

Rocks – Metamorphic rocks

Name _____

Class _____

What you will need for this lesson: some sweets (Starburst sweets are best!), a sheet of wax, greaseproof or baking paper, access to a microwave and plate. **You will need to ask an adult to help you!**
You will also need a pen, a pencil and if you have it, access to a computer, tablet or iPad.

LESSON STARTER

We are going to explore metamorphic rocks, how they were formed and what characteristics they have in common.

Look at the pictures of different types of metamorphic rocks below and answer the questions on the next page.



Can you name some features of the metamorphic rocks in the picture?

1. _____

2. _____

3. _____

How are all the metamorphic rocks similar?

How are they different?



When you've finished, watch the video to see whether you were right!

The Investigation

We are going to make our own version of a metamorphic rock!



Let us look at the method.

1. Use your scissors to cut each sweet into little pieces. Keep the colours in separate piles (these represent sediments).
2. Mix all the colours up together and place it on a sheet of wax paper. Fold the wax so you create a little pouch.
3. Squeeze the pieces of sweet together or place a heavy book onto the pouch and lean on it for 30 seconds. This now represents a sedimentary rock.
4. Take your pouch and place it in the microwave for 5 seconds. Let the sweets inside cool for a bit before handling it again.
5. Open your pouch and observe how it has changed. This is now a metamorphic rock!
6. Health and safety - Be careful using the scissors to cut the sweets. Ask your adult to help you with the microwave and let the sweets cool before handling them.

What did you notice about your rock?

How is your rock similar to the ones in the picture?

WORKING SCIENTIFICALLY

Our next focus is about working scientifically. All scientists apply these principles whenever they are investigating anything and we've divided them into different skill units.

Find the section your teacher has asked you to focus on and answer the questions in the relevant section.

A. Planning or

B. Presenting and analysing data or

C. Evaluation

A. Planning

Every scientist wants to solve a problem and so takes the following steps:

1. **Decides on a question that needs answering.** e.g. Does the size of the pieces of sweet affect the appearance of the rock?
2. **Decides what the independent variable (the thing that is changed) might be in order to work out the answer to the question** e.g. we will carry out 3 different rock investigations with different sized sweet pieces..
3. **Decides what the dependent variable might be (how to measure the differences in each different example)** e.g. we observe the difference between the finished rocks.
4. **Last of all decide what elements have to stay the same in order to make it a fair test** e.g. we will keep the amount of time in the microwave the same.

Now using this knowledge, see if you can answer the questions below!

Years 3 and 4 – Design the question you would ask if the following were your independent and dependent variables.

The Independent variable is **the type of sweet**.

The Dependent variable is the **colour of the metamorphic rock**.

My question is:

Years 5 – Look at the following question:

Does the size of the sweets used affect the colour of the metamorphic rock?

What do you think will happen? Write your **prediction** below.

Scientists will always write a **prediction** when they are carrying out an investigation.

Planning continued..

My prediction is: _____

Year 6 – Look at the following question:

Does the size of the sweets used affect the colour of the metamorphic rock?

What do you think will happen? Write your **prediction** below.

My prediction is _____

Now **justify your prediction**. Why do you think that will happen?

B. PRESENTING & ANALYSING DATA

When scientists carry out investigations, it is really important that they capture data to make sure they can then answer the questions that they have set themselves. The scientist on the video has asked you to complete the following:

Year 3 pupils – You are carrying out experiments to answer the following question:

Does the colour of the sweets used affect the colour of the metamorphic rock?

Think about how you would create a table to show your results? Draw your table in the space at the end of the Presenting and analysing data section and then record your results within it.

Year 4 & 5 pupils – You are carrying out experiments to answer the following question:

Does the type of sweet used affect the colour of the metamorphic rock?

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

After you have recorded your data in your table, can you see if there is a pattern or trend in it?

Year 6 – Look at the following question:

Does the number of sweets used affect the colour of the metamorphic rock?

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

After you have recorded your results, see if you can present your data in a graph of some kind, e.g. bar chart or line graph. There is some squared paper at the end of the Presenting and analysing data section to do this.

PRESENTING & ANALYSING DATA continued

My Table



C. EVALUATION

Evaluating how an investigation went as well as the data that comes from a science experiment is a really important part of science. It may be that you feel your experiment could have been done better or more thoroughly and it is important to understand this.

Answer the questions below:

Year 3, 4, 5 and 6 pupils: You are going to carry out an investigation. It might be that you want to ask this question:

Does the number of sweets used affect the colour of the metamorphic rock?

Or you might want to choose your own question. **Record the data carefully in a table or by writing the results down. Us the space below to do this.**

EVALUATION continued

Can you see any anomalies or odd results? Circle or underline any you see. If there are none then just say that there weren't any.

Anomalies are results that stand out because they don't fit into a pattern.

Year 4,5 and 6 Can you work out why there were any anomalies? Explain below what you think caused those anomalies.

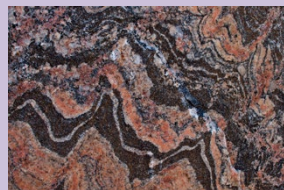
Year 5 and 6 Can you explain what you could do to prevent any anomalies? Think about how to carry out a fair test.

The science behind the investigation

Metamorphic rocks start out as either igneous or sedimentary rocks. Metamorphosis means to change from one thing to another.

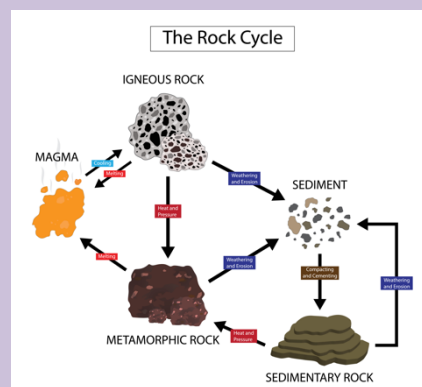


The igneous or sedimentary rocks are either exposed to very high pressure – similar to how you were squeezing your sweets – or very high temperature – similar to the sweets' time in the microwave – the metamorphic rocks are created. Sometimes they are exposed to both of these.



These rocks are formed underneath the surface of the Earth. The rocks often have ribbon like layers and shiny crystals on their surface.

Metamorphic rocks never contain fossils because of the temperatures they are exposed to and take about 20 to 30 million years to form.

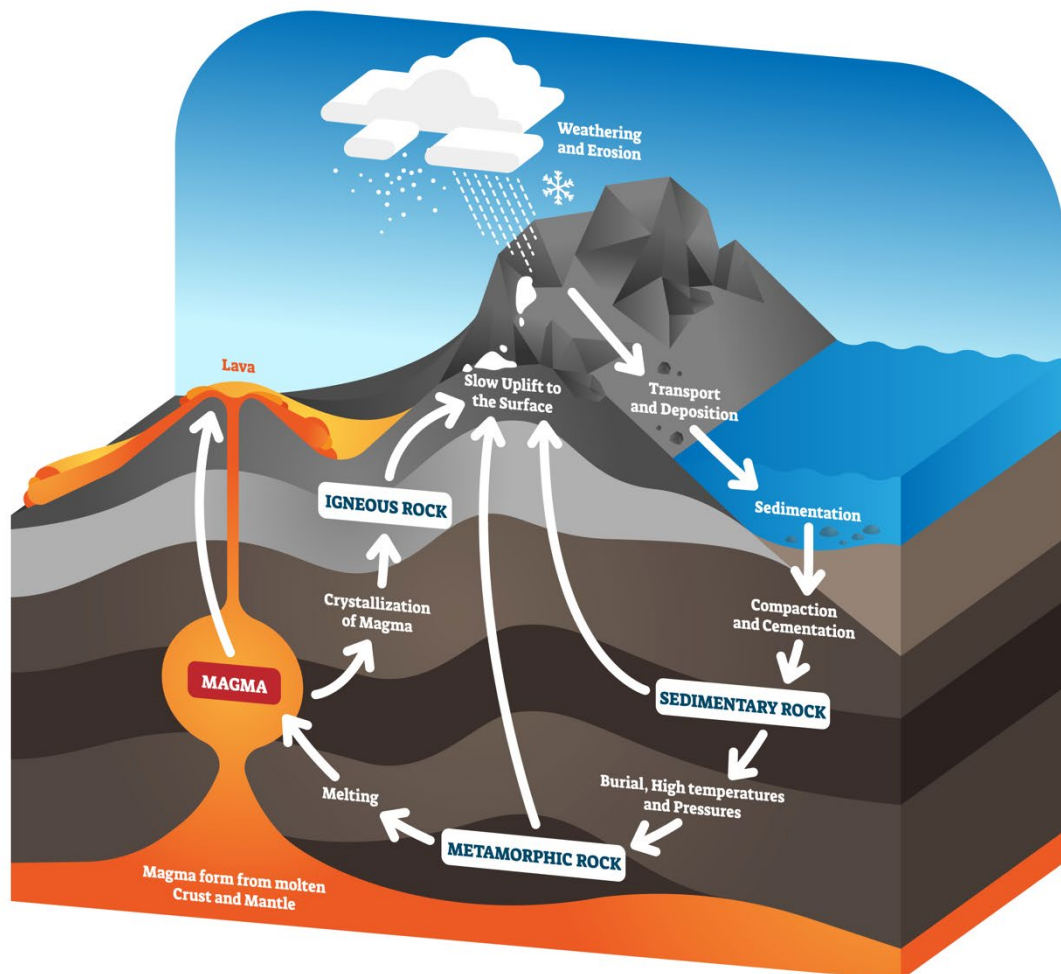


Your challenge!

Imagine you are a sedimentary rock, on a separate piece of paper, write a story or an account of what happens to you travel through time. This cycle will happen over millions of years!

Use this diagram to help you.

ROCK CYCLE



What was your score?

QUIZ
TIME!

QUIZ
TIME!