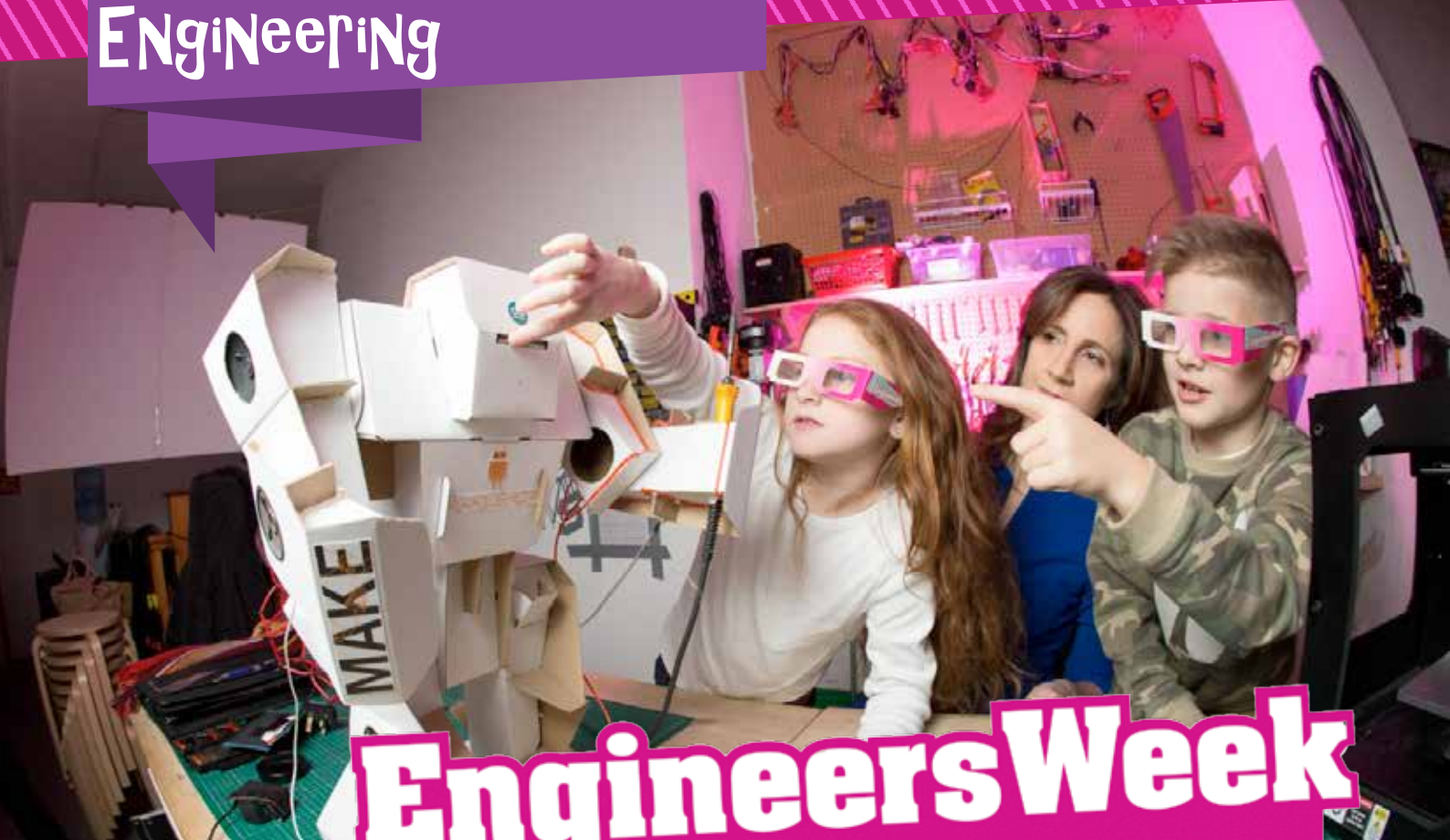


EXPLORING careers in ENGINEERING

Φ STEPS
ENGINEERS IRELAND



Engineers Week

4 - 10 March 2017

Exploring
STEM careers

SMART
FUTURES

www.smartfutures.ie

WWW.ENGINEERSWEEK.IE

INFO For teachers

Thank you so much for deciding to get involved in Engineers Week. Submit the details of any Engineers Week activities you and your class plan to complete on engineersweek.ie to receive an Engineers Week participation certificate!

Take part and Win!

1. Carry out the activities in this pack
2. Tweet us your photos #EngWeek17 or email: steps@engineersireland.ie

One of your students could win a prize by entering our photo competition!

IN THIS PACK YOU WILL FIND THE FOLLOWING:

Free printables:

1. 2017 Engineers Week parent and guardian letter
2. #ILookLikeAnEngineer handout
3. Engineering Your Future student handout
4. Research an engineering career handout
5. Engineering in your locality photo competition
6. Engineering design process poster
7. Recycled robots engineering challenge
8. Engineering challenge organiser

1. 2017 Engineers Week parent and guardian letter

The letter can be sent to parents telling them more about Engineers Week. The letter also gives suggestions on how parents can get involved and help you gather the materials you need for the Engineers Week challenge!

PRINT: The parent and guardian letter and send it home in advance of Engineers Week.

2. #ILOOlikeANEngineer

The #ILookLikeAnEngineer activity is a good opportunity to generate some discussion about who engineers are and find out what the class know about engineering.

PRINT: The activity sheet for each student in the class.

ASK: In teams, ask students to complete the questions.

RESPONSES: Get a volunteer from the class to record the feedback from the class. Compare responses from team, were there any trends?

EXPLAIN: Engineers are a community of creative professionals from various different backgrounds. Stereotypes are an overly simple picture or opinion of a person, group or thing. It is a stereotype to say all old people are forgetful. Stereotypes often exist with regards to engineering e.g. All engineers fix cars, when in actual fact there is a very diverse scope for a career path in engineering.

#ILookLikeAnEngineer: The image in the activity sheet shows Isis Anchalee, an engineer with a security company. Her image was used in an ad campaign. Gender stereotype comments appeared on social media dissecting her appearance. In response, Anchalee started up the Twitter hashtag #ILookLikeAnEngineer. Log onto Twitter and search for the hashtag.

3. Engineering Your Future Student Handout

EXPLAIN: That engineers bring dreams to life! Engineers take ideas and turn them into reality, using science, maths and imagination. Engineers are masters of problem-solving and creative design.

PRINT: The handout for each student in the class. The handout is perfect for increasing students' knowledge about engineering.

VISIT: steps.ie for more information about engineering.

4. Research an engineering career Handout

PRINT: The handout for each student in the class.

ASK: The students to complete the handout.

RESPONSES: Ask students to give feedback on the of engineering that interests and inspires them. Get a volunteer from the class to jot down the different types on the whiteboard.

5. Engineering in your Locality photo competition

PRINT: A handout for each student.

EXPLAIN: Engineering is all around us! From the phone in your pocket to the pen in your hand involved the work of engineers. Ask students to complete the handout, research Dargan, one of Ireland's greatest engineers and take a snapshot of engineering in action or an engineering monument or structure in your community. Tweet photos to #EngWeekPhoto and you could win a prize! Check out <http://www.engineersjournal.ie/2016/09/20/william-dargan-engineer-railway/> to find out more about William Dargan.

6. Engineering design process poster

The engineering design process is a series of steps that engineers follow to come up with a solution to a problem. Many times the solution involves designing a product.

THE BASIC STEPS IN THE ENGINEERING DESIGN PROCESS:

- Identify the problem. (Ask)
- Brainstorm solutions. (Imagine)
- Design, build and test a model. (Plan and create)
- Use results to improve the model. (Make it better)

PRINT: The engineering design poster and display on the white board. It is great to use with the robots challenge.

7. Recycled robots engineering challenge

Engineers love a challenge! The challenge gives students a chance to try out the engineering design process in the classroom. Challenges work best in teams!

8. Engineering challenge organiser

The challenge organiser is an easy to use organiser for the design cycle. It is perfect to use with the robots challenge.

1 2017 ENGINEERS WEEK PARENT LETTER

Dear Parents and Guardians,

Engineers Week is coming

Engineers Week is a week-long programme of nationwide events with the aim of celebrating the world of engineering in Ireland. Coordinated by the Engineers Ireland STEPS programme this week is an opportunity for everyone to raise awareness of the contribution of engineering to our society. It will be held in our school from Monday 6th to Friday 10th March 2017.

How can you be involved?

Throughout the week we will be exploring engineering careers, engineering in your local community, stereotypes in engineering and students will be working on creating a recycled robot. We need your help collecting materials. Here are some items we could use:

- Cardboard
- Cereal or shoe boxes
- Toilet paper tubes
- Pasta
- Buttons
- Bottle caps

#EngWeek17 events

All around Ireland people will be taking part in Engineers Week. To find out what events are happening in your local area, check out engineersweek.ie

#EngWeek17 activities

Download engineering activities from engineersweek.ie that you can do at home. The activities have clear instructions and can be used to investigate and observe engineering.

#EngWeek17 get INVOLVED IN STEM

In today's world we face a number of challenges, from climate change to the treatment of diseases. The world needs more problem solvers in science, technology, engineering and maths (STEM) to help find solutions. Check out www.smartfutures.ie for a list of STEM events and career resources.

Thank you for your support!

2 #ILOOLIKEANENGINEER

Engineers work in teams! In teams discuss the following:

1. What picture or description comes to mind when you hear the word engineer?
2. What are stereotypes? Who suffers or is impacted by them?
3. What's your attitude towards the image below?



4. Read stereotypes about engineering below. Write down what you think of each opinion?
 - Engineers have to get their hands dirty to fix things
 - Engineering is for men only
 - Engineering is boring
 - Engineers love maths
5. What other stereotypes do you think exist in relation to engineering?
6. What personality traits do engineers exhibit?
7. Is engineering understood by everyone in the community? Look at ways to your share your knowledge of engineering with other students in the school. Tweet #EngWeek17

ENGINEERING YOUR FUTURE

STUDENT GUIDE

ENGINEERS TAKE IDEAS AND TURN THEM INTO REALITY, USING SCIENCE, MATHS AND IMAGINATION. ENGINEERS ARE MASTERS OF PROBLEM-SOLVING AND CREATIVE DESIGN. AS A CAREER, ENGINEERING OFFERS A CHANCE TO MAKE A DIFFERENCE TO PEOPLE'S LIVES, WHILE YOU ENJOY A DYNAMIC AND VARIED WORKING LIFE.



Right now, engineers around the world are working on innovative projects from solar energy to synthetic organs, driverless cars to virtual reality headsets.

An engineering qualification offers a chance to do interesting work with interesting people, enhance people's lives, and explore almost unlimited career opportunities.

IS ENGINEERING FOR YOU?

- Are you naturally curious about how things work?
- Do you love solving problems?
- Do you enjoy making, breaking or designing things?
- Do you like the idea of working as part of a team?
- Are you competent* in mathematics?

If you answered yes to most of these questions, engineering might be right for you!

** While not necessarily excelling at mathematics, most engineers are comfortable with the subject. Many engineering courses offer extra maths support to students in First Year. Higher Level maths is not a requirement for every engineering course.*

HOW DO ENGINEERS MAKE A DIFFERENCE?



"Engineering gives me the ability to design the future. It allows me to help shape future technologies, from advanced forms of energy to cutting edge medical products - all to improve daily life around the globe."

Colin Keogh,
mechanical & energy engineer



"Engineering gives you the tools to problem-solve and allows you to work in any area, from producing a simple water filter in the African desert to building a rocket to send people to Mars".

Elaine Doyle,
manufacturing engineer



"I know when I go into work in the morning that I am helping someone's life. People are using our products all over the world."

Claire Lillis,
mechanical design engineer





A STRONG FOUNDATION FOR YOUR WORKING LIFE

ENGINEERING IS A BROAD, DIVERSE FIELD OF STUDY WITH MANY ENGINEERING DISCIPLINES INCLUDING:

- Aeronautical
- Biomedical
- Biosystems, agriculture and food
- Building services
- Chemical and process
- Civil
- Computer and software
- Electrical
- Electronic
- Environmental
- Manufacturing and industrial
- Materials
- Mechanical
- Mechatronic/electromechanical
- Structural

STUDYING ENGINEERING

You can choose a specialised course that reflects your interest in a particular area or, if you want to keep your options open, a general engineering degree will give you plenty of flexibility after graduation.



THINKING OF STUDYING ENGINEERING?

> CHECK YOUR COURSE IS ACCREDITED BY ENGINEERS IRELAND

Accreditation functions like a 'quality mark'. Graduation from an accredited course...

- enhances your employability
- assures international employers of the quality of your qualification
- smooths out the process of attaining a registered title (e.g. Chartered Engineer, Associate Engineer, Engineering Technician)

**CHECK YOUR CHOSEN COURSE IS ACCREDITED BEFORE APPLYING
- VISIT ENGINEERSIRELAND.IE/SERVICES**

ARE ENGINEERS IN DEMAND?

RIGHT NOW IN IRELAND:

- 105,000+ people work in the technology sector
- 250 medical technology companies employ 25,000 people
- 160 games companies employ 3,300 people

IRELAND IS HOME TO:

- nine of the top 10 software companies
- nine of the top 10 global pharmaceutical corporations
- 12 of the top 20 global internet firms
- seven of the top 10 industrial automation companies



REVIEW EACH COLLEGE PROSPECTUS CAREFULLY FOR A COMPLETE GUIDE TO YOUR CHOSEN COURSE

DO ENGINEERS GET TO TRAVEL MUCH?

Many engineers are required to travel for work, whether to visit different sites or to meet clients in various locations. Many large companies have international offices.



WHAT ELSE CAN YOU DO WITH AN ENGINEERING DEGREE?

Engineering gives the flexibility to explore many different career paths. Engineering students gain a valuable set of skills that serve as a strong career foundation. These skills are valued by all employers. In a US survey of the top 500 companies on the stock market, 33% of CEOs had an engineering degree.

I CAN'T DECIDE ON AN ENGINEERING DISCIPLINE. WHAT DO YOU ADVISE?

There are plenty of general engineering courses. You can then specialise in a particular area that interests you. Also, many courses offer general engineering for the first year or two.

WHAT DO ENGINEERS EARN?

According to Engineers Ireland, graduate engineers earn €28,000 and engineers with 3 years' experience earn €38,000.



steps.ie
smartfutures.ie



4 RESEARCH AN ENGINEERING CAREER HANDOUT

Name: _____

Date: _____

What type of engineer inspires you!

RESEARCH INSTRUCTIONS:

- Gathering information is important when making a career decision. Explore the different types of engineers.
- Use the resources mentioned below to help you explore.
- Your goal is to explore the different types of engineers e.g. biomedical engineer and choose the type that interests and inspires you the most.

USEFUL RESOURCES:

- www.steps.ie, your guide to engineering as a career.
- www.smartfutures.ie, you can find 150+ career stories under the "Who Works in STEM?" page.
- www.gradireland.ie, helps you find out from young engineers what it's all about.
- www.careersportal.ie, use the occupation search engine to explore engineering occupations.

INTERVIEW QUESTIONS WITH AN ENGINEER

Connect with an engineering professional and use the questions below to guide you through a conversation that will help you understand more about their career.

1. What type of engineer are you?
2. What does your company do?
3. What do you like most about your job?
4. What inspired you to become an engineer?
5. How do you spend most of your time?
6. What technology do you use for your job?
7. Do you work with other people? How?
8. What did you study at school and university to become an engineer?
9. Is it important to study maths and science for your job?
10. There are currently fewer women working in engineering than men. What would you say to girls who are interested in a career in engineering?
11. What has been your favourite project to work on?
12. Why should young people think about a career in engineering?
13. What do you like to do in your spare time?

Engineering careers

_____ type OF engineer INspires Me

I AM CHOOSING THIS engineer
because

THree tasks that this
engineer WOULD perFORM in a
typical day

1.

2.

3.

Engineering My
Future

What I Need to Study to become
this type OF engineer?

COMPANIES Where I COULD WORK as this type OF engineer

Other inFOrmation that I Have FOUND related to engineering that is interesting to
KNOW

5 ENGINEERING IN YOUR LOCALITY PHOTO COMPETITION



RESEARCH

This photo is taken outside the National Gallery of Ireland.

Do you know who Dargan is? Research Dargan and find out what he specialised in?

CAPTURE

There is a wide variety of engineering in your locality, take a photo that showcases engineering in your locality. The photo can include any aspect of engineering so be creative!

COMPETITION

Through your schools Twitter account, tweet your photos using the #EngWeekPhoto and @engineerireland for your chance to win a tablet with your name and school name before the closing date of Friday 17th March. Please see engineersweek.ie for full instructions and complete terms and conditions.

6. ENGINEERING DESIGN PROCESS POSTER



ASK

What's the challenge?
How can you solve it?



IMAGINE

What are some solutions?
Brainstorm ideas with your team



PLAN AND CREATE

Make a drawing.
Use your plan to test your
ideas with your team



IMPROVE

Think about what could work better.
Modify your design and try again!

7. RECYCLED ROBOTS ENGINEERING CHALLENGE

Teacher Directions

HERE'S WHAT YOU NEED:

- Cardboard
- Small boxes for body and head
- Cereal box
- Bottle caps
- Pasta
- Glue
- Buttons
- Scissors
- Paints

PREPARATION:

- Gather materials
- Give each team cardboard boxes, recycled materials, glue and paint
- Provide a flat surface for making the robots

CHALLENGE GOAL:

Students will design and make cool robots using recycled materials. Students will then design and create a robot to perform a specific task.

A. Recycled Robots

Robotics engineers are responsible for creating robots and robotic systems that are able to perform duties that humans are either unable or prefer not to complete.

Celebrate Engineers Week and make an #engweek17 Robot.

CHALLENGE INSTRUCTIONS:

- Your goal is to make a robot using recycled material provided.
- Cut a very large square piece of cardboard and paint it any way you like.
- Create your robot using box lids for the body and arms and legs cut from cereal boxes.
- Decorate using assortment of materials (plastic bottles, boxes, tinfoil, kitchen paper tubes, egg cartons etc.) Be creative!
- Glue your robot in place

B. Robots with specific tasks

Engineers work in teams to design, test and improve on their ideas.

Can you design and build a robot that will perform a specific task?

CHALLENGE INSTRUCTIONS:

- Your goal is to work in teams to create a robot that will perform a task.
- Think about what task you would like your robot to perform. Use the internet or books to carry out research.
- Construct robot on a flat surface using the materials supplied.
- Be creative when completing this challenge.

8. ENGINEERING CHALLENGE ORGANISER

Name: _____

Date: _____

What's needed For today's challenge?

Problem solving
Creative thinking

Team work
Communication

What is today's challenge?

What ideas do you have For completing the challenge?

DeSign it!

What can We change to Make it better?

What Worked Well?

What didn't Work Well?