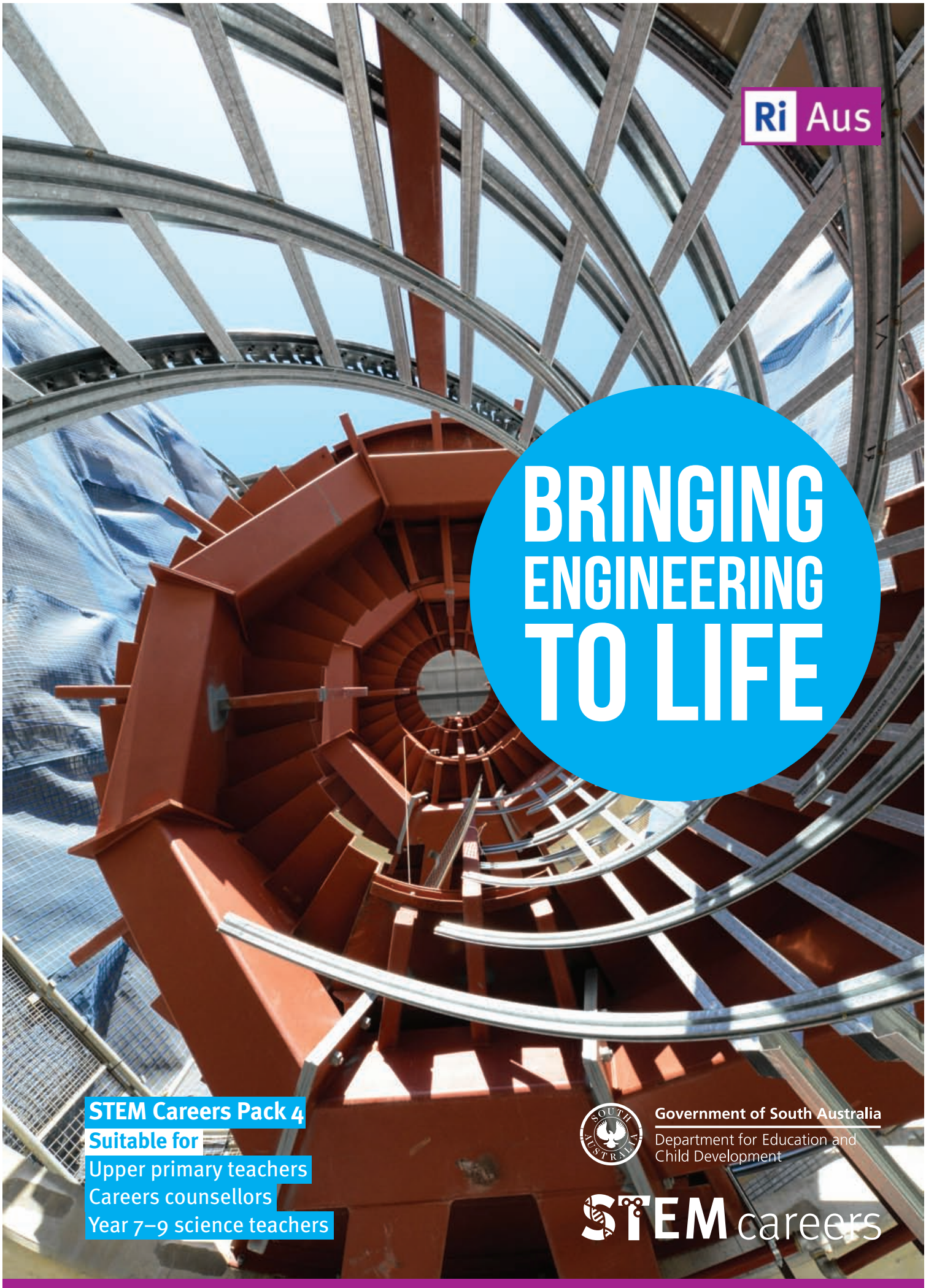

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BRINGING ENGINEERING TO LIFE

STEM Careers Pack 4

Suitable for

Upper primary teachers
Careers counsellors
Year 7–9 science teachers

Government of South Australia
Department for Education and Child Development

STEM careers

Introduction

The aim of each STEM Careers Pack is twofold: first, to make students aware of the wide variety of STEM careers there are and; secondly, to help students understand the nature of scientific knowledge, how science influences society and how society influences science (i.e. Science as a Human Endeavour).

During their explorations students will also appreciate how the different areas of science, technology, engineering and mathematics interact and are interdependent. They will develop their own STEM literacies and competencies.

Bringing engineering to life:

Rather than asking students what engineering is, it might be easier to tell them what engineering isn't! Engineers are designers, inventors, improvers, creators, builders and problem solvers. They understand how things work and they can use that knowledge to fix something, improve something or design and build something entirely new.

Evidence of engineering is all around us, from large scale buildings, roads and bridges to the chairs we sit on, the electronic devices we use and the medicine we digest. Engineering enables us to live as we do today. How we would like to live in the future influences the directions of engineering and the work of engineers.

Contents

How to use this pack

Designed to be used:

- as a whole, but individual tasks can be selected
- in conjunction with units of work on Science Understanding and Science Inquiry Skills

What do we want them to learn?

What is the intended learning?

There are two main aims for this unit of work: one, to have students learn broadly about engineering and that there are many types; and two, for students to consider and appreciate the important role of engineering today, throughout history and into the future. These aims are important as it is commonly thought that low student numbers in engineering courses is a reflection on students simply not grasping what engineering is and the career possibilities. This pack then is a broad introduction that will be followed up in future STEM Career Packs.

why is it important?

- We need individuals to be curious about the world and how it works.
- We need scientifically literate citizens
- We need a future supply of aspiring scientists, engineers and mathematicians both women and men.

What do students bring?

Students may come with little understanding or misconceptions of engineering. Students will come to this topic knowing themselves, even if they have difficulty articulating it, how interesting and absorbing it is to design something, to brainstorm ideas for how to make or improve an existing item. Ideally teachers need to draw this out and help students make the link between these feelings and what engineers do.

Planning approach

Planning approach based on the SA Department for Education and Child Development's Learning Design: aligning ***what*** and ***how*** of teaching and learning in the Australian Curriculum. **www.decd.sa.gov.au/teachingandlearning/pages/Leadersresource/44209/?reFlag=1**

Reference

Stereotyping, and Discovery and Invention sections have been adapted/reproduced with permission from the Institute for the Advancement of Philosophy for Children **www.montclair.edu/iapc**

Lipman, M., Sharp, A.M. & Oscanyan, F.S. (Eds) 1984, 'Philosphical Inquiry: An Instructional Manual to Accompany Harry Stottlemeier's Discovery', 2nd edn, University Press of America, Lanham, USA.

How will we know if they got it?

What could the intended learning look like at this level?

The **Australian Curriculum: Science** focus for this unit is **Science as a Human Endeavour**. Students will be able to broadly describe the various types of engineering and the jobs or projects engineers work on. What is important though is that students come away realising how creative engineering is, how it is fundamentally designing, inventing and tinkering.

This pack is designed to simply open students' eyes to the vast range of projects that engineers work on.

Future packs will delve more deeply into specific engineering types. The fact that engineers face ethical issues in their work is touched on too.

Teachers use the intended learning, as indicated in the Quick Reference table for this unit in conjunction with the Achievement Standards in the integration of the Tasks or the development of whole units of learning and assessment.

Students will demonstrate development towards the following skills and dispositions in relation to:

Australian Curriculum: Science **Science as a Human Endeavour**	**Tasks**					
Year 7	1	2	3	4	5	6
ACSHE120 - Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may inpact on other areas of society and involve ethical considerations.	■	■			■	
ACSHE121 - Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.		■	■			■
ACSHE224 - People use understanding and skills from across the disciplines of science in their occupations.	■	■	■			■
Year 8						
ACSHE135 - Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may inpact on other areas of society and involve ethical considerations.	■	■			■	
ACSHE136 - Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.		■	■			■
ACSHE227 - People use understanding and skills from across the disciplines of science in their occupations.	■	■	■			■
Year 9						
ACSHE158 - The values and needs of contemporary society can influence the focus of scientific research.		■	■			
ACSHE161 - Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities.	■	■	■		■	■
ACSHE228 - The values and needs of contemporary society can influence the focus of scientific research.		■	■		■	■
The Personal and Social Competence Continuum: social awareness; and self-awareness			■		■	
The Ethical Behaviour Continuum: understanding of ethical concepts and recognising the moral domain; the knowledge of accepted values and ethical principles (specifically students' ability to critically analyse ethical principles).					■	
The Critical and Creative Thinking Continuum: inquiring, identifying, exploring and clarifying information; analysing, evaluating and synthesising information; reflecting on thinking, actions and processes.	■	■	■		■	■

How will we know if they got it?

What evidence will enable us to assess the intended learning?

Science as a Human Endeavour

1. Students' understanding of engineering, including a developing knowledge of engineering careers.
2. Students' understanding of how science and technological advances have affected engineering, how they will continue to in the future.

Personal and Social Competence and Critical and Creative Thinking

3. Students' ability to participate in whole class discussion.
4. Students' ability and disposition to reflect on their own and others' beliefs.

Ethical Behaviour and Critical and Creative Thinking

5. Students' ability to engage in reasoned discussion with peers (in pairs, small groups and whole class), including the ability and disposition to draw on evidence when making informed decisions and to evaluate their own and others' reasons.
6. Students' ability to identify and discuss ethical issues raised and articulate reasons for their position.

The terms 'understanding' and 'knowledge' are synonymous and thus used interchangeably throughout this unit.

So, what will we do to get there?

How will we engage, challenge and support their learning?

- Tasks will draw on students' prior knowledge, relate learning to students' everyday lives and provide opportunities for students to direct their own learning. Throughout the unit, students will be expected to:
  - Articulate their own questions about the role of engineers, types of engineering and engineering jobs.
  - Research and summarise significant engineering achievements and the people behind those achievements.
  - Identify possible or part science, engineering and technology solutions to issues currently facing the mining industry.
  - Discuss as a whole class some ethical issues that engineers might face and ask students to take a stand on each issue and give reasons to support their stance.
  - Watch interviews with engineers and reflect on the characteristics of engineers and whether this work is appealing to them personally and why.

Based on the SA TfEL[1] this unit focuses on the following Teacher Domains:

2.2 **Build a community of learners** – the teacher creates a culture where everyone inspires and encourages each other's learning.

2.4 **Challenge students to achieve high standards with appropriate support** – the teacher has high expectations and guides each student to achieve his/her personal best.

4.1 **Build on learners' understandings** – the teacher identifies students' prior knowledge and cultural practices as a starting point for curriculum.

4.2 **Connect learning to students' lives and aspirations –** the teacher ensures that learning builds on the resources, skills, knowledge and goals that students develop in their homes and communities.

1. South Australian Teaching for Effective Learning Framework (SA TfEL) www.decd.sa.gov.au/teachingandlearning/pages/Teaching/Teachlearnandassess/?reFlag=1

The terms 'understanding' and 'knowledge' are synonymous and thus used interchangeably throughout this unit.

So, what will we do to get there?

Links to Australian Curriculum: Science Understanding content

In conjunction with the tasks in this pack you could also look at the science behind the work of chemical and civil engineers e.g. GM (genetically modified) crops, medicines, bridges or drainage systems. Incorporating these ideas would address the following science curriculum content.

Year 7

Biological sciences

ACSSU112 – Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions.

Chemical sciences

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

Earth sciences

ACSSU116 – Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques.

Year 8

Biological sciences

ACSSU149 – Cells are the basic units of living things and have specialised structures and functions.

Chemical sciences

ACSSU225 – Chemical change involves substances reacting to form new substances.

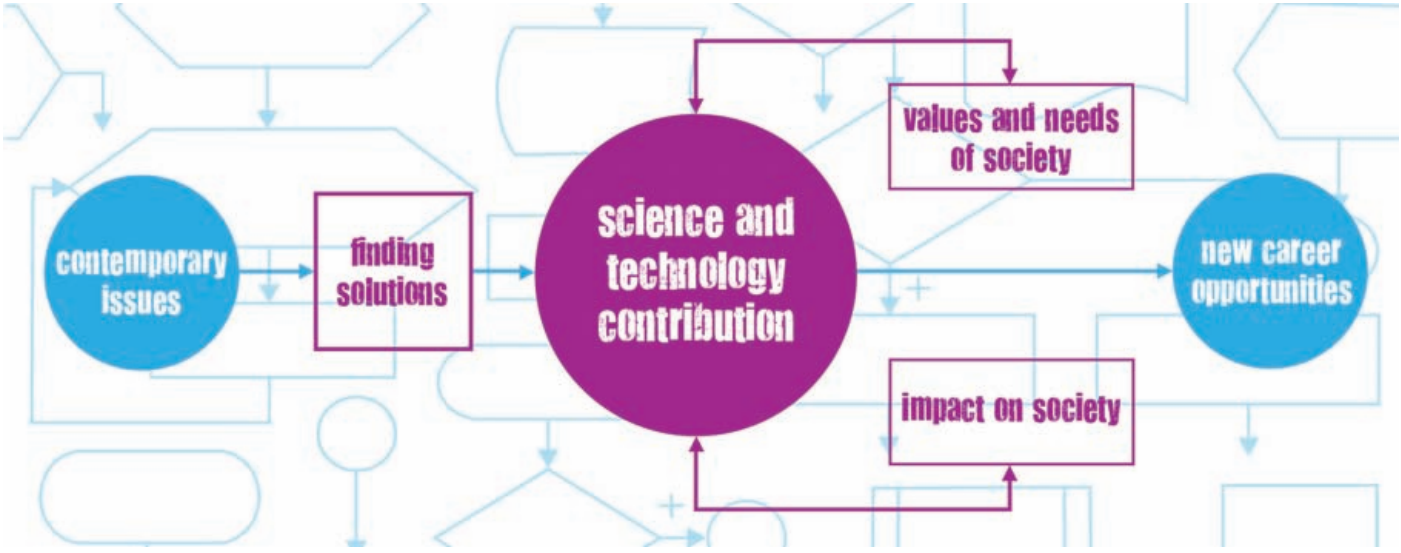
Year 9

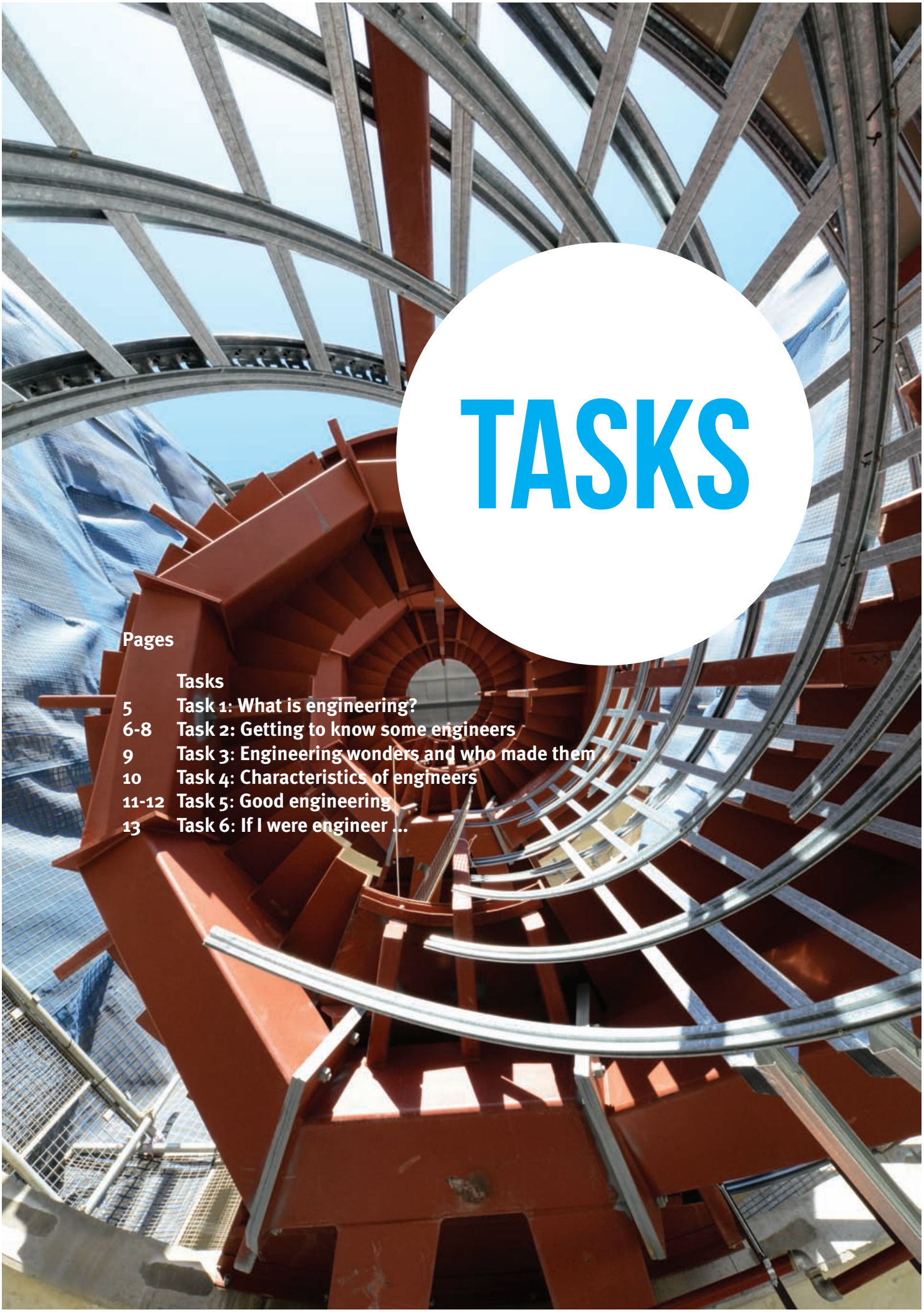
Biological sciences

ACSSU178 – Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed.

Physical sciences

ACSSU182 – Energy transfer through different mediums can be explained using wave and particle models.





TASKS

Task 1

What is engineering?

Australian Curriculum Links		
Year 7 ACSHE 120 ACSHE 224	Year 8 ACSHE 135 ACSHE 227	Year 9 ACSHE 161
Creative and creative thinking		

First, ask students as a class to list and describe what they think engineering is.

You might create a mind map on the board or a list the types of engineering there are and what the work entails. This task will allow you to gauge how much the students know about engineering and even their attitude towards it. Once students' have listed all they know ask them to research online and fill in any gaps in their knowledge. For example, did they know there are forensic engineers? What do forensic engineers do? These can be added to the class list and even kept for students' reference.

There are many types of engineering. The illustration below should cover the main types (note that some titles may differ from this list to others you might find):

There are lots of websites and YouTube clips students can use to help them learn about the types of engineering. Here are some suggestions:

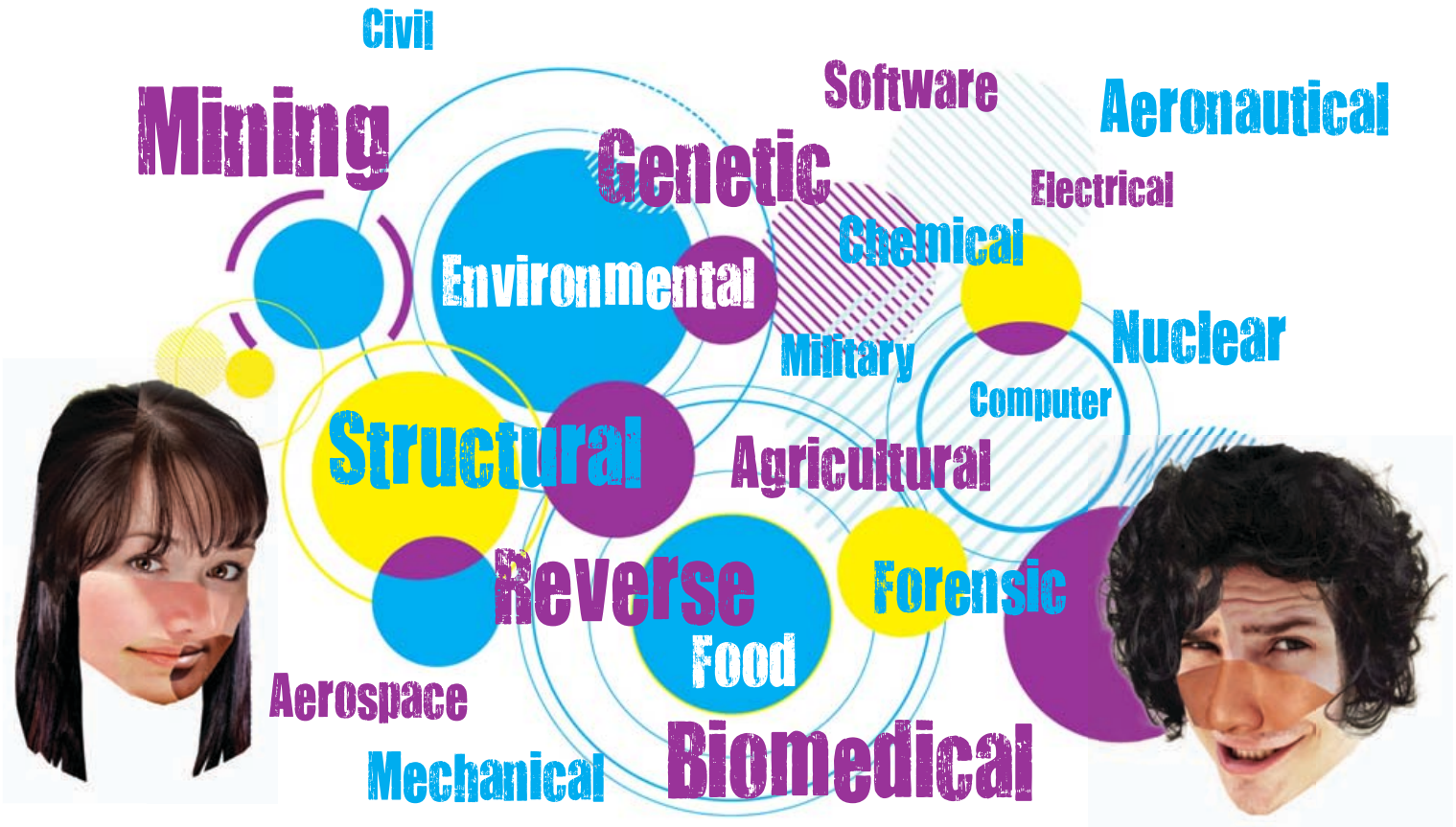
Types of Engineering, Science Kids
www.sciencekids.co.nz/sciencefacts/engineering/typesofengineeringjobs.html
(a good website for younger students)

What is engineering? University of Newcastle
www.youtube.com/watch?v=bipTWWHya8A

What is engineering? NASA
www.youtube.com/watch?v=wE-z_TJyzil

Once students have looked at the different types of engineering and, in basic terms, what engineers do in each type, ask students what they think the difference is between science and engineering. They should be able to reach something like this:

- Science is primarily about understanding the laws, principles and behaviours of materials and living things.
- Engineering is the application of that understanding; using the information to make things happen.



Task 2a

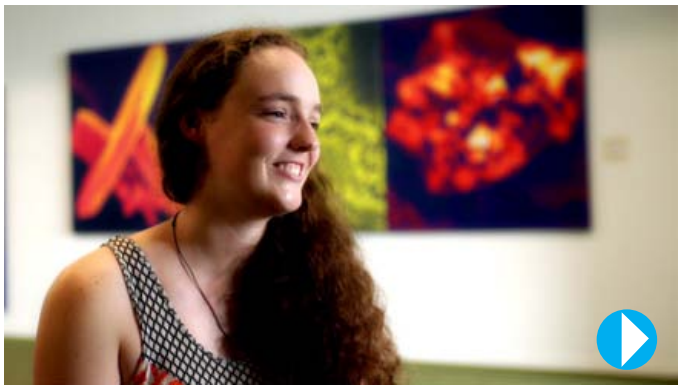
Getting to know some engineers

Australian Curriculum Links		
Year 7 ACSHE 120 ACSHE 121 ACSHE 224	Year 8 ACSHE 135 ACSHE 136 ACSHE 227	Year 9 ACSHE 161 ACSHE 228 ACSHE 158
Creative and creative thinking		

Ask students to watch the following interviews with engineers and take note of what type of engineer or engineering student they are (referring back to the information on engineering types from Task 1).

SARAH

ALICIA



ARNA

- Sarah is already a qualified engineer; what sort of work does she do? Does it sound like an interesting job? Why/why not?
- Alicia is studying a double degree in Chemical Engineering and Biotechnology; what sort of work is she likely to be doing when she finishes her studies?
- Arna is working towards a degree in Civil Engineering and hoping to specialise in water and/or structural engineering; what sort of work will she be doing once she is qualified?
- Alicia said she is the first person in her family to attend university, might that be the case for you? How does that make you feel about considering university as an option?

Note – you might also like to have students watch the clips from the pack Bringing Military Science to Life featuring Jess, Ben, Craig and Laura who are also engineers.

Let's think about three topics that into Arna and Alicia's areas of engineering: civil and chemical.

- biofuels
- GM foods
- housing

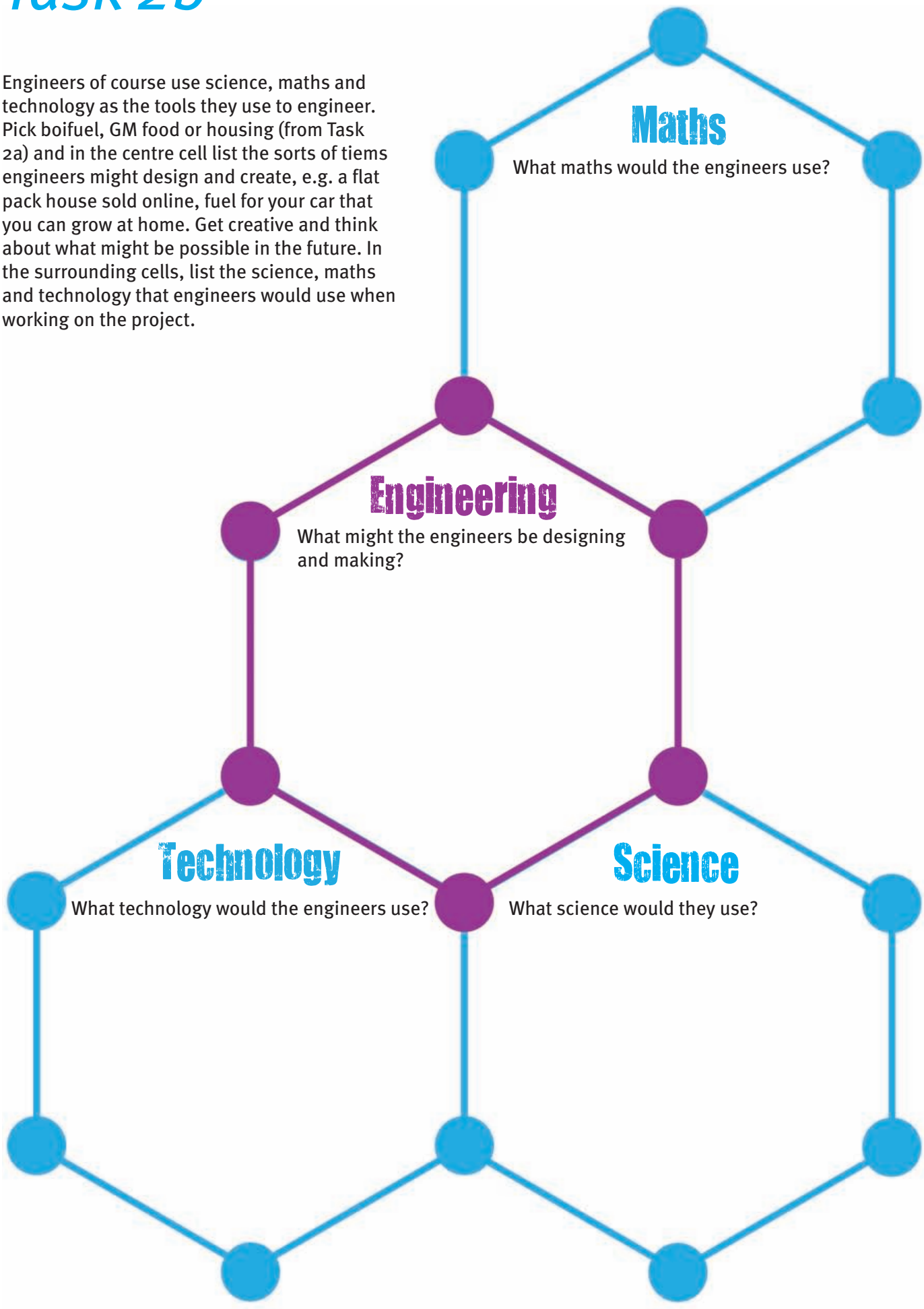
currently what are engineers working on in each of these topics?

What might our world look like in the future?

- What will cars use for energy? Will we even have cars?
- What will be eating? How and where will it 'be grown'?
- What will our houses look like?

Task 2b

Engineers of course use science, maths and technology as the tools they use to engineer. Pick boifuel, GM food or housing (from Task 2a) and in the centre cell list the sorts of tiems engineers might design and create, e.g. a flat pack house sold online, fuel for your car that you can grow at home. Get creative and think about what might be possible in the future. In the surrounding cells, list the science, maths and technology that engineers would use when working on the project.



Task 2c

Getting to know some engineers

Australian Curriculum Links		
Year 7 ACSHE 120 ACSHE 121 ACSHE 224	Year 8 ACSHE 135 ACSHE 136 ACSHE 227	Year 9 ACSHE 161 ACSHE 228 ACSHE 158
Creative and creative thinking		

Let's take a look now at some well-known engineers. First, ask students if they know the names of any engineers they've met or heard about. Here are a few engineers that your students may have heard of or recognise.

In the past

- Leonardo da Vinci
- Alexander Graham-Bell

And the present

- Bobak Ferdowsi
- Howard Wolowitz
- Mythbusters
- Q - James Bond

Ask students the following questions either to generate class discussion or as research questions. Depending on the technology students have available you could combine the two and have students researching and contributing to a class discussion at the same time.

- Who was Da Vinci? What is he most well-known for?
- What were his engineering achievements? (the strut bridge, the automated bobbin winder, the rolling mill, the machine for testing the tensile strength of wire, the lens- grinding machine, also designs for war machines, flying machines, musical instruments)
- Where would Da Vinci have used maths? Look at his engineering achievements and identify where he would have used maths and why.
- What was Da Vinci like as a person? Do we know why engineering fascinated him?
- If Da Vinci was alive today, what engineering projects do you think he might be working on? e.g. flying machines of the future.
- What shot Bobak Ferdowsi to fame in 2012? (Besides his hair!) NASA's 'Mohawk Guy' from the Mars Rover Landing live-feed
- What type of engineer is he? What does he do at NASA's Jet Propulsion Lab (JPL)?
- What got him interested in engineering in the first place?
- Do you think his popularity will encourage students to get interested in engineering and even think about engineering as a job?

Suggestions for Assessing Task 2 – Formative – There is little to assess here other than students responses to the questions which could be individually written or discussed as a class. It is still important here that the students are continuing to learn about the types of engineering and who engineers are – referring back to the You Can Be a Scientist pack.

Task 3

Engineering wonders
... and who made them

Australian Curriculum Links		
Year 7 ACSHE 121 ACSHE 224	Year 8 ACSHE 136 ACSHE 227	Year 9 ACSHE 161 ACSHE 228 ACSHE 158
Critical and Creative Thinking Personal and Social Competence		

Ask Students - What are you interested in? Water? Chemicals? Saving lives? Robots? Machines? Space? The environment? Ever looked at a building and wondered how it manages not to blow over on a windy day? What about sat in a plane and thought how amazing it is that is stays in the air? Or have you looked at a computer program and thought you could make it work better? Have you ever needed a way to get behind the bookshelf and grab a tiny battery off the ground but can't move the bookshelf... and you've made your own device? Then you're probably already a huge fan of engineering without even knowing it!

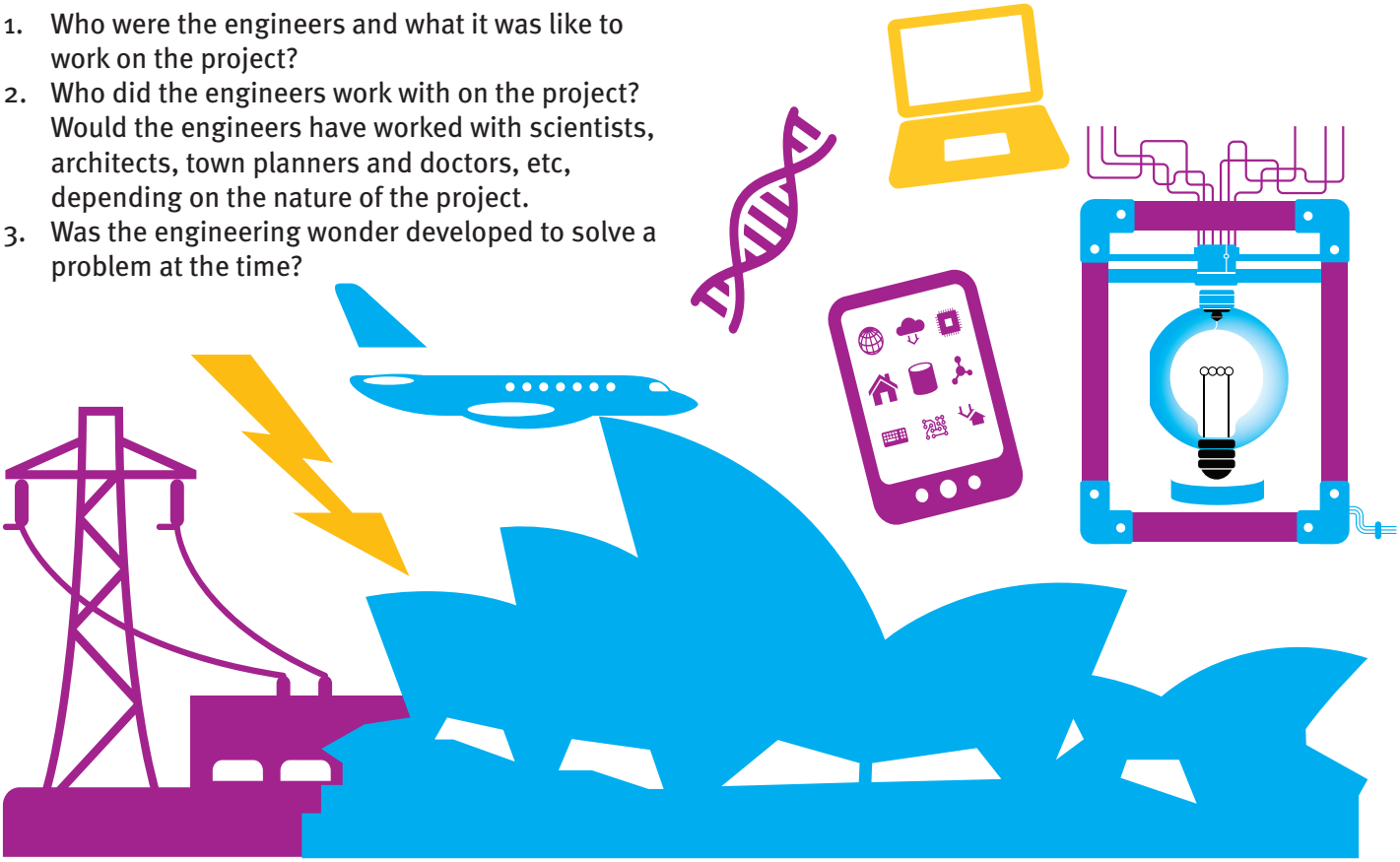
Ask students to brainstorm some engineering wonders to get them thinking. Then ask them to choose an engineering wonder – a building, piece of machinery, material, medicine, food - that has been engineered. It could be something from the ancient world, the modern industrial world, a massive structure or a tiny mechanical device. (Students will need to think back to what they uncovered in Task 1.)

Work with students to decide what is worth finding out about each engineering wonder. Work as a class to brainstorm and choose a handful of questions they need to answer. Suggestions for questions are:

1. Who were the engineers and what it was like to work on the project?
2. Who did the engineers work with on the project? Would the engineers have worked with scientists, architects, town planners and doctors, etc, depending on the nature of the project.
3. Was the engineering wonder developed to solve a problem at the time?

Students can then research their chosen engineering wonder and be ready to report back on each of the questions. A time line of all these engineering wonders could be developed. As engineers are often working with the latest in technology the time line will also represent developments in technology, science and manufacturing.

Suggestions for Assessing Task 3 – Formative
Monitor students' investigation into engineering wonders. Students' will begin to see the breadth of engineering projects, its links with the environment, people's everyday lives, science, technology and our economy. Monitor students' understanding in relation to (Science as a Human Endeavour: Years 7 & 8) people using understanding and skills from across the science disciplines in their occupations and working directly with a wide variety of people. Also, in relation to (Science as a Human Endeavour: Years 7 & 8) the ability of engineering to find solutions to contemporary issues. Furthermore, (Year 9) that advances in science and technology can significantly affect people's lives and create new career opportunities, and that the values and needs of today's society can influence the focus of scientific research.



Task 4

Characteristics of engineers

Australian Curriculum Links
There is no summative assessment for this task. The same formative assessment suggestions for Task 3 apply here where appropriate.

Start here by posing questions to get students thinking:

- What sort of people are engineers/ what sort of people become engineers? How would you describe engineers?
- What skills do engineers have?
- What characteristics do you think would be necessary or helpful to have if you were an engineer?

Watch clips of engineers talking about their work and how they came to be engineers. Look back to the clips in Task 1 and Task 2, and the engineers researched in Task 3. You could also have students watch clips of

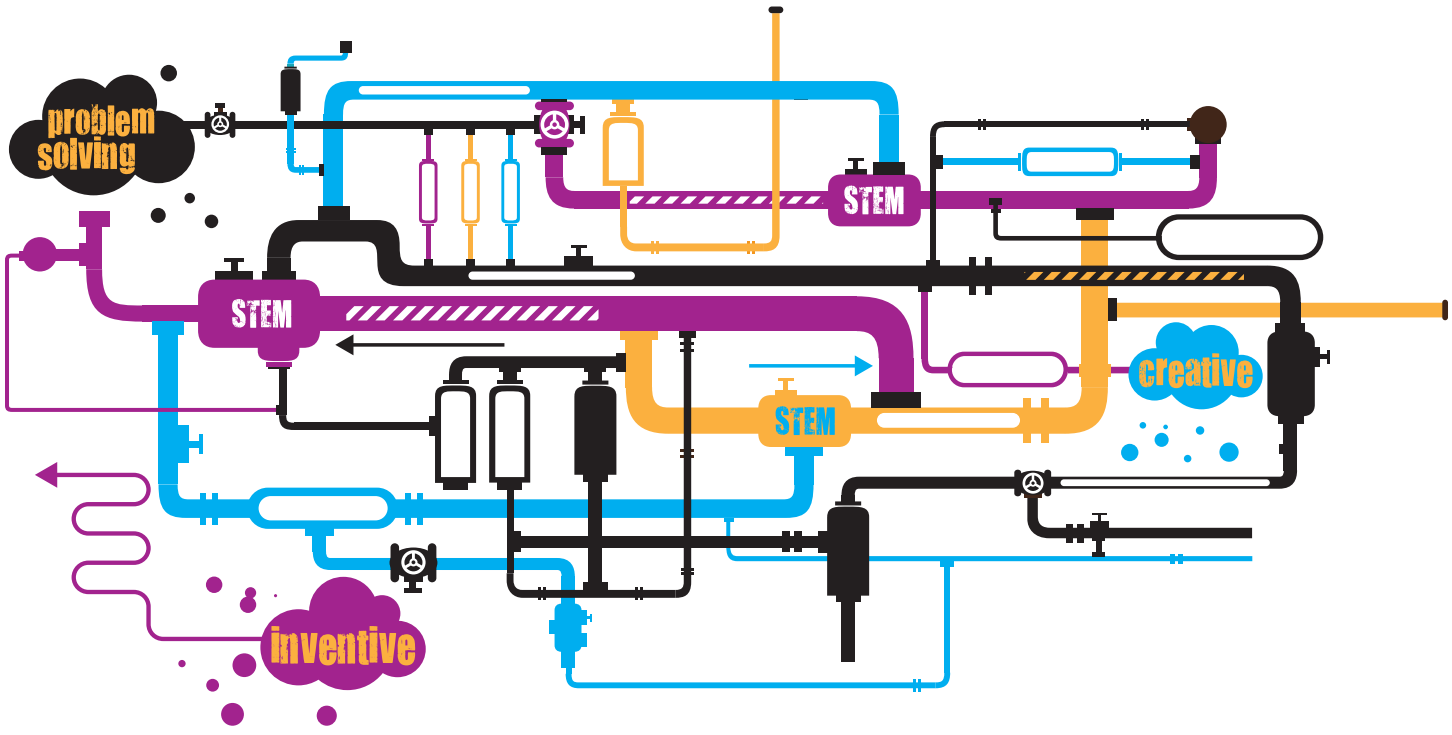
Prototype This
www.youtube.com/results?search_query=Prototype+THis&oq=Prototype+THis&gs_l=youtube.3..0l10.299030.301940.0.303472.14.12.0.2.2.0.227.1784.4j2j6.12.0...0.0...1ac.1.11.youtube.jVR24bKIj7Q).

One of the presenters, Zoz Brooks grew up in Adelaide, and went on to complete an Electrical Engineering and Computer Science PhD at MIT in the US specialising in robotics. See his bio here: www.riaus.org.au/people/zoz-brooks/

In small groups or as a whole class have students describe and/or list characteristics of engineers.

Some suggestions are:

- Inventors
- Experimenters
- Creators
- Makers
- Designers
- Thinkers
- Thinking into the future
- Thinking outside the square
- Problem solvers
- Explorers
- Test ideas out even – if they seem crazy
- Love a challenge
- Need to know some science and math
- Need to stick with a problem
- Don't give up easily
- Love to learn/find answers
- Their work is also their hobby
- Love to play with technology
- Imagination
- Altruism
- Can work on a massive scale or on tiny things
- They're not all geniuses
- They have a sense of humour
- They work in teams as well as alone
- Wide variety of engineering projects
- Tinkerers



Task 5

Good engineering

Australian Curriculum Links		
Year 7 ACSHE 120	Year 8 ACSHE 135	Year 9 ACSHE 161 ACSHE 228
Critical and Creative Thinking Personal and Social Competence Ethical Behaviour		

Engineers do have ethical issues to face in their work. For some of these ethical issues it may seem obvious what decisions engineers should make – they shouldn't intentionally design a building that will fall down or a car with dodgy brakes or a submarine that leaks. Engineers even have a code of ethics to guide their behaviour: Code of Ethics, Engineers Australia www.engineersaustralia.org.au//sites/default/files/shado/About%20Us/Overview/Governance/codeof-ethics2010.pdf); but they still need to think for themselves about what is the right or wrong action and how to deal with it.

The table overleaf describes some ethical issues that engineers might face. Read the vignettes to students and pose the ethical question for students to discuss as a class. You can collate for and against reasons on the board. A few possible responses from students are included in the table below for your preparation. Underlying these ethical issues are the notions of good design, intentional design and planned obsolescence. The following links can help spell out these ideas. In facilitating the class discussion you can raise these points where necessary for students to consider.

Comparing the Engineering Design Process and the Scientific Method, Science Buddies
www.sciencebuddies.org/engineering-design-process/engineering-design-compare-scientific-method.shtml

The Engineering Design Process, Science Buddies
www.sciencebuddies.org/engineering-design-process/engineering-design-process-steps.shtml

Dieter Rams: ten principles for good design
www.vitsoe.com/rw/about/good-design

Planned obsolescence
http://en.wikipedia.org/wiki/Planned_obsolescence

What is important here is that students practice giving reasons and evaluating their own and others' reasons. This is an important disposition and set of skills to develop in students in relation to science and everyday life. Raising and addressing ethical questions in the classroom ought to be encouraged and is supported by the Australian Curriculum in the Ethical Behaviour Continuum.

There are many resources to support teachers in this task, most notably, resources captured under 'Philosophy for Children' and 'Community of Inquiry'. Here are some resources that will be helpful:

Institute for the Advancement of Philosophy for Children (IAPC)
www.montclair.edu/cehs/academics/centers-and-institutes/iapc/what-is/

DeHaan, C., MacColl, S. & McCutcheon, L. (1995) Philosophy with Kids, Book 3, Hawthorn: ACER, pp. 13-17

Cam, P. (1995) Thinking Together, Sydney: Hale & Iremonger, pp. 41-54

White, T (1988) Right and wrong a brief guide to understanding ethics. New Jersey, Prentice Hall.

Burgh, G., Field, T. & Freakley, M. (2006) Ethics and the Community of Inquiry: education for deliberative democracy. Australia: Thomson Social Science Press.

NOTE: The Philosophy for Children movement uses Community of Inquiry as its primary methodology. In the pack 'You can be a scientist' the Community of Inquiry method was referred to in relation to whole class guided discussions. This same methodology should be used for whole class discussions of ethical questions.

Suggestions for Assessing Task 5 – Summative – Peer assessment of reasoning and discussion skills: as a class, prior to engaging in the task, develop a set of criteria for a reasoned whole class discussion. Students should be able to identify basic criteria for engaging in whole class discussion. Students could also use these criteria to assess their own reasoning and discussion skills and even identify a specific skill which they would like to focus on developing. As for the reasoning elements, you could develop your own checklist using the criteria for Community of Inquiry discussions outlined in the above resources. Ultimately you want students to be skilled at clearly articulating their position and reasons on an issue and be prepared to reassess this position and their reasons in the light of new evidence or circumstances or other relevant considerations.

Task 5

Good engineering

Australian Curriculum Links		
Year 7 ACSHE 120	Year 8 ACSHE 135	Year 9 ACSHE 161 ACSHE 228
Critical and Creative Thinking Personal and Social Competence Ethical Behaviour		

Should an engineer design a TV to deliberately break after a set amount of time? Why or Why not?

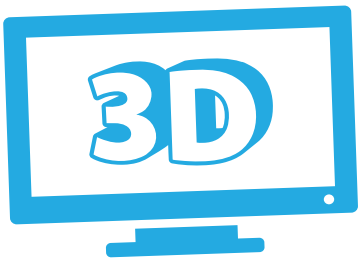
An electrical engineer is working for a company to develop a 3D TV that has at least one new feature that other 3D TVs don't have. The company also wants the TV to 'break' after 2 years in the hope that people will then buy another TV from them. The company wants the engineer to use cheap parts to build the TV.

YES SHE SHOULD

She might lose her job otherwise.
That's just how companies stay in business and make money.
People will want a new TV by then anyway.

NO SHE SHOULDN'T

We consume too much already; we need to make quality products that last the cost of living becomes too expensive.
Consuming so much leads to environmental pollution, land fill, etc.
People might only be able to afford to buy one TV every 5 or 10 years and buy that TV expecting it to last that long.



Should an engineer design a car that is not as safe as possible for the passengers? Why or Why not?

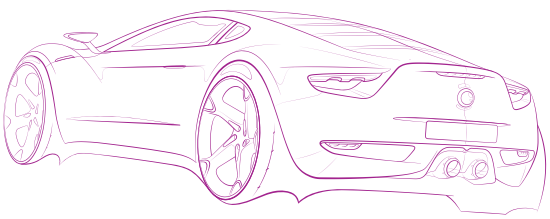
Mechanical engineers working for a car manufacturer are asked to design an affordable car, able to reach high speeds. The engineers design a car that can reach high speeds. Because it can travel so fast they include lots of safety features. The car manufacturer doesn't like the design because the safety features make the car very expensive and so asks the engineers to take out the safety features.

YES THEY SHOULD

They might lose their job if they don't.
It is up to the person buying the car; if they want a car without safety features then it's up to them.

NO THEY SHOULDN'T

People should be taking a stand against cars that aren't safe, especially if those cars can travel fast. Engineers can take that stand.



Should the engineer give away details of the new drug? Why or Why not?

A chemical engineer, part of a team working for a large drug company, is developing a new drug to prevent diabetes. The drug company realises they can make a lot of money selling the drug at a high price, but most of people can't afford it. Another drug company secretly contacts one of the chemical engineers and says if you can give us the recipe and manufacturing process we are willing to make the drug for low cost so everyone can afford to buy it.

YES SHE SHOULD

He should do it to help all those people who need the drug but can't afford it. Why should just the rich get the medicine when everyone should be able to get it if they want?
Engineers have a duty, a responsibility, to help others.

NO SHE SHOULDN'T

He might lose his job.
He shouldn't give away what isn't his.
Can he be sure the other drug company will do what they say?
Unless he's sure he shouldn't tell them anything.

Task 6

If I were an engineer

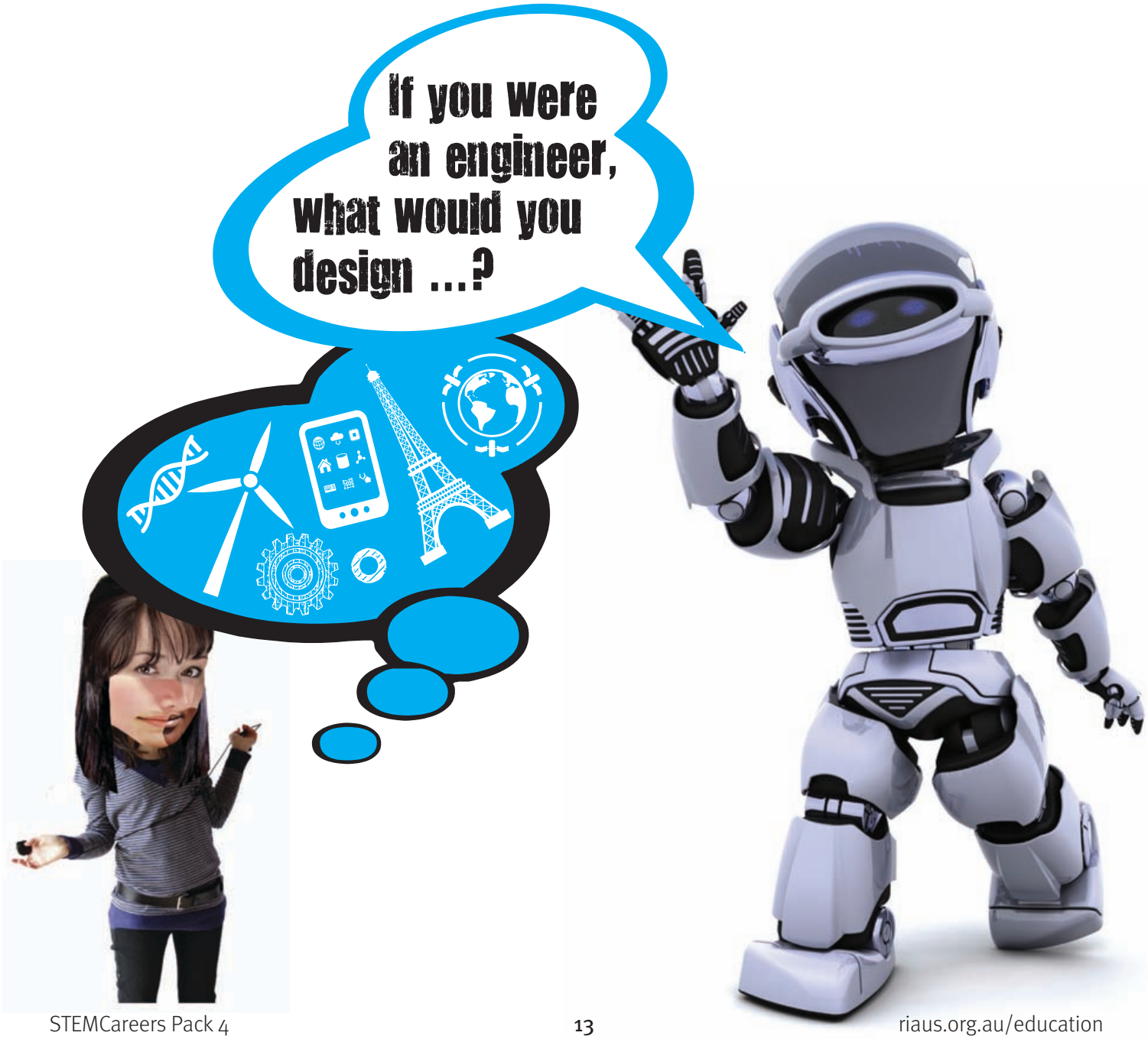
Australian Curriculum Links		
Year 7 ACSHE 121 ACSHE 224	Year 8 ACSHE 136 ACSHE 227	Year 9 ACSHE 161 ACSHE 228
Critical and Creative Thinking		

Here you want to draw together Tasks 1 to 4. You might say something to students like:

So far, we've looked at the different types of engineering, some amazing engineering achievements and what sort of people engineers are. Using all that you've learnt thus far about engineering I want you to now imagine you are an engineer. What would be your ideal project? Would you have liked to be an engineer in the past working on the Panama Canal or building the Pyramid of Giza? Would you like to be an engineer today working for Apple designing the latest smartphone software or surgical robot? Would you prefer to be an engineer in the future... what would you be working on then?

Ask students to present in some way (e.g. written piece/experiment/prototype/video diary) what would be their ideal engineering project, from the past, present or future. Students should identify the type of engineer they are, describe the project, which aspect they would work on specifically and why they would want to work on it. They could talk about the people they work with, including people from other STEM disciplines.

Suggestions for Assessing Task 6 – Summative – Written responses to these questions will allow you to gauge students' developing knowledge of engineering and the sort of work engineers do, as well as their attitude toward and interest in these careers.



Resources

Useful websites

Biomedical Engineer, ABC Ace Day Jobs
www.abc.net.au/acedayjobs/cooljobs/profiles/s2599873.htm

CSIRO Engineering Faculty
www.csiro.au/en/Organisation-Structure/National-Facilities/Engineering-Facility---Clayton.aspx

CSIRO honours wireless team, CSIRO
www.csiro.au/Portals/Media/CSIRO-honours-wireless-team.aspx

Engineers Australia
www.engineersaustralia.org.au/

Engineers Without Borders Australia
www.ewb.org.au/

How Curiosity got us to Mars - Bobak Ferdowsi, TEDEducation
www.youtube.com/watch?v=weNKci8MrfI

My Future
www.myfuture.edu.au/

Mythbusters (episodes on YouTube)
www.youtube.com/results?rlz=1C2SKPH_enAU394&q=mythbusters+episodes&bav=on.2,or.r_cp.r_qf.&bvm=bv.48572450,d.aGc&biw=990&bih=911&um=1&ie=UTF-8&gl=AU&sa=N&tab=w1

Q&A: NASA's Bobak, TIME Kids
www.youtube.com/watch?v=K-qv7yEVtJs

Prototype This - Zoz Brooks - Dr. Robot
www.youtube.com/watch?v=Um13rOhtaoM

Seven Wonders of the Industrial World, BBC
www.bbc.co.uk/history/british/victorians/seven_wonders_01.shtml

TED (Engineering related talks)
www.ted.com/search?cat=ss_all&q=engineering&page=1

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