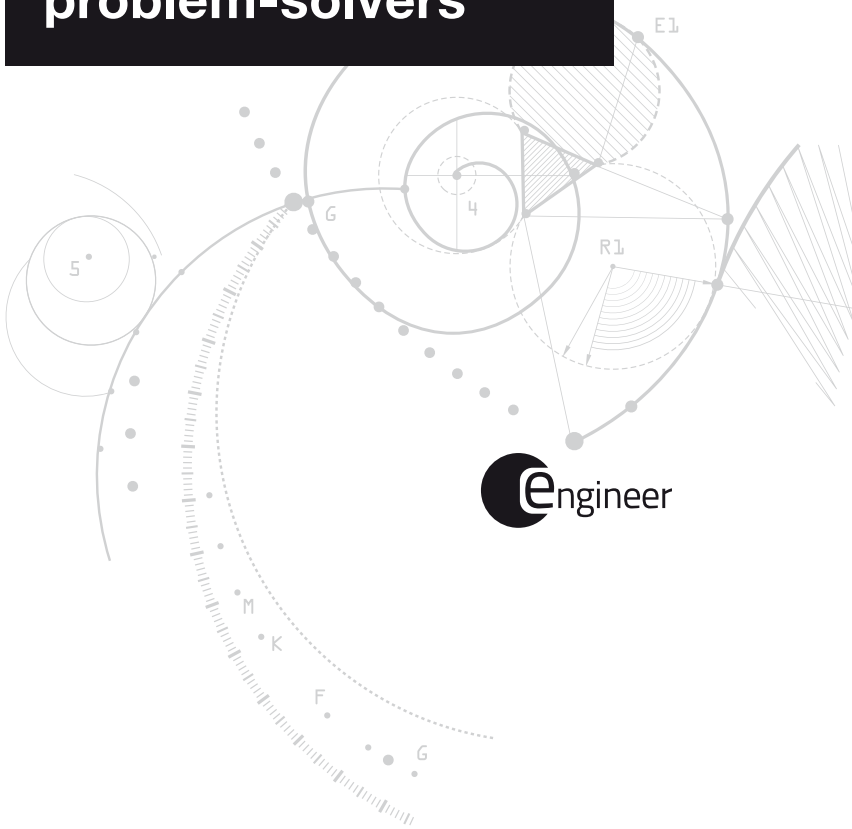
ENGINEERing Europe's next generation of innovators and problem-solvers



engineer

www.engineer-project.eu

“Any project which enthuses young people for engineering is worth doing. Engineering is the link between science and the economy and we need our best young people to consider this as a career”

Professor **Anne Glover**,
Chief Scientific Advisor to the President,
European Commission

ENGINEER

A shortage of skilled labour in science and engineering is halting economic growth in Europe according to Business Europe, which represents more than 20 million companies in 35 countries.

The European project ENGINEER is addressing the shortfall in expertise by introducing 1,000 teachers and 27,000 students from primary schools across Europe to the problem solving principles of engineering. Twenty-six institutions from twelve countries have committed to this challenging initiative of inspiring children to choose engineering for learning and fun.

Our ambitious goal is to introduce engineering into primary school and museum programmes throughout Europe and inspire the next generation of innovators and problem-solvers. If you can help us engineer this change, fold the paper plane and let it fly.

”My students didn’t just like the activities – they loved them.”

Teacher participating in ENGINEER

Why engineering? The numbers tell the story

Growing demand: Society is led by technology and engineers are crucial to moving technology forward. Technicians and engineers will be Europe's most employed group by 2020 with 18.1 per cent of total employment [1].

Low output: Only 12 per cent of all university and college graduates in Europe major in engineering – a figure that dropped by two per cent since 2000 [2].

An ageing population: By 2020, more of Europe's population will be over 65 compared to 2010 and most of these people will no longer be in the labour force. Increases in the working population will be concentrated on those over age 45 who will account for 42 per cent of the labour force in 2020, compared to 39 per cent in 2010 [3].

Gender imbalance: only one in six engineers is female [4].

1
Future skills supply and demand in Europe. Forecast 2012, Research paper No 26, Cedefop

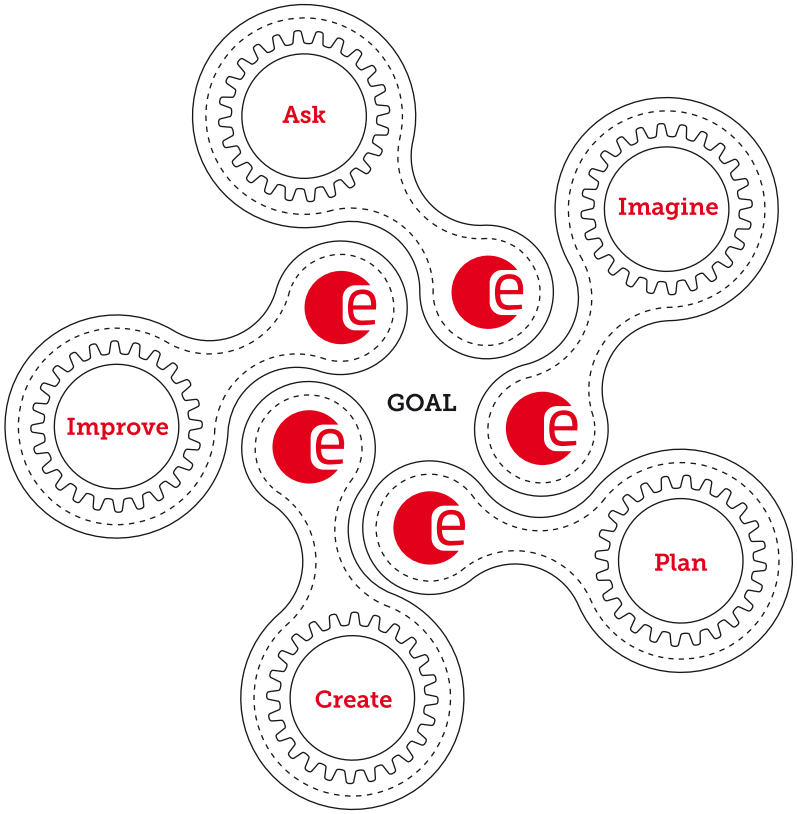
2
Key Data on Education in Europe 2012 and Key Data on Education in Europe 2002, EURYDICE

3
Future skills supply and demand in Europe. Forecast 2012, Research paper No 26, Cedefop

4
European Engineering Report, 2009, VDI in cooperation with Institut der deutschen Wirtschaft Köln

"The shortage of engineering graduates is becoming a serious problem. We need to find innovative ways to get kids excited about engineering – so much so as to inspire them to study it in university. Introducing engineering into primary schools is a good place to start building a solution. Industry, policy makers and educators need to work together to make change happen."

Maxine Fassberg,
Intel Vice President, Technology and Manufacturing Group, Fab 28 Plant Manager, General Manager, Intel



Engineering Design Process

How does ENGINEER work?

Ten engineering challenges have been developed by science museum specialists and school teachers in ten different disciplines. Students follow a five-step design process using engineering principles to solve simple problems such as building a glider to carry messages between friends or constructing a system to water plants. They start with investigating the problem and looking at the science needed to solve it. Then applying this knowledge, they design and create solutions to an engineering problem.

Engineering challenges available to use for free
Target: 9-12 years old

1 **Huff and puff**: Designing a device for measuring exhalation volume
2 **A fine balance**: Building a hanging sculpture
3 **Knee deep**: Designing and constructing a water pond
4 **High and dry**: Protecting objects on a floating platform
5 **Music to the ears**: Designing and creating a sound generator
6 **Suck it up**: Designing a contraption that sucks up debris
7 **Life support**: Direct water flow to plants
8 **Frisky feet**: Winter-proof a pair of shoes
9 **Popular mechanics**: Becoming a designer of machines
10 **High flyers**: Building a glider with everyday materials

Success indicators

ENGINEER is a new European project based on the successful Engineering is Elementary® (EiE®) model of the Museum of Science in Boston, USA. The programme has found its way into the school curricula in all 50 US states, benefiting 4.5 million students.

Notable EiE® programme observations are[5]:

- Both girls and boys were significantly more likely to report engineering as a potential career
- Major improvements in student problem-solving assessments
- Increased interest in engineering and science
- Better grasp of what engineers do and in which fields they work
- EiE® is effective for all students regardless of their academic achievement level, gender, or cultural background.
- Student engagement and performance in EiE® ranked higher than in science

5

Research and Evaluation Results for the EiE ProjectAn Executive Summary of the First Eight Years, 2012

“It was a project that brought us all together and taught us a very important lesson; when we work together, we can make everything happen”.

Student participating in ENGINEER

“Israel supports the ENGINEER project because we believe in the need to educate children about the human-made world we live in. Moreover, we believe that ENGINEER can be an enjoyable and an effective way to inspire pupils, to raise their motivation, and to promote involvement in meaningful ways, through deep cognitive, social and emotional learning experiences, of contents and skills in science & technology that are needed for the 21st century”

Shoshy Cohen,
Director of Science Unit, and
Chief Inspector of Science and Technology Instruction
At the Science & Technology Administration Ministry of Education Israel

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Contacts in ten countries

Like what you’ve read and want to find out more? Please get in touch with the ENGINEER contact person in your country, listed below. For general inquiries, contact Ecsite, the European network of science centres and museums: info@ecsite.eu.

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Ioannis Miaoulis,
President and Director of
the Museum of Science, Boston
'Holistic Engineering Education'

"Students in middle school can spend weeks learning how a volcano works, and no time understanding how a car works. How often will they find themselves in a volcano compared to a car? Understanding the natural world is essential, but ignoring the engineered world which forms about 95 per cent of our day to day experience is simply wrong."

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