

Presentation Notes

Slide One



Shape the future by solving problems

Pick a problem, search for a solution, and get involved

Where could engineering take you?

1.732 $\Sigma F = ma$ Fun Data

Big Idea

Learning School play

STEM

Engineering Australia | STEM PUTTING THE E IN STEM

Slide Two



Where could engineering take you?

Your aim: Introduce yourself and what you do.

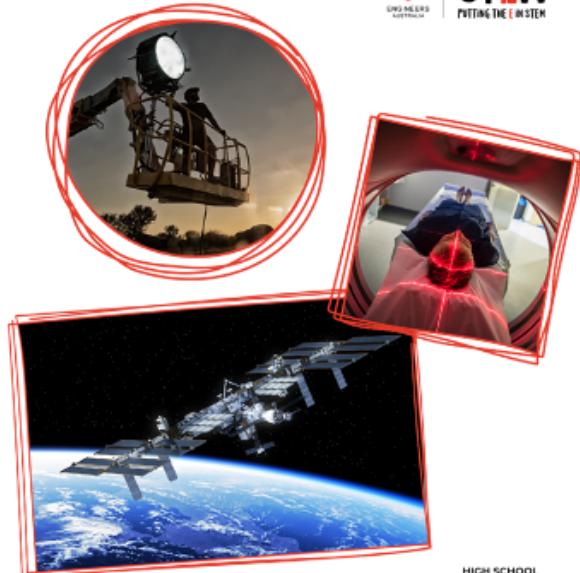
If you feel comfortable include a personal trait i.e. 'I also sell homemade products at markets' or 'I used to play saxophone in a band'.

Slide Three

What could **YOU** be?

- Planet cleaner
- Star maker
- Cancer crusher
- Robot ruler
- Sustainability hero
- Material manipulator
- Time traveller

Problem Solver



HIGH SCHOOL

Your aim: inspire about the big-picture of why engineering matters, and how engineers shape the future...without using the word 'engineering' in this slide.

How would you like to solve the world's problems and shape the future?

You could be a:

- Planet cleaner (clean up our environment and change what the world looks like)
- Star maker (we're not talking about the Death Star - you could use the power of sound to be the person behind the next Post Malone or Billie Eilish)
- Cancer crusher (the one who finds the solution, or builds the hospital that finds a cure for cancer, or even comes up with the best way to distribute the cure)
- Robot ruler (making robots that do whatever you say, or even robotic arms and legs that work better than before)
- Sustainability hero (what about inventing the next biodegradable plastic or building fully off-grid buildings?)
- Material manipulator (harnessing the building blocks of the universe to make planes, skyscrapers or bridges)
- Time traveller (well, this hasn't happened yet, but you could be the one!)

How do you get to be any of these - or all of these?

One step at a time, of course - starting with the foundations in your next few years of schooling.

A strong technical or scientific background sets you up to be a world changer, a problem solver and a force to be reckoned with.

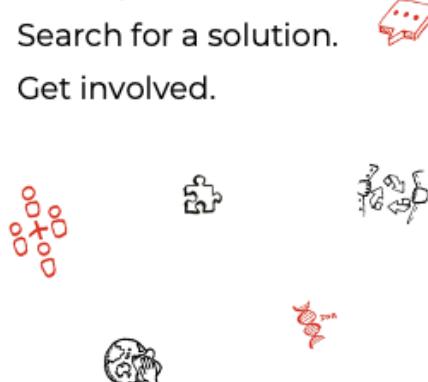
Slide Four

Shape the future

Pick a problem.

Search for a solution.

Get involved.



HIGH SCHOOL

Your aim: connect engineering disciplines with answers to real-life problems that could shape the future.

Imagine growing gold on trees, playing with nanotechnology to build a tower that reaches to space, or building the world's largest 3D printer.

It's not the future - it's already happening.

How? Some of the world's best thinkers have put their minds to solving a particular problem.

What about:

- Creating an alarm clock that tells your toaster to make your breakfast?
- Making a robot that takes people out of danger in the workplace or out on the farm?
- Finding a new way to recycle plastic in the ocean?
- Building a skyscraper that won't be affected by the forces of nature?

There are 3 simple steps to changing the world - you just **pick a problem, search for a solution, and get involved.**

But some of the best problem solvers have a superpower - it's engineering.

- alarm clock = electrical engineering
- robot = mechanical engineering
- recycling plastic = chemical engineering
- building a skyscraper = civil engineering

Leaving school with a maths subject and at least one science or engineering subject will put you on the right pathway to shape your future - and the world's.

Slide Five



Your aim: illustrate how engineering touches nearly every aspect of modern-day life.

Before you came to school today, did you pick up a phone or tablet and have a quick browse through Facebook? You've got wifi today thanks to engineers from the CSIRO here in Australia.

Did you drive past an electric vehicle (or maybe even drive in one)? Engineers have been working for years to make electric vehicles a reality.

Did you drive past roadworks or a construction site? Before anyone puts a shovel to the ground, an engineer has spent months planning and problem-solving to work out exactly what needs to happen.

<1:04 video>

While that video was made for Global Day of the Engineer, it's pretty obvious that engineers play a key role in every single day.

Here's another one: on the way to school, did you use a GPS? This year, a bunch of engineers are working to implement a new set of geo-positioning data that means everything in Australia moves 1.8m north-east. Without this, we won't be able to use self-driving cars.

Slide Six

8 reasons to consider engineering

1. Create and shape the future
2. Make great money
3. Get a job straight after uni
4. Work in any industry, anywhere
5. Never stop learning
6. Beat the stereotypes
7. Travel the world
8. Solve problems all day, every day



Your aim: put engineering into a context that the students can picture themselves in.

Let's play a game., I'm going to read a statement, and if I'm describing you, you can stand up.

Test statements: Your hair is brown <there will always be one clown that sits down/stands up at the wrong time, have a laugh if you get one of these!>

Real statements:

When you start something, you want to finish it.
You want to contribute to making the world better.
You want the freedom to work anywhere in the world.
You question things - you've been in trouble for asking 'why' too many times.
You like problems that have a definite answer (like 'what is 2+2', rather than 'describe a perfect lunch'.)
You had a thing for LEGO or Minecraft.
You want to earn a good living.

<hopefully the majority of the class is now standing - these are your future engineers!>

Slide Six

If you're standing, here's why you should consider engineering. *<you don't have to read out the titles>*

1. Create and shape the future

You can:

Shape the future

Turn ideas into reality

Solve the problems that our planet is facing

2. Make great money

Don't want to be a lawyer or a doctor to make your fortune? Engineers are the next-best paid professionals, with the chance to earn more than \$200k a year at the top of your game.

3. Get a job straight after uni

Nobody wants to go to uni and then end up as a barista at Maccas - with engineering, you've got an 83% chance of walking into an awesome full-time job straight away.

4. Work in any industry, anywhere

Engineers are involved in nearly every industry. If you're a fan of cars, music or computers, you can choose the field of engineering that makes those things better.

5. Never stop learning

Engineers don't stop learning - the profession is always changing, and you'll never get bored. *<this is great for a personal example - what's changed in your field since you graduated?>*

6. Beat the stereotypes

Engineering is about more than maths - you need to be a team player, creative, and business-savvy.

7. Travel the world

You can work nearly anywhere in the world with internationally recognised engineering qualifications.

8. Solve problems all day, every day

Do you love that 'a-ha' moment when you solve a problem that's been bugging you?

<this would be a good opportunity to share or ask the students about their biggest 'a-ha's>

Slide Seven

More than lab coats and geek glasses

Makeup = chemical engineer
Music = audio engineer
Cars = mechanical engineer
VFX + Animation = electrical engineer

The collage features several hand-drawn style icons: a red circle around a woman in a lab coat, a red circle around a drone, a microphone with musical notes, a bar chart, a person working on a robot, and a heart. A small 'HIGH SCHOOL' label is at the bottom right.

STEM
ENGINEERS AUSTRALIA | PUTTING THE E IN STEM

Your aim: point out engineering careers that transcend stereotypes. Feel free to insert your own examples!

Think back to the things you said 'yes' to when we were all standing up.

What interests you? Put that together with your yes and you've got the start of a career in engineering.

You question things and you love watching makeup tutorials on YouTube - what about changing the way that beauty brands build their products, or finding sustainable fragrances as a chemical engineer?

You want to make a good living and you spend every spare minute with your AirPods blasting your favourite artist - what about shaping the sound of pop or hip-hop as an audio engineer?

You've always been fascinated by cars and you always question things - you could be the best at making the next generation of transport faster, bigger, deeper, smaller or smarter.

You are a wiz at maths and science and are also in awe of films with great VFX and animation - maybe you can make the next Oscar winning animated film, like Guy Griffiths.

<Click on Lego Movie image to show Guy Griffiths video>

Slide Eight

What makes a good engineer?



Creativity



Critical thinking



Collaboration



Communication

HIGH SCHOOL

Your aim: help the students understand the 'soft skills' that make a great engineer.

Engineers need to know more than just the technical side of things.

<Question/answer if the mood is right> - what do you think would make a good problem solver?

Look for answers along the lines of:

- Use your strong imagination
- See problems from different angles
- Put your thoughts on paper
- Visualise something and sketch it out
- Get an idea across to a group of people
- Break a problem down into the details
- Get lost in the YouTube or Google rabbit-hole when you're looking for information on something
- Take technology to its limits and beyond

All of these things also make a great engineer.

Slide Nine

Choose your own adventure

HIGH SCHOOL + UNI

- Science (Physics + Chemistry) + Math
- creative/communication subjects, such as English

ALTERNATIVE PATHWAYS

- Enabling courses
- Other related courses at university
- TAFE/colleges/PIBT/V.E.T.
- Defence

HIGH SCHOOL

Your aim: bust the myth that getting a high ATAR score and going to university is the only way to become an engineer.

So, you want to be an engineer. How do you get there? It's not true that you have to head straight to uni and study - while you're laying the foundations now, you can still choose your own adventure.

<now is a great time to put in an example from your own experience!>

Sure, you can go straight from school with a strong background in Science (think Physics and Chemistry) and Maths. But don't neglect your creative subjects - engineers still need strong communication skills, and it doesn't hurt to be able to draw either!

If you don't get the ATAR score you need to get in, there are other ways to still end up as an engineer.

- Enabling courses that help to get your skills to the right level
- Starting out in another course like Science and transferring to Engineering
- Doing a TAFE qualification that gets you advanced standing
- Going through a Defence traineeship

If you want it badly enough, there are a thousand roads to becoming an engineer.

Slide Ten

You can't spell TEAM without...



T

Tradespeople,
technicians,
technologists

E

Engineers

A

Associates

M

Me!

HIGH SCHOOL

Your aim: widen perceptions of who's in a team of engineers.

Engineers don't just work with other engineers all day - we need a whole team to get things done. This includes:

- Tradespeople - often these are the people that end up putting engineers' plans into action, like welding together parts of a bridge or wiring circuits
- Technicians and technologists - these people assist engineers, putting basic engineering principles into practice to help make ideas a reality
- Engineers - the ideas people, the problem solvers
- Associates - these people have completed a two-year degree (rather than the full four-year engineering course) but get to work right alongside engineers
- Me - <what role do you play?>

Why should you be interested in being part of an engineering team, even if you're not an engineer?

- I'm a words person - we need people who can understand a particular field of science or knowledge, and also put together ideas and information to communicate to others
- I'm all about the creative - we need people who can understand data and explain it visually or kinetically
- I'm interested in managing people - we need people who can put together world changing teams
- I want to be in business - we need people who can scale up and turn research into profitable businesses

Even if you don't become an engineer, there are opportunities right alongside them.

Slide Eleven



Your aim: introduce the video and generate some interaction.

Speaking of teams - can you guess how many parts are in an average aeroplane?

What about how many people work on a Boeing 737 before it takes to the skies?

How long does it take to build a plane?

<take guesses - parts = 367,000, people = 10,000, plane = 9-11 days>

Felicity Furey (yes, that's her real name, and no, she's not a Marvel superhero) is working to change the stereotypes in engineering, alongside engineers like Renee. What's this got to do with planes? Let's take a look...

<4:20 video>

Slide Twelve



Your aim: introduce the video and generate some interaction.

Can you guess how many parts are in a Formula 1 race car?

<take guesses - 16,000 parts according to McLaren>

Building a Formula 1 car sounds like a lot of work, right?

Well, a bunch of people your age have done exactly that - except in miniature - thanks to the F1 in Schools challenge.

A team from Australia won the competition in 2018 - let's take a look. <[3:19 video](#)>

Slide Thirteen

Engineering groups and events



Powerofengineering.org



rea.org.au/f1-in-schools



starportal.edu.au



dayofstem.com.au

HIGH SCHOOL

Do you want to explore engineering? There are plenty of ways to get involved.

Here are some projects that you can get involved in with the help of your school:

Power of Engineering

The Power of Engineering project holds one-day events for Year 9 and 10 students around Australia.

F1 in Schools

This is a worldwide competition with 17,000 students racing to develop the fastest miniature Formula 1 car.

If you want to explore engineering on your own:

STARportal

This site is full of free and low-cost STEM activities. Log on and discover a world of online and home-based activities to spark your curiosity.

Day of STEM

A free online resource that lets you experience what a day in the life of a STEM career might look like.

There's plenty out there, but what can you do now?

- Start thinking about the problems you want to solve
- There are programs and grants out there, so get involved now
- Keep your head in the game - turn up, every day
- What's your passion? learn all about it

Final Slide

