



GEOLOGY

HPC Inspire

We're Hinkley Point C's Education Programme in Somerset and the wider South West region. And we're here to help young people at school or college learn about the huge opportunities the construction and operation of Hinkley Point C has to offer them.

www.edfenergy.com/hpcinspire

Subjects

This activity supports curriculum learning at Key Stages 3 and 4:

- ▶ Geography
- ▶ Chemistry
- ▶ Combined Sciences

Part 1: Geology at Hinkley Point C

Watch **this film** to learn more about the importance of understanding geology when excavating tunnels.

Q. What is Rachel's job title?

A. _____

Q. Why are tunnels so important to a nuclear power station?

A. _____

Did you know?

“ We have the same rock type at Hinkley Point C as you find at Lyme Regis. ”

Q. How many tunnels are there at Hinkley Point C?

A. _____

Q. What rocks are there at Hinkley Point C?

A. _____

Q. What makes it complex to tunnel through the rocks on site?

A. _____

Q. How do geologists know what rocks they are excavating?

A. _____

Q. What did Rachel study to get into a geology career?

A. _____

Rachel says:



“ We’re fortunate in the UK to have a diverse geology, with igneous, sedimentary and metamorphic rocks. It means every site you work on is completely different. ”

Part 2: Follow up activities

(see the Useful links section or search online if stuck)

Q1. Can you give a definition for the following types of rocks?

A.

Igneous: _____

Sedimentary: _____

Metamorphic: _____

Q2. Complete the table below:

A.

Rock characteristics	Mudstone	Limestone
Type of rock		
Appearance and touch		
Contains fossils?		
Formed in a marine or estuary environment?		

Q. Which is stronger: limestone or mudstone?

A. _____

Did you know?

“ It’s complex to bore through sedimentary rocks because they’re layered – and each layer has a different strength. So the tunnel boring machine has to accommodate these. But it’s not just the strength of the rock we’re interested in; we also want to know about any fractures in the rocks. Because these let through water, which changes the pressure of the environment and determines how quickly the machine can work. ”



Part 3: Careers in geology

Complete the fact file below.

Rachel says:



“ Depending on which area of geology you want to go into, I recommend studying Chemistry and Physics. ”

Geoscientist / Geologist fact file: <https://nationalcareers.service.gov.uk/job-profiles/geoscientist>

<p>What do geoscientists / geologists do?</p>	
<p>What are some of a geoscientist’s day-to-day tasks?</p>	
<p>What salary range can you earn?</p>	
<p>What is the route into this role?</p>	





Q4. What does Gemma enjoy most about the job?

A. _____

Q5. Name at least TWO of the extra training courses Gemma's done in her career.

A. _____

Q6. Write down at least ONE piece of advice Gemma has for anyone who wants to work in geology.

A. _____



Geotechnical SME

Read **this interview** with Gemma Sherwood (Rachel's predecessor!) then answer the following questions on being a Geotechnical Subject Matter Expert (SME).

Q1. What are some of the things a Geotechnical Subject Matter Expert (SME) does in their job?

A. _____

Q2. What did Gemma study to become a Geotechnical SME?

A. _____

Q3. Name three skills/behaviours Gemma thinks are important for the job.

A. _____

Further reading:**Careers in geology:**

<https://www.geolsoc.org.uk/Geology-Career-Pathways/Careers>

An interview with an Engineering Geologist:

<https://www.geolsoc.org.uk/Geology-Career-Pathways/Careers/Career-Profiles/Engineering-Geologist-3>

The rock cycle (KS3):

<https://www.geolsoc.org.uk/ks3/gsl/education/resources/rockcycle.html>

Types of rocks:

<https://www.thegeographeronline.net/rocky-landscapes.html>

Rock landscapes (GCSE – Geography):

<https://www.bbc.co.uk/bitesize/topics/ztd7ty>

The formation of sedimentary rock (GCSE – Chemistry):

<https://www.bbc.co.uk/bitesize/clips/zpmcd2p>

More on mudstone:

https://flexiblelearning.auckland.ac.nz/rocks_minerals/rocks/mudstone.html and <https://geologyscience.com/rocks/sedimentary-rocks/mudstone/>

Next steps:**More films on jobs and apprenticeships at Hinkley Point C:**

https://www.youtube.com/playlist?list=PLXeIrBe86r_Kg8-XGXzarZelevl3TyCGi

Young HPC – our skills development programme for 16-21 year olds:

www.edfenergy.com/younghpc

Young HPC toolbox – careers advice and tools:

<https://www.edfenergy.com/energy/nuclear-new-build-projects/hinkley-point-c/education-and-skills/young-hpc/tool-box>

Jobs and training at Hinkley Point C:

<https://www.edfenergy.com/energy/nuclear-new-build-projects/hinkley-point-c/jobs-and-training>
HPC Jobs Service – sign up for job alerts and learn about different roles at HPC (post-16s only): <https://hpcjobsservice.edfenergy.com>





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- ▶ Geography
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- ▶ Combined Sciences

Part 1: Geology at Hinkley Point C

Watch **this film** to learn more about the importance of understanding geology when excavating tunnels.

Q. What is Rachel's job title?

A. Geotechnical Subject Matter Expert (SME) in tunnelling.

Q. Why are tunnels so important to a nuclear power station?

A. They bring cooling water in to condense the steam from the turbines and turn it into water again. The hot water is then pumped out to sea and the process begins again!

Did you know?

“ We have the same rock type at Hinkley Point C as you find at Lyme Regis. ”

Q. How many tunnels are there at Hinkley Point C?

A. Three: two intake tunnels and one outfall tunnel.

Q. What rocks are there at Hinkley Point C?

A. There are different sedimentary rocks: mainly mudstones and limestones.

Q. What makes it complex to tunnel through the rocks on site?

A. Mudstone and limestone have different properties.

Q. How do geologists know what rocks they are excavating?

A. They carry out site investigations before any digging begins. This involves drilling boreholes out at sea to bring up rock cores. These are then analysed so the geologists know what type of rocks are below ground.

Q. What did Rachel study to get into a geology career?

A. Geology – at GCSE, A-Level and university!

Rachel says:



“ We’re fortunate in the UK to have a diverse geology, with igneous, sedimentary and metamorphic rocks. It means every site you work on is completely different. ”

Part 2: Follow up activities

(see the **Useful links** section or search online if stuck)

Q1. Can you give a definition for the following types of rocks?

A.

Igneous: Formed from molten rock.

Sedimentary: Formed from sediment grains – deposited by water, wind or ice – that join together.

Metamorphic: Former igneous or sedimentary rocks that changed (‘metamorphosed’) due to heat and/or pressure.

Q2. Complete the table below:

A.

Rock characteristics	Mudstone	Limestone
Type of rock	Sedimentary	Sedimentary
Appearance and touch	<ul style="list-style-type: none"> ▶ Variable colour – black, blue, brown, grey, red ▶ Formed from tiny clay particles ▶ Smooth to touch 	<ul style="list-style-type: none"> ▶ Usually white/ yellow, through to grey ▶ Formed in layers ▶ Grainy to touch
Contains fossils?	Yes	Yes
Formed in a marine or estuary environment?	Usually estuary	Mostly marine

Q. Which is stronger: limestone or mudstone?

A. Limestone.

Did you know?

“ It’s complex to bore through sedimentary rocks because they’re layered – and each layer has a different strength. So the tunnel boring machine has to accommodate these. But it’s not just the strength of the rock we’re interested in; we also want to know about any fractures in the rocks. Because these let through water, which changes the pressure of the environment and determines how quickly the machine can work. ”



Part 3: Careers in geology

Complete the fact file below.

Rachel says:



“ Depending on which area of geology you want to go into, I recommend studying Chemistry and Physics. ”

Geoscientist / Geologist fact file: <https://nationalcareers.service.gov.uk/job-profiles/geoscientist>

<p>What do geoscientists / geologists do?</p>	<p>Geoscientists study the Earth’s structure and formation, and analyse rocks to explore its natural mineral and energy resources.</p>
<p>What are some of a geoscientist’s day-to-day tasks?</p>	<p>In the field you could:</p> <ul style="list-style-type: none"> ▶ Travel to investigate rocks in their natural setting ▶ Assess the ground for suitability on engineering projects like dam or tunnel building ▶ Sample rocks and record information to search for energy resources and minerals, like water, gas and oil ▶ Study volcanic and seismic activity to develop early warning systems for communities living close to earthquake zones ▶ Supervise site teams ▶ Advise on suitable sites for landfill or storage of nuclear waste. <p>In the laboratory you could:</p> <ul style="list-style-type: none"> ▶ Use a microscope to study rock samples ▶ Test for things like strength or pollution levels ▶ Use software modelling programmes ▶ Analyse data and write reports.
<p>What salary range can you earn?</p>	<p>Between £28,000 as a starting salary; up to £42,000 when you have more experience.</p>
<p>What is the route into this role?</p>	<p>To work as a professional geoscientist you need a degree in a relevant subject.</p> <p>It’s becoming more common for new entrants to hold or be working towards postgraduate qualifications like an MSc or PhD.</p>





Geotechnical SME

Read **this interview** with Gemma Sherwood (Rachel's predecessor!) then answer the following questions on being a Geotechnical Subject Matter Expert (SME).

Q1. What are some of the things a Geotechnical Subject Matter Expert (SME) does in their job?

- A.** Choose from the following:
- ▶ Answer technical queries from contractors
 - ▶ Undertake geological field work for the construction records of the nuclear power station
 - ▶ Supervise mapping and logging of vertical slopes and horizontal formations, looking at the geology and hydrogeology
 - ▶ Work in other areas of geology, such as the backfill around buildings using engineered site won material and the tunnelling works.

Q2. What did Gemma study to become a Geotechnical SME?

A. A-Levels in Geography, Chemistry and Biology; an MSc in Geology; MSc in Geotechnical Engineering; and Chartered Geologist (CGeol).

Q3. Name three skills/behaviours Gemma thinks are important for the job.

- A.**
- ▶ Enthusiasm
 - ▶ A willingness to try new things
 - ▶ A proactive attitude

Q4. What does Gemma enjoy most about the job?

A. The variety: challenging her brain with technical queries and interpretative reporting, as well as field work and site supervision.

Q5. Name at least TWO of the extra training courses Gemma's done in her career.

- A.** Choose from the following:
- ▶ Speed boat driving
 - ▶ Working at height
 - ▶ Driving a cherry-picker
 - ▶ Escaping from a helicopter crash in the sea
 - ▶ MSc in Geotechnical Engineering
 - ▶ Tunnelling

Q6. Write down at least ONE piece of advice Gemma has for anyone who wants to work in geology.

- A.** Choose from the following:
1. Study Maths A-Level
 2. Keep an open mind when looking for a job, as there are so many different paths in industry and academia that you can take with a Geology degree.



Further reading:**Careers in geology:**

<https://www.geolsoc.org.uk/Geology-Career-Pathways/Careers>

An interview with an Engineering Geologist:

<https://www.geolsoc.org.uk/Geology-Career-Pathways/Careers/Career-Profiles/Engineering-Geologist-3>

The rock cycle (KS3):

<https://www.geolsoc.org.uk/ks3/gsl/education/resources/rockcycle.html>

Types of rocks:

<https://www.thegeographeronline.net/rocky-landscapes.html>

Rock landscapes (GCSE – Geography):

<https://www.bbc.co.uk/bitesize/topics/ztbd7ty>

The formation of sedimentary rock (GCSE – Chemistry):

<https://www.bbc.co.uk/bitesize/clips/zpmcd2p>

More on mudstone:

https://flexiblelearning.auckland.ac.nz/rocks_minerals/rocks/mudstone.html and <https://geologyscience.com/rocks/sedimentary-rocks/mudstone/>

Next steps:**More films on jobs and apprenticeships at Hinkley Point C:**

https://www.youtube.com/playlist?list=PLXeIrBe86r_Kg8-XGXzarZelevl3TyCGi

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Young HPC toolbox – careers advice and tools:

<https://www.edfenergy.com/energy/nuclear-new-build-projects/hinkley-point-c/education-and-skills/young-hpc/tool-box>

Jobs and training at Hinkley Point C:

<https://www.edfenergy.com/energy/nuclear-new-build-projects/hinkley-point-c/jobs-and-training>
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