Teacher Notes

What is 'I'm an Engineer'?

You can read this to your students to brief them about the event. It may help to have the website (imanengineer.org.uk) up on a projector or interactive whiteboard whilst you describe the event.

I'm an Engineer, Get me out of Here! is an online event where you get to meet and interact with real engineers. It's in the form of an X Factor-style competition between the engineers. You submit questions which the engineers will try to answer by the next day. These stay on the site so you can read the questions other students have already asked, and the engineers' answers. You can have live online Facebook-style chats with engineers where you get to ask the engineers questions and learn more about them.

You get to vote for the engineer that you think should win a prize of £500 to promote their work. A student from each zone will win a £20 gift voucher prize for asking the best questions and engaging with the engineers.

Each of you will get an Access Code card which you'll use to register on the site. You'll be asked to choose a username and password. Write them on the Access Code card and don't lose it. You'll need it to log onto the site. You'll also be asked for an email address and your school's name. Giving your email address will mean you'll be kept up to date with answers to your questions and evictions of engineers.

Once you're on the site you'll be able to do the following:

Meet the Engineers – there are five engineers competing for your votes. They have each posted a profile and answered some set questions. (*You will hopefully cover this in more detail in Lesson 2: Meet the Engineers.)*

ASK - You have the chance to ask the engineers whatever question you like. They'll try to answer by the next day and you'll get an email to let you know it has been answered. Questions and answers remain on the site so have a look around and see what others have asked before you pose your own question. *(Lesson 2: Meet the Engineers will help prepare.)*

CHAT - Live chats are your chance to ask questions and let engineers know your opinions. *(Lesson 3: Live Chat has more details on this.)*

VOTE - You vote for the engineer you think should win a prize of £500 to promote their work. You can vote at any time and your final vote in each of the four rounds is the one that counts. In the second week the engineers are evicted day by day until the winner is announced on the Friday.

How long will it take/How much time should you spend on it?

Maximum: 5 hours
Including interacting with engineers on the website and all the lesson plans, there is enough material for 5 hours of lessons, depending on what you decide to use.

Average: 2-3 hours
Most teachers will do Lessons 1-3 and have one live chat.

Minimum: 2 hours
This will usually be 1 introductory lesson, 1 homework of reading more about the engineers and submitting questions and 1 lesson of live chat with the engineers

Be warned:
Most teachers, when asked what they would do differently next time, said, *"spend more time on the event."*

Eviction update:
In the second week of the event, evictions take place daily from Tuesday. During this week, even in lessons not on I'm an Engineer, take five minutes at the start or end of the lesson to check the website (imanengineer.org.uk) to see who has been evicted.

Teacher tips – other teachers' experiences

In every event we ask teachers in the feedback survey what they would do differently if they ran the event again. Here are the most common answers from the sister I'm a Scientist event, in order of popularity:

1. Spend more time on the event

2. Involve more students

3. More preparation time – especially before live chats

> *"Prepare the class more, carry out the discussions first. Get them thinking about what engineers do, and the decisions they have to make."*

> *"I'd spend more time working with the group looking at the sort of questions they might like to ask. I did some of this but a number of students persisted in asking 'trivial pursuit' type science questions"*

There are better ways to use the event than using engineers as Googlers.

4. Use smaller groups or pair up students in live chats

> *"I would book more chunks of online chat but split the group so there were fewer students on at a time to give more chance of dialogue."*

> *"I would pair up weaker members of the group during live chat so they could work as a team to read/assimilate information/type responses."*

5. Use the provided resources more

How do the lesson plans and the activities work together?

1. **"You're the Judges!"** Coming to it cold, students may just vote for the engineer with the nicest photo, or the best joke. This lesson plan gets students thinking about some of the deeper issues, while still giving them ownership of the criteria they come up with (rather than telling them what to consider). There's no right or wrong answer, but all students should have thought about how we judge engineers a little by taking part. Do the exercise interactively using the web ranking system we have produced and we can share how other classes have ranked the criteria.

2. **Interaction with engineers and voting** gives students practice at using these skills and giving them a real say about something gives them a reason to engage.

> *"It really promoted higher thinking skills"*
> **Kirsty Price, teacher, Sherwood Hall School**

Lesson Plans

There are many ways to use the I'm an Engineer event. We've put together four lesson plans and we recommend that you use Lessons 1,2 and 3. These lesson plans were developed in consultation with teachers and have been extensively tested. Most have found them extremely helpful.

Format: Starter/activity/plenary

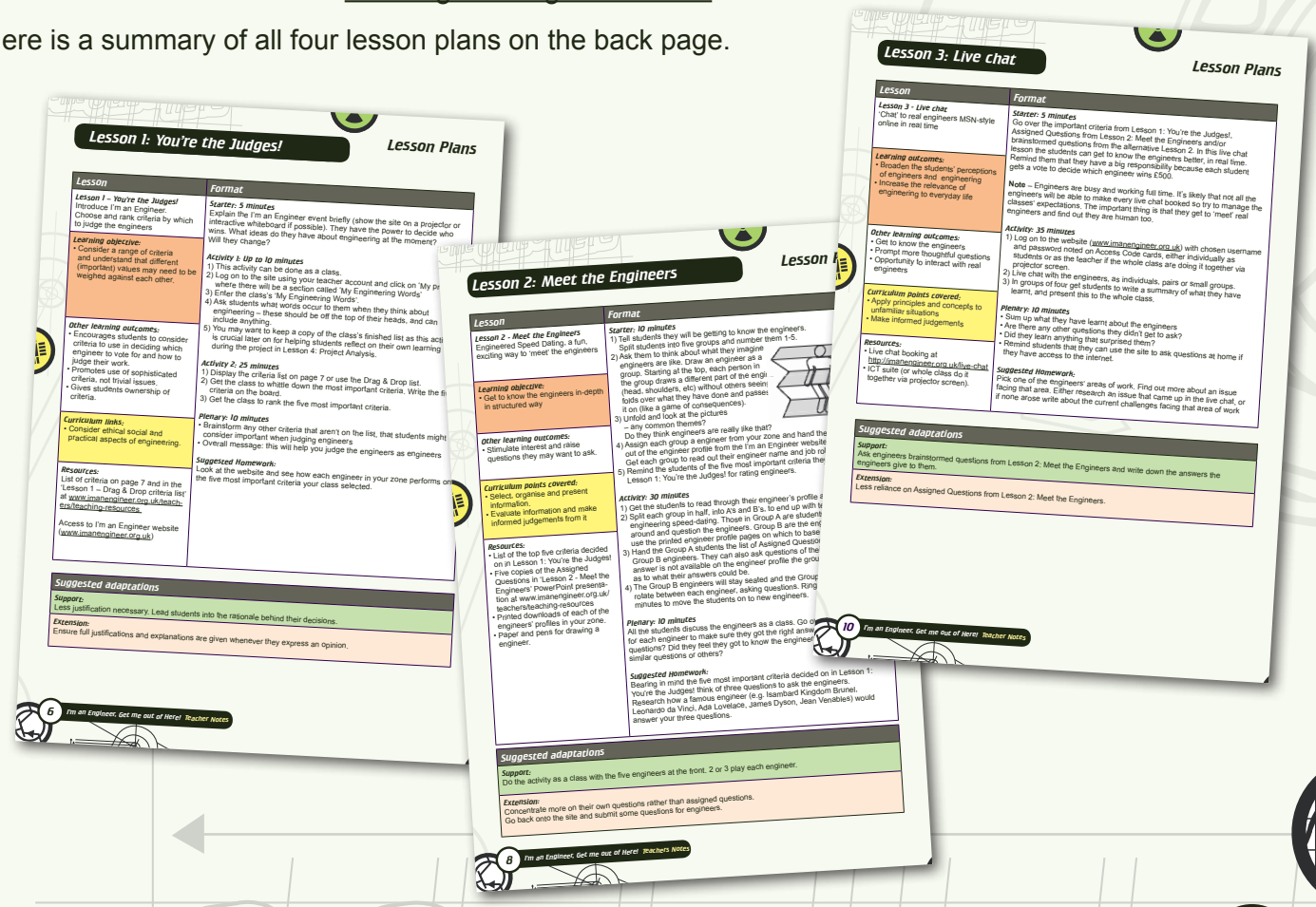
Suggested adaptations: For lower and higher ability groups

Timings: Designed for 50 mins

Purpose: Develop skills and deepen learning (see back page for more details)

Further resources: Online at imanengineer.org.uk/teachers

There is a summary of all four lesson plans on the back page.



Lesson 1: You're the Judges!

Lesson	Format
Lesson 1 – You're the Judges! Introduce I'm an Engineer. Choose and rank criteria by which to judge the engineers.	***Starter: 5 minutes*** Explain the I'm an Engineer event briefly (show the site on a projector or interactive whiteboard if possible). The students have the power to decide who wins. What ideas do they have about engineering at the moment? Will they change? ***Activity: 30 minutes*** 1) Display the criteria list or use the Drag & Drop list. 2) Get the class to whittle down the most important criteria. Write the five criteria on the board. 3) Get the class to rank the five most important criteria. ***Plenary: 10 minutes*** • Brainstorm any other criteria that aren't on the list, that students might consider important when judging engineers. • Overall message: this will help you judge the engineers as engineers. ***Suggested Homework:*** Look at the website and see how each engineer in your zone performs on the five most important criteria your class selected.
Learning objective: • Consider a range of criteria and understand that different (important) values may need to be weighed against each other.	
Other learning outcomes: • Encourages students to consider criteria to use in deciding which engineer to vote for and how to judge their work. • Promotes use of sophisticated criteria, not trivial issues. • Gives students ownership of criteria.	
Curriculum links: • Consider ethical, social and practical aspects of engineering. • Learn about real world applications and use of science, technology, engineering and maths.	
Resources: List of criteria on page 7 and in the 'Lesson 1 – Drag & Drop criteria list' at imanengineer.org.uk/teachers/teaching-resources Access to I'm an Engineer website (imanengineer.org.uk).	

Suggested adaptations

Support:
Less justification necessary. Lead students into the rationale behind their decisions.

Extension:
Ensure full justifications and explanations are given whenever they express an opinion.

Lesson 1: You're the Judges!

Criteria list

- I go to events like lectures and press conferences to tell people about my work
- My work could make me and my company rich
- My work finds new uses for unwanted materials
- I work outdoors
- I work indoors
- I work to make our soldiers safer
- I'm religious
- I'm not religious
- I have created the world's best mousetrap
- I help build really big stuff
- I help build really tiny stuff
- I am part of a big team
- I run my own company
- I'm the lead singer in a band
- The Queen once came to our offices.
- I design weapons to make our country safer
- My work helps save peoples lives
- My company takes on lots of work experience students and apprentices
- I have my name on a dozen patents
- I'm a part-time model
- I work as a researcher at a University
- I work for an engineering company
- I make things go really fast
- I make things really efficient
- My trainers have a high modulus of elasticity. And they look cool
- I wear smart business clothes to work
- I go to work in casual clothes
- I met my partner through work
- There's no practical use for my work. (Yet)
- I give lots of time and money to charity
- I use some complicated maths in my work

This list of criteria is also available as a Drag & Drop list to use with your students at imanengineer.org.uk/teachers/teaching-resources

Lesson 2: Meet the Engineers

Lesson

Lesson 2 - Meet the Engineers
Engineered Speed Dating, a fun, exciting way to 'meet' the engineers.

Learning objective:
- Get to know the engineers in-depth in a structured way.

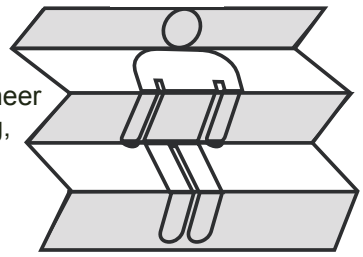
Other learning outcomes:
- Stimulate interest and raise questions they may want to ask.

Curriculum points covered:
- Select, organise and present information.
- Evaluate information and make informed judgements from it.
- Learn about real world applications and use of science, technology, engineering and maths.

Resources:
- List of the top five criteria decided on in Lesson 1: You're the Judges!
- Five copies of the Assigned Questions in 'Lesson 2 - Meet the Engineers' PowerPoint presentation at imanengineer.org.uk/teachers/teaching-resources
- Printed downloads of each of the engineers' profiles in your zone.
- Paper and pens for drawing a engineer.

Format

Starter: 10 minutes
1) Tell students they will be getting to know the engineers. Split students into five groups and number them 1-5.
2) Ask them to think about what they imagine engineers are like. Draw an engineer as a group. Starting at the top, each person in the group draws a different part of the engineer (head, shoulders, etc) without others seeing, folds over what they have done and passes it on (like a game of consequences).



3) Unfold and look at the pictures – any common themes? Do they think engineers are really like that?
4) Assign each group a engineer from your zone and hand them a print out of the engineer profile from the I'm an Engineer website. Get each group to read out their engineer name and job role.
5) Remind the students of the five most important criteria they chose in Lesson 1: You're the Judges! for rating engineers.

Activity: 30 minutes
1) Get the students to read through their engineer's profile as a group.
2) Split each group in half, into A's and B's, to end up with ten groups for engineering speed-dating. Those in Group A are students who will go around and question the engineers. Group B are the engineers who will use the printed engineer profile pages on which to base their answers.
3) Hand the Group A students the list of Assigned Questions to ask the Group B engineers. They can also ask questions of their own. If the answer is not available on the engineer profile the group can speculate as to what their answers could be.
4) The Group B engineers will stay seated and the Group A students will rotate between each engineer, asking questions. Ring a bell every 3 minutes to move the students on to new engineers.

Plenary: 10 minutes
All the students discuss the engineers as a class. Go over the questions for each engineer to make sure they got the right answers. Did they like the questions? Did they feel they got to know the engineers? Would they ask similar questions or others?

Suggested Homework:
Bearing in mind the five most important criteria decided on in Lesson 1: You're the Judges! think of three questions to ask the engineers. Research how a famous engineer (e.g. Isambard Kingdom Brunel, Leonardo da Vinci, Ada Lovelace, James Dyson) would answer your three questions.

Suggested adaptations

Support:
Do the activity as a class with the five engineers at the front. 2 or 3 play each engineer.

Extension:
Concentrate more on their own questions rather than assigned questions.
Go back onto the site and submit some questions for engineers.

Lesson 2: Meet the Engineers *(alternative version)*

Lesson	Format
Lesson 2 – Meet the Engineers (alternative version) This is an alternative version of Lesson 2 that does not involve engineering speed-dating and student movement around the classroom.	***Starter: 10 minutes*** Recap the event, and what can be done on the site. Can also use 'fold game' starter from the engineering speed-dating version of Lesson 2. ***Activity: 35 minutes*** 1) As a class brainstorm suitable questions that they want to ask to get to know the engineers. Get students to write them all down. Assign a question to each pair to ask when they use the site. 2) Take students online (in pairs or threes in ICT suite or all look at site together on projector), and read the profiles of all the five engineers in your zone and the information on the site. See if the impression they get of them is different from what they expected. Decide which engineer they like the best. 3) Write down three interesting things they find out on the site. 4) Ask a brainstormed question, and one of their own for the engineers to answer when they use the site. 5) Present their three interesting things to the class, and for which engineer they intend on voting, or for which they would not vote. ***Plenary: 5 minutes*** Discuss what they found out – did anything surprise them? ***Suggested Homework:*** Pick one of the engineers. Find out about the type of work they do and write about it, including: – What they work on – Where they work – A well-known engineer who worked in a similar field
Learning objective: • Get to know engineers and realise they are normal people!	
Other learning outcomes: • Stimulate interest and raise questions they may want to ask. • Opportunity to interact with real engineers.	
Curriculum points covered: • Select, organise and present information. • Evaluate information and make informed judgements from it.	
Resources: • Pupils own pen and exercise book. • ICT suite or a computer and projector in the classroom so students can work together with the teacher leading.	

Suggested adaptations

Support:
Give more assistance in brainstorming questions. Use the criteria from Lesson 1: You're the Judges! and suggested Lesson 2: Meet the Engineers questions as a basis.

Extension:
Allow more freedom when looking at the site. Write a short paragraph about what they find on the site to present back to the class. Justify more clearly which engineer they like best.

Assigned Questions

1. At what kind of place do you work?
2. What do you do?
3. What's your favourite band?
4. Do you work alone or as part of a team?
5. How long have you done your job?
6. What have you done in your work that no one's done before?
7. Will your work affect people?
   If so how many people and in what way?

These Assigned Questions are also available as the PowerPoint presentation Lesson 2 - Meet the Engineers at imanengineer.org.uk/teachers/teaching-resources

Lesson 3: Live chat

Lesson	Format
Lesson 3 - Live chat 'Chat' to real engineers Facebook-style online in real time.	***Starter: 5 minutes*** Go over the important criteria from Lesson 1: You're the Judges!, Assigned Questions from Lesson 2: Meet the Engineers and/or brainstormed questions from the alternative Lesson 2. In this live chat lesson the students can get to know the engineers better, in real time. Remind them that they have a big responsibility because each student gets a vote to decide which engineer wins £500. **Note** – *Engineers are busy and working full time. It's likely that not all the engineers will be able to make every live chat booked so try to manage the class's expectations. The important thing is that they get to 'meet' real engineers and find out they are human too.*
Learning outcomes: • Broaden the students' perceptions of engineers and engineering. • Increase the relevance of engineering to everyday life.	***Activity: 35 minutes*** 1) Log on to the website (imanengineer.org.uk) with chosen username and password noted on Access Code cards, either individually as students or as the teacher if the whole class are doing it together via projector screen. 2) Live chat with the engineers, as individuals, pairs or small groups. 3) In groups of four get students to write a summary of what they have learnt, and present this to the whole class.
Other learning outcomes: • Get to know the engineers. • Prompt more thoughtful questions • Opportunity to interact with real engineers.	***Plenary: 10 minutes*** • Sum up what they have learnt about the engineers. • Are there any other questions they didn't get to ask? • Did they learn anything that surprised them? • Remind students that they can use the site to ask questions at home if they have access to the internet.
Curriculum points covered: • Apply principles and concepts to unfamiliar situations. • Make informed judgements.	***Suggested Homework:*** Pick one of the engineer's areas of work. Find out more about an issue facing that area. Either research an issue that came up in the live chat, or if none arose write about the current challenges facing that area of work.
Resources: • Live chat booking at imanengineer.org.uk/live-chat • ICT suite (or whole class do it together via projector screen).	

Suggested adaptations

Support:
Ask engineers brainstormed questions from Lesson 2: Meet the Engineers and write down the answers the engineers give to them.

Extension:
Less reliance on Assigned Questions from Lesson 2: Meet the Engineers.

Live chats

"Normally they start putting their coats on five minutes before the end but [when doing the live chats] they were in their chairs still after the bell went."
Michelle Crooks, teacher, King Arthur's Community School

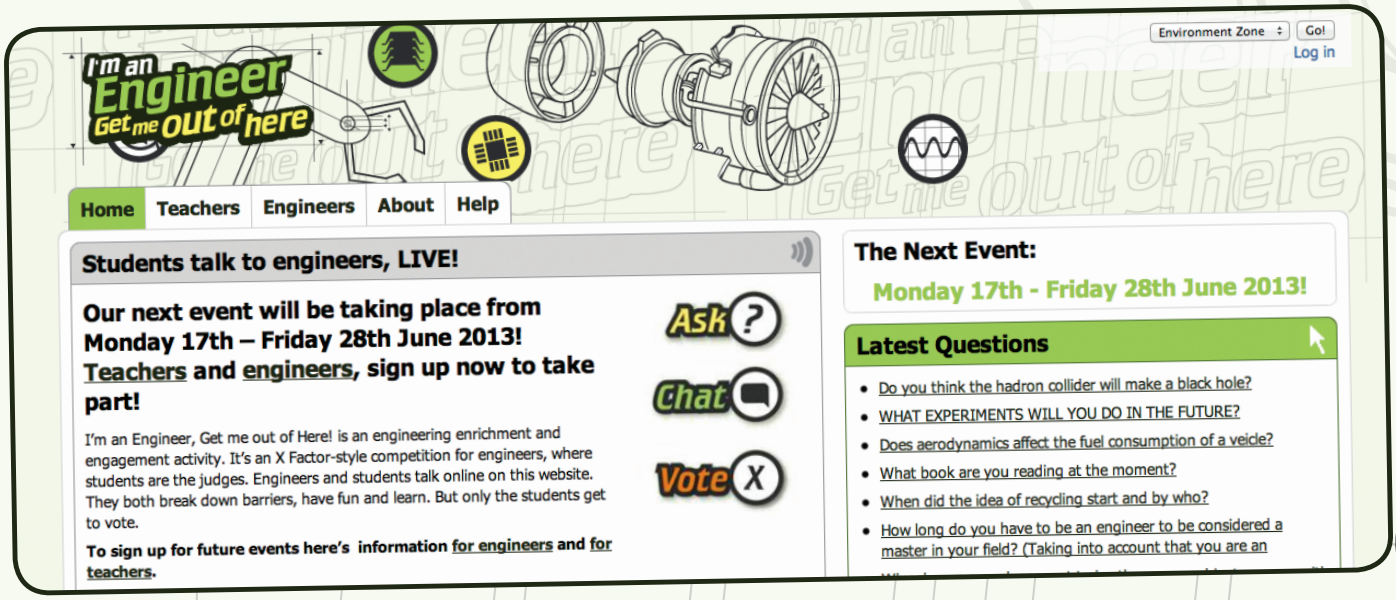
Before live chat lesson

- Book IT suite/provide internet access for students
- Book live chat - please use the online booking form at imanengineer.org.uk/live-chat.
- Do some preparation with your class (we suggest Lesson 1: You're the Judges! and Lesson 2: Meet the Engineers).

During lesson

Explain to your students that they are going to have an online Facebook-style chat with some real engineers. Please encourage them to interact with the engineers, and not just amongst themselves. Encourage students to express their opinions on the work that the engineers do. Tell them there will be a moderator in the chatroom who will help keep the conversation on track and will block disruptive pupils.

- Log in and use your Teacher account to join in the chat - anything you say will have a special teacher icon by it.
- Live chats are consistently the most popular part of the event – for students, for engineers, and even for teachers!
- They are fun and give immediate contact between engineers and students. Students realise engineers are 'real people' and feel connected to them.
- Many teachers tell us that quieter students are more active in live chats than face to face and it can be an interesting change to class dynamics.
- Don't be embarrassed if your class are boisterous or mess about. The moderators will deal with this.
- Remind your students to ask any questions the engineers didn't manage to answer during the chat under ASK, and to VOTE for their favourite engineer to make sure they stay in the competition.



Lesson Plan Summary

	Lesson	Learning Outcomes
1	***You're the Judges!*** Introduce I'm an Engineer then choose and rank criteria by which to judge the engineers.	• Consider ethical, social and practical aspects of engineering and technology. • Learn about real world applications and use of science, technology, engineering and maths.
2	***Meet the Engineers*** Get to know the engineers in your zone through engineering speed-dating, or an alternative version of Lesson 2 that doesn't involve student movement around the classroom.	• Select, organise and present information. • Evaluate information and make informed judgements from it • Learn about real world applications and use of science, technology, engineering and maths.
3	***Live chat*** 'Chat' to real engineers online in real time.	• Apply principles and concepts to unfamiliar situations • Make informed judgements • Learn about real world applications and use of science, technology, engineering and maths.

Notes

After the event

- Please do fill in the feedback survey we email you. You are the expert on what happened in your classroom. Your feedback will help us to continuously improve the event.
- Please also encourage your students to fill in the student survey on their profiles both before and after the event.
- In each zone the moderators pick a student winner (who they think has asked good questions and really engaged with the event). They get a certificate and a £20 WH Smith voucher. We'll let you know if this is one of your students.
- To help all the students feel they have done something important, we have created student participation certificates. Individual ones can be downloaded from the students' profile pages.

Putney High School taking part in I'm an Engineer

Contact

If you need any help please email admin@imanengineer.org.uk or call 01225 326892.

For further information please visit: imanengineer.org.uk/teachers