



MINE OF INFORMATION

@NatMiningMuseum



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WELCOME

Dig deep and have fun learning about your mining past in this educational resource.

National Mining Museum Scotland

#MuseumsFromHome

#HeritageAtHome

#HomeLearning #GoIndustrial

Contents: Topic 1 – Rocks, Fossils & Energy



Introduction

National Mining Museum Scotland is a Registered Scottish Charity. Our mission is to preserve and promote Scotland’s mining history and heritage for current and future generations. This resource has been created for educational purposes only in order to support families and learners during these unprecedented times.

In each of our resource packs we have included:

- Section 1: Facts!
- Section 2: Related, fun and hands-on **activities** you can do at home
- Section 3: Wellbeing Check-In
- Section 4: Link to Awards you can achieve!

Our activities include a mix of STEM, Social Studies, Arts & Crafts and outdoor learning topics. Our intention is for the whole family to be able to take part in at least one activity per section – no matter your age!

As a charity we are reliant on admission, shop and café sales so while the Museum is closed due to Covid-19 restrictions, please consider supporting us by donating the cost of entry here: <https://buff.ly/2WIIJR5>

Subjects Include:

Topic 1: Rocks, Fossils and Energy

Topic 2: Victorian Miners

Topic 3: Coalmine Detectives

Wellbeing Check-In

This is an uncertain time for us all and it’s ok to not always feel ok. Before starting this resource, and at the end, why not complete a Wellbeing sheet to see how you are feeling. If you don’t feel great, we have loads of suggested activities you can do in Section 3.

Awards

You are doing such great work, so why not apply for an Award?! Please see Section 4 for how to apply to us for your own “Mine of Information” certificate or how to apply to Archaeology Scotland for your Heritage Hero Award.

Section 1: Rocks, Fossils & Energy

Fact Sheets



Photo: Fossil Detectives workshop at National Mining Museum Scotland. Full list of school and family workshops/events can be found on our Facebook page or website.

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Section 1:

Rocks

Before we look at coalmining, we first need to discover what coal is!



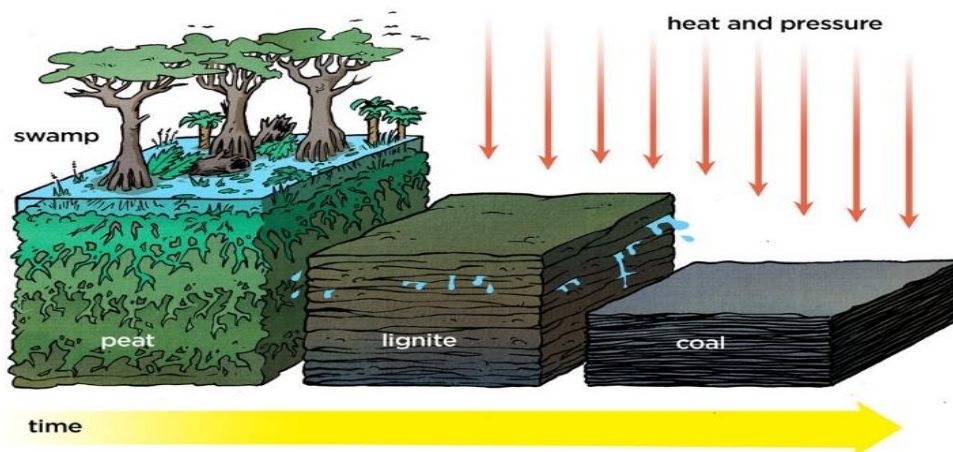
Question: What do you think coal is made from?

Answer:

Answer: read our facts below to find out if you were correct!

Formation of Coal

Coal is formed during the CARBONIFEROUS period and takes around 350 million years to form. Coal was formed from dead plants and trees. These remains were tapped on the bottom on swamps, building up layer after layer, creating a dense material called **peat**. As the peat was buried deeper underground, the high temperatures and pressure, transformed it into **coal**.



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Fossil Fuels

Coal, crude oil and gas are all known as fossil fuels. They were formed over millions of years and where coal was formed from dead plants and trees, crude oil and gas were formed from dead marine organisms. Fossil fuels are **non-renewable**. They took a very long time to form and we are using them up faster than they can be replaced – once they have all been used up, they cannot be replaced.



Activity Sheet: Cookie Coal Mining

What is Coal Used For?

We've learned that coal is a non-renewable energy source. But what did we use coal for? Answer yes or no against the possible uses for coal listed below:*

Use	Yes or No
Fire – for heating homes, light & cooking	
Steam Trains	
Factories – Victorian era manufacturing	
Coal Power Stations – electricity	
Production of steel	
Cement manufacturing	

Steam Trains

Did you know - we have two newly conserved steam trains at the Museum, one of them is pictured below, as well as Europe's largest winding engine. See our video of the Winding Engine in action here on our website: <https://nationalminingmuseum.com/collection/films/>

For more learning resources on James Watt, who improved the Newcomen steam engine with his Watt steam engine in 1776, we recommend:

Activities and info: [James Watt 2019 website](#) or video about the life of James Watt: [BBC Discovery Video](#)



Activity Sheet: Steam Trains

Energy

Scotland's last, deep, coalmine closed in 2002 at Longannet and, in 2016, Longannet Coal Power Station, Scotland's last coal power station, also closed. Scotland is now moving towards more renewable sources of energy! **Renewable energy** is energy that can be produced and used again and again. These include wind, solar and hydro!

There are many online learning resources on renewable energy including the below from the British Wind Energy Association on wind turbines:

http://www.theorganicfarmshop.co.uk/downloads/BWEA_School_Pack.pdf

Activity Sheet: Make Your Own Wind Turbine

***Well done if you said yes to all the suggested uses for coal! Can you think of any others?**

Fossils

Let's travel back millions of years – we know coal was formed during the Carboniferous period but do you think coal is older than the dinosaurs?

Yes! It is older! Dinosaurs walked the Earth about 200-250 million years ago during the JURASSIC period.

When digging down to get coal we have come across many fossils. Keep your eyes peeled on your next visit to National Mining Museum Scotland to see some.



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Activity Sheet: Science Experiment – Fossils and Coal Formation

Fossils Facts

- Fossils can give scientists clues about animals and plants that lived a long, long time ago
- Fossils are the remains of ancient animals and plants, the traces or impressions of living things (like leaf or footprints) or the traces of their activities
- The word fossil comes from the Latin word *fossilis*, meaning “dug up”
- Most fossils are excavated from sedimentary rock layers (sedimentary rock is rock that has formed from sediment, like sand, mud and small pieces of rock).
 - Why not try find different types of rock in your garden? Sandstone is a great example of sedimentary rock!
- The fossil of a bone does NOT have any bone in it! A fossilized object has the same shape as the original object but is chemically more like a rock.
- The scientists who study fossils are called Palaeontologists. They work at dig sites looking for fossils and prehistoric remains.

Digital Game

Have fun while you discover more about the dinosaurs! We love this online game created by BBC Bitesize where you must work scientifically and collect stickers to become a dino-expert! Visit: <https://www.bbc.co.uk/bitesize/topics/zdp4382/articles/znc3y9q>



Activity Sheets: Dino Detectives

Section2:

Activity Sheets



Photo: Tour Guide, John Kane, at the Lady Victoria Colliery Pithead within the National Mining Museum Scotland.

Activity Sheet: Cookie Coal Mining

Carry out some scientific enquiry with this fun (and delicious!) experiment that everyone can take part in.

Concepts:

Coal is a natural resource, mined from the Earth, and there are many pros and cons to using it. It is a reliable but non-renewable energy source. Even though we are not likely to run out for a long while, once it is gone it would take a very long time to make more. Some places in Earth have more coal than others and some places have coal that is easier to mine than others. Coal on the surface is easier and safer to mine than coal that is underground.

What do you need:

- 1 soft/chewie chocolate chip cookie each
- 1 hard/crumblly chocolate chip cookie each
- 1 toothpick (or opened paper clip)
- 1 piece of paper



What to do:

1. Explain that coal was formed from plants that lived millions of year ago. It was due to time, heat and pressure that these dead plants and trees changed into coal.
2. Discuss – what do we use coal for? No more coal power stations – is this a good or bad thing, i.e. air pollution but it was a reliable and fairly cheap energy source. Remember coal is non-renewable – once we use it, we cannot make more of it.
3. Explain that coal is buried underground. When coal is mined, the land that coal came from must be reclaimed so that people can use the land again. There are many examples across Scotland of coalmine sites being turned into industrial or housing estates.
4. Explain that you will be comparing two different land sites containing coal. They will mine the coal from each piece of land.
5. Show everyone their “land” (cookies) and “mining equipment” (toothpicks). Don’t eat the cookies during mining! Decide which cookie is A and which is B.
6. Divide your paper in half and trace the outline of cookie A on one side and cookie B on the other. Map the location of the chocolate chips you can see on the top.
7. Count the number of chips you can see on the top and sides of the cookie. Record this number at the bottom of your page.
8. Using ONLY the toothpick, carefully mine as many chocolate chips as you can from the cookie. Set the chips aside in a pile (your bing!). Count the number of chips mined from the cookie. Record the number at the bottom of the page too.
9. Put the cookie back together without the choc chips. Compare to your map of the cookie.
10. Repeat the procedure for cookie B.
11. Questions:
 - a. Which cookie was easier to mine and why?

- b. Which type of cookie contained the most coal (chips)? (Discussion – how this compares with coal resources, do some areas have coal that is easier to mine than others, do some area have more coal than others?)
- c. Was it easier to mine coal (chips) on the surface of the cookie or inside the cookie? (Why not look online at the difference between deep coalmining and opencast mining.)
- d. Discuss if their reclaimed cookies (once put back together) looked like the original cookie? Why was it still important to put the cookie back together, what is the impact of coal mining on our landscapes and environment?

12. Enjoy eating your cookies!



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Add to The Fun With MATHS

Work on your numeracy skills by adding in the costs of cookie coal mining!
Calculate your profit and loss for your coal mining adventure.

Costs:

Each person starts with £20.

Loss Activity	Cost
Cookie A	- £5
Cookie B	- £7
Toothpick	- £2
Replacement toothpick	- £2

Profit Activity	Cost
Per chocolate chip	£2
Broken chocolate chip	£1
Return cookie back to original shape	£2 per quarter of circle filled

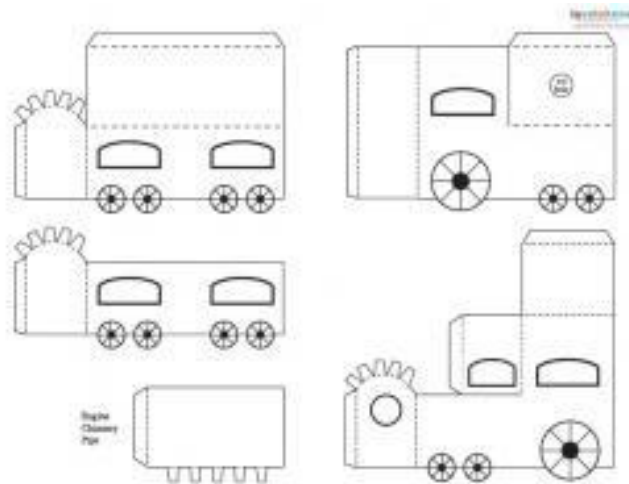
Calculate your total to determine if your coalmine was profitable!

Activity Sheet: Full STEAM Ahead! Steam Trains

During your next visit to NMMS, make sure to go and see our two newly conserved steam locos or enjoy a guided tour and see Europe's largest Winding Engine in action! Read more about the loco project and our collection on our website: www.nationalminingmuseum.com

In the meantime, create your own steam trains using materials you have at home!

Option 1: Print, colour, cut, fold and stick!



Option 2: Egg carton and toilet roll tubes



Option 3: Balloon Powered Steam Train

(Full instructions can be found on website here: <https://sugarspiceandglitter.com/steam-the-little-engine-that-could/>)



Activity Sheet: Make Your Own Wind Turbine

Scotland no longer has any deep coalmines and we are using more renewable sources of energy.

Can you name three renewable energy sources:

1.
2.
3.

Find Out More:

- Virtual tour of a wind farm visit and education videos showing how wind generates electricity please visit EDF's website here: <https://www.edf-re.uk/what-is-wind-power/edf-renewables-for-educators>
- Full resources and activities please visit the British Wind Energy Association's family learning pack (aimed at children 7-11 years old) here: http://www.theorganicfarmshop.co.uk/downloads/BWEA_School_Pack.pdf

Can you think of any advantages and disadvantages of wind as a source of energy (i.e. to make electricity)?

Advantages	Disadvantages
i.e. cleaner energy than non-renewable	It's not always windy

Make a Pinwheel Wind Turbine!

What you need:

- 1 sheet of paper (one or both sides decorated)
- Ruler
- Scissors
- Paper fastener or pin
- Drinking straw, wooden stick or pencil



Directions:

- Cut out a 6 x 6 inch square (you can make the square larger or smaller)
- Use a ruler to trace a line from corner to corner
- Make a mark on each line 1/3 away from the centre
- Cut along the lines you traced until you reach the 1/3 mark
- Bring the edges to the centre of the square
- Make a hole through all 4 edges in the centre
- Make a small cut into the wooden stick to allow the paper fastener through
- Stick the paper fastener (or pin) into wooden stick/straw

Did you know – the Mining Museum has an Energy Lab and offers energy workshops? Get in touch to find out more!

Activity Sheet: Science Experiment - Fossils and Coal Formation

Coal is a fossil fuel that is formed from organic materials. Millions of years ago vegetation that died and piled up in layers slowly, over time formed into peat. After many more years the pressure of sediment and other rock pressing down on the peat forced all moisture out thus leaving coal!

Problem: How do fossils form? How do fossils contribute to the formation of coal?

Materials:

1. Plant leaves
2. Twigs
3. Fern fronds
4. Sand
5. Plastic container
6. Water



Procedure:

1. Pour about 6 inches of water into the container. Spread about 2 inches of fine sand in the bottom.
2. Add in twigs, ferns and leaves. Make a prediction of what will happen after a week and a half. Place the container in a ventilated area that will not allow the smell to invade your house!
3. After a week and a half, record your observation of the container.
4. Next, pour about 1 inch of sand on top of the rotting matter. What happens? Record your observations.
5. Carefully pour off the water and allow the material to dry. Observe the layers. Which layer do you predict will eventually turn into coal if given enough time? Allow the container to sit for 2 or 3 more days.
6. Observe the matter again. Record any changes.
7. Remove a sample of sediment. Can you find any evidence of the plant life that you originally placed in the container? How is this like the fossils preserved over time on Earth? How are these fossils aiding in coal formation?

Activity Sheet: Dino Detectives!

Below are a series of different fossil and dinosaur related activities that we have found that you can complete using materials you have at home.

1. How Dino Footprints Are Made (Online Video and Activities)

Discover what fossils are, how they are made and see a method of making your own footprint fossil at home. Educational video made by BBC Bitesize, complete with teaching notes: <https://www.bbc.co.uk/teach/class-clips-video/science-physics-ks2-ks3-how-dinosaurs-get-made-in-solid-rock/zbm4d6f>

2. Dinosaur Shadow Drawing

This idea came from Facebook page @UKKidsWindows where they share arts and crafts ideas as well as the wonderful window artwork created by families from across the UK during the Coronavirus Outbreak.



3. Dinosaur Puppet Show

Get creative, use your imagination and make a Dino-themed shadow puppet show!

4. DIY Dino Excavation

Bake your own fossils and create your own fossil excavation site!

Instructions available here: <https://parentingchaos.com/make-your-own-dinosaur-fossil-dig-kit/>

Literacy link – why not make alphabet fossils?



Section 3 & 4: Wellbeing Check-in & Awards



Photo: Apprentice Guides from Gore Glen Primary School, at NMMS, 2019

Section 3: Wellbeing Check In

Your family's wellbeing is very important, especially during these uncertain times. Check in with your wellbeing – this could be positive or negative - and use the wellbeing cards for suggested activities if not feeling so great. NMMS is very grateful to Nicola Orr, teacher from Condorrat Primary School, for creating and sharing the great resource below!

You can also download this resource as PDF's [from TES here](#).

Right now, I am feeling...

Awesome
Thrilled
Cheerful
Happy
Grateful
Proud
Excited
Calm
Ok
Unhappy
Upset
Unwell
Down
Lonely
Worried

I am feeling this way because...

Remember it's ok to feel not so great!
What do you want to do next? Have a look at the wellbeing cards for some suggestions.

Date: _____

Right now, I am feeling...

I am feeling this way because...

Remember it's ok to feel not so great!
What do you want to do next? Have a look at
the wellbeing cards for some suggestions.



Awesome
Thrilled
Cheerful
Happy
Grateful
Proud
Excited
Calm

Ok



Unhappy
Upset
Unwell
Down
Lonely
Worried



Date:

Doodle it!

Doodle or draw something. How about a pizza loving cat or a lama with a pineapple for a head? Take some time to doodle.



Make a fort

Make a blanket fort or a den outside!



Read

Take some time out to read a book, graphic novel or magazine. You could even listen to an audiobook too.



Chill

Lie down and chill on a beanbag / chair / sofa / bed for 10 minutes.



Get creative!

Do something you really enjoy! You could make something for yourself or someone else, paint, code, invent, test! It's your choice.



Take a break

Take a break from everyone and everything. Have some quiet time.



Cuddle

Give someone a cuddle. It could be a pet, a friend, a family member or a teacher.



Mindfulness jar

Create a mindfulness jar using water, glitter and dish soap. Shake it and watch the magic happen!



Mindfulness

Listen to a mindfulness app like Headspace or Calm. This can help you relax when you aren't feeling great.



Play

Play a card or board game with someone.



Laugh and laugh some more!

Watch some funny videos on YouTube. Animal ones are my favourite!

Tell some jokes or ask a friend, family member or teacher to tell you some!



Bubbles

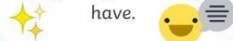
Blow some bubbles. Watch them fall and blow away in the wind. Or try to catch as many as you can!



Talk it through

Share how you feel with a family member, a teacher, a friend or someone else that you trust.

You could tell them about how proud you are of something or you could talk through any worries you have.



Shred it!

Try writing worries or negative thoughts down on a piece of paper and shredding them!



Clear the air...

Go outside and get some fresh air. You could go for a walk, a jog, a bike ride, play in the park or just watch the clouds go by.



Rock Out!

Listen to your favourite songs! Dance, sing, rock out or just listen and enjoy!



Memes!

I have a collection of AWESOME memes for every occasion. If you think these will help, choose this card.



Wee note...

Need a wee note of positivity, kindness and encouragement? Or a terrible joke? Choose this card and I will write a wee note for you!



Section 4: Awards

Well done on completing this topic. We hope you had fun learning!

Please remember to tag us on social media with any photographs or work you have done – we would love to see and share what you have accomplished! Find us on Facebook, Twitter or Instagram @NatMiningMuseum



Photo: Members of Y2K, youth group based in Mayfield and Easthouses, who took part in the Mayfield Explorers Project and achieved their Heritage Hero Awards!

Awards

If you have completed any of the topic activities – well done! Please get in touch by email to education@nationalminingmuseum.com and we will send you a personalised “Mine of Information” certificate of completion.

Please include the following information in your email:

1. Which resource you completed and any activities
2. The name of the child(ren) for the certificate(s) – please double check spelling as names will be copied and pasted into the certificates
3. Any photographs of your work (we would like to share these on social media but we will not share any names given)

Please note – your email will be permanently deleted once you confirm receipt of your certificate. Certificates will be sent by email as PDF attachments. Please feel free to tag us @NatMiningMuseum with your certificates!

Alternatively, if you are working on a heritage or archaeology themed project, why not apply for your own **Heritage Hero Award from Archaeology Scotland**? It’s easy to sign up to and full instructions are on their website here:

<https://archaeologyscotland.org.uk/heritage-resources-portal/wp-content/uploads/sites/5/2020/03/Heritage-Hero-Award-remote-.pdf>