Soil savers

An ICE do-at-home activity for ages 4-18

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Background

This activity helps young people understand that civil engineers work on large projects that help us in our day to day lives and help protect the environment.

Civil engineers design and build structures that make our modern lives possible, from supply pipelines that give you clean water to brush your teeth, to the bridges and road we use on a car journey – these things are only possible due to the work of civil engineers.

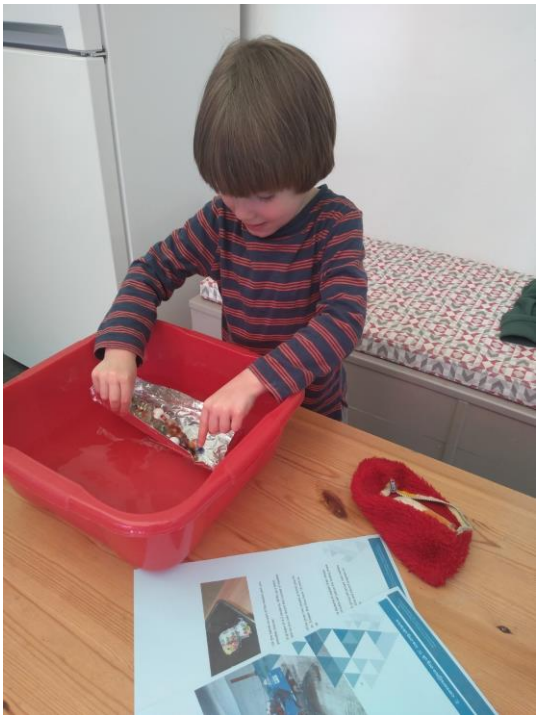
Crossrail is a large civil engineering project in London that will help people get to work by building new underground train lines across the city. To do this, civil engineers use massive machines called Tunnel Boring Machines (TBMs) to dig out huge underground tunnels.

Digging large tunnels produces lots of rock and soil – which engineers call spoil. This has to go somewhere! The spoil from the Crossrail project was taken by boat down the River Thames to an island in the county of Essex to create new habitats for wildlife at the RSPB Wallasea Island nature reserve.

What you'll need

Suggested resources – but feel free to use similar alternatives.
A bag of marbles (or a bag of coins)
A large tub filled halfway with water
A sheet(s) of tinfoil (ideally 30 cm x 30 cm)
Newspaper or a cloth to mop up any spills/splashes

The challenge



It's your job to design a boat that can carry heavy spoil a long way. Use the tinfoil to fashion a craft (you can have a practice go if you have a spare sheet) that can hold as many marbles as possible without sinking. Your boat should stay afloat for at least one minute.

If there is more than one person taking part then why not try a competition to see whose boat can stay afloat the longest with the same number of marbles?

For 11-16 year olds

Can you work out what force the spoil (marbles your boat is carrying) in cm2 is exerting on the water using the formula below? You'll need some weighing scales to weigh your load and a ruler to measure the boat.

Pressure = weight / area

For 16-18 year olds

Can you calculate the volume of your 'spoil' (the marble load) by using the formula below?

Volume of a sphere equation: $V = 4/3\ \pi r3$

Tell us what you thought!

Email us at **careers@ice.org.uk** or write a comment or post on the ICE@schools Twitter.

More resources on civil engineering

Careers advice for becoming a civil engineer: **ice.org.uk/beacivilengineer**

Careers and activity resources on our website: **ice.org.uk/educationresources**

Civil engineering project case studies: **ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do**

Civil engineer (people) case studies: **ice.org.uk/what-is-civil-engineering/who-are-civil-engineers**

Info about all types of engineering careers (not just civil)**:** Tomorrow's Engineers **tomorrowsengineers.org.uk**