



## Family Home Learning Pack

# ROCKS & MINERALS

### Notes for parents and carers:

These home learning packs have been compiled by the Young People's Trust for the Environment to support you whilst your children are at home during the Covid-19 lockdown.

Each week, we will include suggestions for activities you can do alongside your children, as well as those that they can do independently, whilst you are working from home.

We will attempt to suggest activities which require no special materials other than those you may find around the house. It may be possible to pick up some resources during your occasional shop for essentials but please do not aim to shop specifically for listed supplies! We will also attempt to minimise the need to print out any materials.

We'd love to hear your suggestions for making the packs more useful for you, or your children's ideas for future topics. You can follow us on Facebook at <https://www.facebook.com/WeAreYPTE/> or on Instagram @weareyppte. You can share your pictures with us using #ypptelearning

### In your pack each week:

- \* Open ended project ideas and research topics
- \* Activities to explore independently or together
- \* Games to play
- \* Ideas for science experiments
- \* Art and craft ideas
- \* Links to other learning resources
- \* A use each week for toilet roll tubes...



# ACTIVITY IDEAS

Our home, planet Earth is one of 4 small planets in our solar system that are made mostly from rock (the other rocky planets being Mercury, Venus and Mars). The rocks on our planet tell us something of the story about how the planet has been shaped over the past 4.6 billion years. It's possible to study rocks and find out about the climate, about natural disasters and about the animals and plants that have lived before humans existed. Minerals are substances that are formed inside the earth and we use them for a huge range of tasks. From jewellery to food, we build our world from the minerals around us - a real life Minecraft game that's lasted for the whole of human existence.

But how do rocks form? How do we get minerals out of the ground to use them? Find out some answers to these questions with this pack!

The study of the physical properties of the earth, such as rocks, is called geology. Even though there are thousands of different rocks on Earth, they can all be sorted into three main types based on the way they are formed. Find out about that and some clues to work out which of the 3 types a rock that you have found might be here: (Youtube clip, supervision recommended)

<https://www.youtube.com/watch?v=tNs1gqkYerg>

**The three main rock types are igneous, metamorphosis, and sedimentary.**

**Igneous rocks:** Common igneous rocks include basalt, pumice, granite, and obsidian.



Magma is the molten rock near the earth's core. It's so hot there that rock melts into a liquid. Igneous rock forms when magma hardens. You might have a piece of lava in your home! Pumice stones like this one (*pictured left*) are often used by people to rub dry skin from their feet...

Sometimes, igneous rock, forms very quickly without crystallising. This creates a smooth, black, volcanic glass-like rock called obsidian (*pictured right*).



Obsidian can be chipped to have razor - sharp edges and was often used to make spears, arrow heads or other sharp tools. Lorna sent in these great pictures of the two different types of igneous rock.



**Sedimentary rocks:** Common sedimentary rocks include sandstone, coal, limestone, and shale.

Sedimentary rocks are formed from pre-existing rocks that have been broken down into tiny particles. When these particles settle together and harden, they form sedimentary rocks. They form from deposits that accumulate on the Earth's surface and can travel along via streams and rivers. Sedimentary rocks often have a layered appearance, which shows how they formed.



Case from Birmingham sent in this picture of a piece of limestone, which contains lots of little fossils inside it!

**Metamorphic rocks:** Common metamorphic rocks include marble, granulite, and soapstone.

Metamorphic rocks started out as some other type of rock, but have been changed from their original form by heat, pressure, or a combination of these factors, deep under the earth, over a long, long time. This piece of marble shows what happens when limestone is exposed to high pressure and temperature over millions of years.



Stuart B

## Make an edible rock cycle:

To help explain the different types of rock and how they form, Dylan and Felix in Devon tried this activity with fruit chew sweets. Watch this video to begin the discussion, then use the sweets to represent rock at different stages.

[http://www.onegeology.org/extra/kids/rocks\\_and\\_minerals.html](http://www.onegeology.org/extra/kids/rocks_and_minerals.html)



You will need:

- Fruit chews (such as Starburst)
- A ziplock bag
- A heat source (microwave or hairdryer)
- A small cup
- A plastic knife or spatula
- A plate

First, select a sweet of each colour and cut your chews into quarters. These represent small pieces of rock or other matter called sediments. The sediments can be carried along, perhaps by a stream, till they settle at the bottom of the water.



Next, take two quarters of each colour and touch them together lightly till they form a clump. This represents sedimentary rock.







Apply heat and pressure from your hands to represent the heat and pressure deep under the earth. Use your hands directly (or place the sediments into a ziplock bag so that you don't get sticky fingers).

Squash your sedimentary rock into a whole new shape! This creates a metamorphic rock.

Place your metamorphic rock in a heatproof cup and either microwave it for a few seconds, (not more than 5-10 seconds at a time) checking it regularly, or heat it with a hairdryer. When the 'rock' is fully melted, it has become magma.



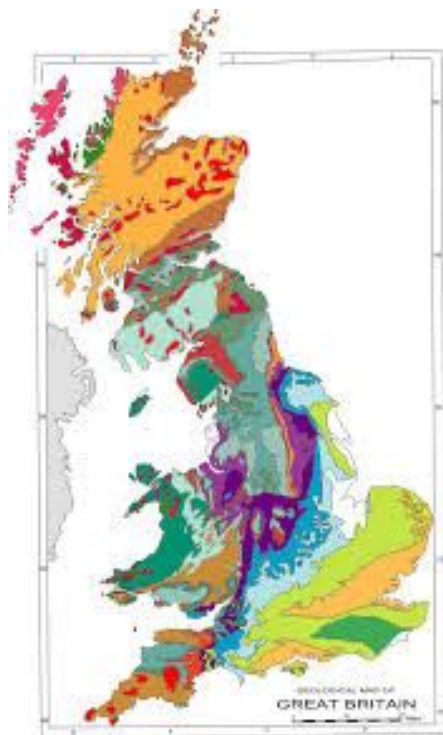
You can pour the molten sweet on to a plate and allow it to harden again and this will form an igneous rock.

Finally, splinter the igneous rock (carefully, as the pieces can be very sharp) back into small parts - which, when broken down over time and carried along in rivers and streams, form new sediments.

(If you'd like a version of this activity that is less sugar heavy - the same process can be repeated using wax crayons!

**CAUTION: Heat candles very gently and carefully to avoid setting the wax on fire!**





Wikimedia commons

## Look up geological maps for your area:

There's an app called **iGeology** which will allow you to identify the rocks that you find in your local area, using geological maps. This article shows you the top ten most popular rock hunting locations in the UK (based on where people have used the app most often)

<https://www.bgs.ac.uk/igeology/onTheRocks.html>

You can also find geological maps of the UK here:

<http://mapapps.bgs.ac.uk/geologyofbritain/home.html> where you can zoom in on any location to explore what type of rocks there are nearby.

## Investigate local sites of interest:

Perhaps you are very lucky and you live near enough some special stones that you could go and visit for a walk, if it's likely to be quiet there. There are lots of ancient stone monuments in the UK and it can be interesting to find out what type of rock the stones are and where they came from.

Lorna lives in the north of Scotland and was able to go for a walk at a place called Bonar, where there is a collection of the types of rocks found in North Scotland. She sent us these photographs:



There are signs which explain what period in history the rocks were formed. Studying rocks can help geologists know what the climate was like in certain places at different times in the past.

The place that is now Scotland has been through many changes. It's been a desert, a swamp, frozen over and covered in tropical rainforest... and we can tell this from rocks!

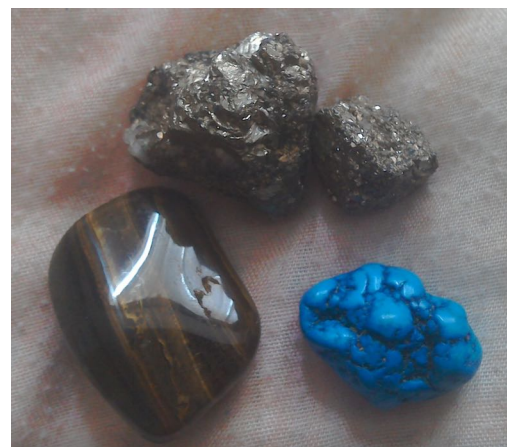


## Start Rock Collecting:



You might already have a collection of interesting rocks or stones. Rock collectors like to find different sorts of rocks and study them to find out how they were formed. It's important to keep a record of the place that you find your rocks so that you can use maps, like the one above, to help identify the rocks. This collection (left) belongs to Morty from Helsby.

Gemstones are types of metamorphic rocks. Many of them, such as diamonds, form and crystallise inside igneous rock. They form from mineral deposits which get crushed and heated inside the earth. Some gems are very rare. Beth and Crow sent in these pictures (right) of some of their semi-precious gems:



## Fossil hunting:

A fossil is a special kind of rock, made up from minerals such as calcium, which are left behind long after the remains of a living organism have broken down. Fossils are found in sedimentary rocks. This BBC clip shows how they form:

<https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/z2ym2p3>



It can be very exciting to hunt for fossils. They aren't found everywhere, so you would need to check whether you live in a suitable hunting location, or whether you need to plan a trip for the future. You also need to make sure that the place you are hunting is safe and that you have permission from anyone who may own the land.

Paul from Halifax found this amazing fossil in the cliffs at Sandsend near Whitby and spent ages digging it out!



He also discovered these fossilised plant stems! The largest piece, itself a foot long, came from one of the Redmires reservoirs outside Sheffield, and was just one part of a trunk that was a good 6 feet long altogether!

## Make Lego layers of the earth:

The earth can be divided into three main layers: the core, the mantle, and the crust. Each of these layers can also be divided into two parts: the inner and outer core, the upper and lower mantle, and the continental and oceanic crust. Choosing colours to represent each layer and building a model out of lego can be a way to help understand how this works. Alex from Durham made this amazing model showing the different layers. Find out more about each of them, here (Youtube clip, supervision recommended):

[https://www.youtube.com/watch?v=24wOIG\\_7fyc](https://www.youtube.com/watch?v=24wOIG_7fyc)



Stephen Matthews Photography



## Smash open a geode:

Geodes are formed when a liquid mineral solution enters a hollow space inside a rock. Over thousands of years the water evaporates, leaving a crystallised mineral inside the rock. When the rock is cut open, you can see the crystals inside the rock shell.

You can buy kits online containing geode rocks that can be broken open to reveal their glittering insides - crystals that have never been seen before and that have been intact for thousands of years!

<https://www.britishfossils.co.uk/product/break-your-own-geode-pack/>

Morty in Helsby smashed his geodes up especially for this pack, to show what they look like. Be really careful as you smash the rock because there might be sharp pieces that can fly into the air. Be sure to put the geode in a bag and wear protective goggles to protect your eyes.



## Make edible geodes:

Even if you don't have any real geodes to smash, you can make these edible ones at home! Rowan from Sheffield made these awesome geodes for us!

You will need:

- Boiled sweets
- Silicone cake cases
- A rolling pin or similar
- Ziplock or other bags
- An oven





Put your hard sweets into a bag and then break them into tiny pieces using the rolling pin.



Pour the tiny pieces, representing mineral deposits, into the silicone cases and heat them gently in the oven, checking regularly until they have melted into a liquid.

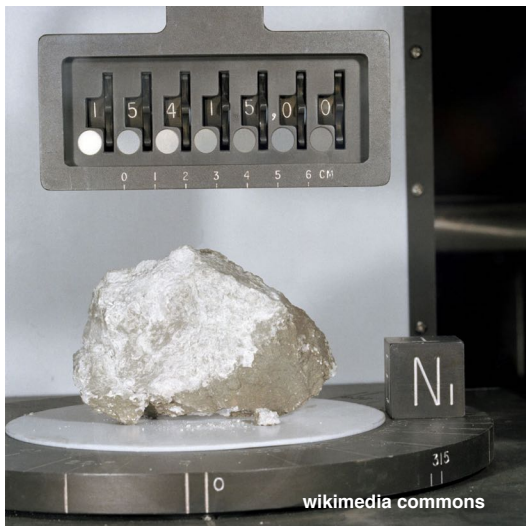
Once the 'mineral solution' has cooled, you can turn the sugary crystals out of their 'rocks' (the cake cases) and they are ready to eat.





## Space Geology

As well as learning about our own planet, the study of geology can help us find out about other bodies in space. We can try to find out how parts of the universe have formed and even how long ago it happened.

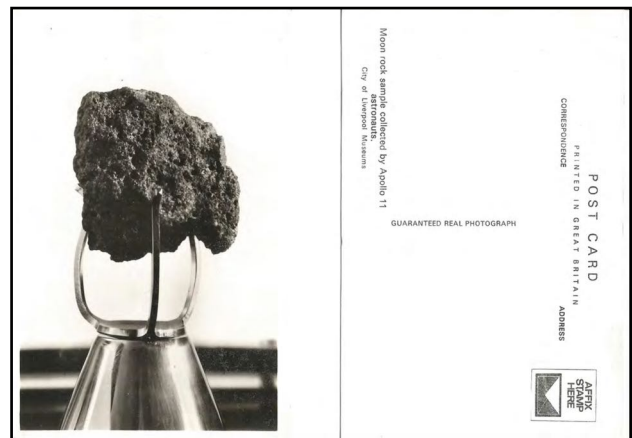


### Moon Rocks:

In August 1971, this piece of rock was collected from the surface of the moon. Known as "Genesis Rock, sample number 15415", this rock was an anorthosite, a piece of the moon's primordial crust. Geologists were able to study the rock and learn it was about 4 billion years old!

This postcard (above right) belongs to Paul in Halifax and it shows a moon rock sample that was taken on a tour round Europe for people to see.

It attracted huge crowds of people wherever it went.



### Meteorites and meteoroids:

Meteoroids are objects in space which can range in size from a grain of dust to a small asteroid. When meteoroids enter Earth's atmosphere at high speed and burn up, the fireballs or "shooting stars" are called meteors. Sometimes pieces land on earth and these are called meteorites. This meteorite (below right) belongs to Alan in Scotland. It's about the size of a penny and is around 4.6 billion years old!

Find out more about meteors and carry out a quiz on what you have learned here:

<https://study.com/academy/lesson/meteor-facts-lesson-for-kids.html>



# RESEARCH IDEAS

## Which minerals are in your mobile phone?

You might be carrying several precious minerals around with you in your pocket every day. Did you know that smart phones contain minerals such as gold? Some of these minerals are rare and the supply from deep in the Earth will one day run out.



### Find out:

- Which minerals are used in mobile phones and what do they do?
- Where do the minerals come from?
- How are the minerals brought out of the Earth and who by?
- What is the carbon footprint of a smart phone?

### Some questions to consider:

- If minerals are found under the ground in certain countries, who do they belong to, if anyone?
- If the minerals used to make our mobile phones ran out, would people be willing to give up their phones?
- How much does a smart phone cost?
- How much does someone working in a mineral mine earn? Is the work easy?



Fairphone/closing the loop

What happens to mobile phones when people don't want them any more?

How long do people keep their phones for?



# MATHS CHALLENGES

## Ricky's Rocks

Ricky has three rocks. Each is a different weight.

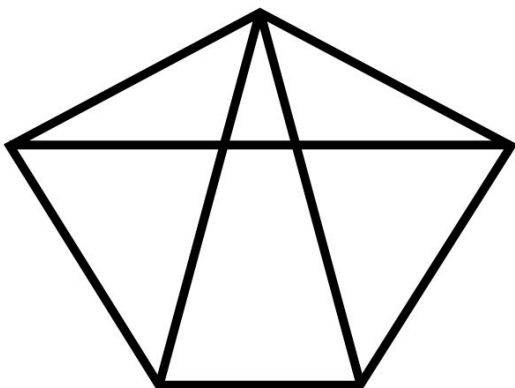


The first and second weigh **7kg** altogether.

The second and third weigh **8 kg** altogether.

The first and third weigh **11 kg** altogether.

**What is the weight of each rock?**

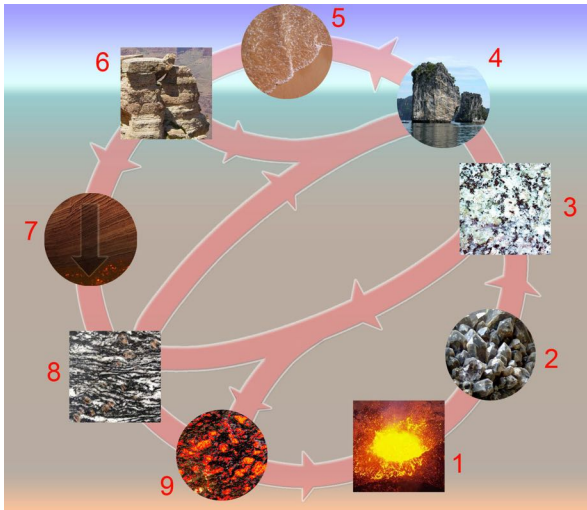


## How many triangles?

**How many triangles can you count in this gemstone?**

*Questions adapted from Mathematical Challenges for Able Pupils, DFE, 2000.  
Solutions at end of the pack!*

# WORD CHALLENGES



wikimedia commons

## Formation Explanation:

Write an explanation of how each of the 3 different types of rocks are formed and draw diagrams to go with it. See if you can use your explanation to help explain the information to someone in your family.

## Fossil discovery:

Imagine that a fossil hunter has just discovered an exciting find: the remains of a totally new type of dinosaur, never seen before! Write an imaginary newspaper report about the fossils and the type of creature it may have come from.



Cole Henley

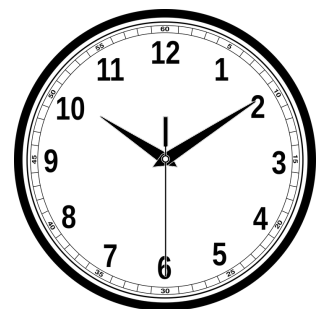
## Ock Collecting:



freesvg.org

The word 'Rock' ends with a 'ck' and both 'c' and 'k' are used together because the 'o' in 'rock' is a short vowel sound. can you make a list of rhyming words that also end in 'ock'?

Can you find other words that end in 'ck' but that have different short vowels in the middle?



Pixabay



# ART AND CRAFT

## Make a wire wrapped rock necklace:



If you have a special stone or rock that you would like to turn into a necklace or pendant to wear, there are some simple ways that you can attach the stone, without needing any specialist tools.

The first is to use very thin jewellery wire, to wind round and round your stone, forming a loop at the top that you can thread a ribbon through.

The wire needs to be very thin, to make it easy to twist round the rock. Lorna in Lairg tried this for us and it was quite tricky with the wire as thick as this.

**CAUTION: You also need to be very careful not to poke yourself with the sharp ends of the wire.**

If you find a stone that already has a hole in it, you can wear it as a piece of jewellery. Lorna plaited a cord out of embroidery threads and used that to make a necklace!



## Make a painted pebble pendant:



Another technique you can use, if you have a pebble with quite a flat side, is to glue a wire loop to the back of the stone using a scrap of felt or similar material.

You will need:

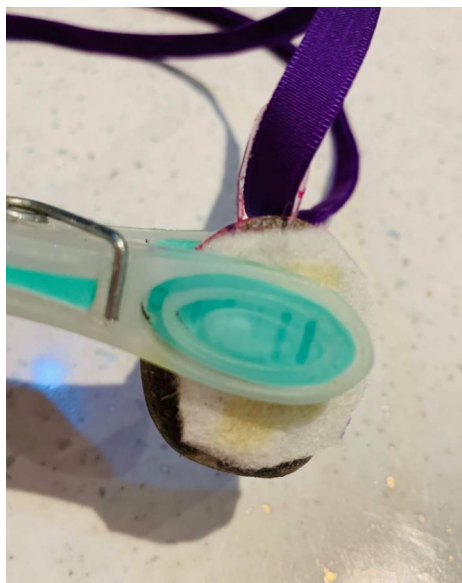
- Pebbles
- Paint (acrylic works best)
- Thin wire
- Felt or similar fabric
- Strong glue
- A ribbon for threading



First, paint your pebbles (if you'd like to - you can also just leave them plain)



Leave them until they are completely dry.



Next, cut a disc of felt, slightly smaller than your pebble. Take your wire and bend in into a loop. It can help to thread the wire through the felt first, to add strength.

Glue the fabric, with the wire, to the back of the stone and hold it in place until it is set. Callie used a clothes peg to do this.

Once the glue has dried, you can thread a ribbon through the loop and wear your pebble as a pendant!



Many thanks to Callie in Rochdale for testing this activity for us and making such lovely pendants!





## Make paper gems: (photo by Kate Lilley)

Scroll to the bottom of the web page below page to find a series of templates to make your own paper gemstones. You will need to print these out on to coloured paper of your choice. A heavier weight paper, or thin card can work better. Simply cut out the templates, fold along the lines and glue the flaps into place.

<http://www.minieco.co.uk/paper-gems-new-templates/>



## This week's use for a toilet roll tube:

### Make a pretend microscope to view your rock collection

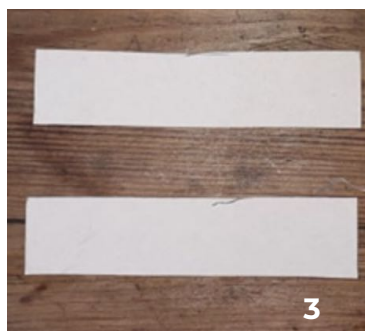
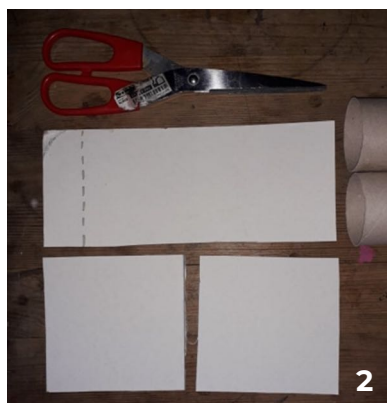
Although nothing beats a chance to look at your rock collection through a real microscope, or by using a magnifying tool called a 'loup', like jewellers use, this toilet roll tube microscope might be just the thing to look at the paper gems you make!

#### You will need:

- \* Two toilet roll tubes
- \* Thick card (we used a cereal box, with the front and back pieces of the box glued together to make it stronger.)
- \* A lid, such as the one from a carton of drink
- \* Glue
- \* Tape. Masking tape will allow you to paint over it
- \* Paint to decorate

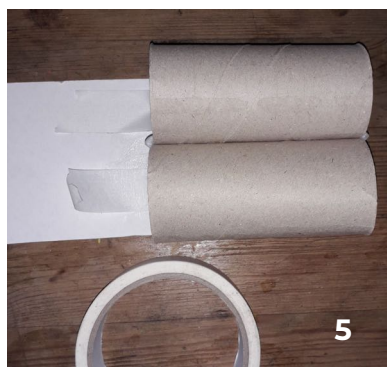


First, glue your toilet roll tubes together, like this (see photo 1, left).

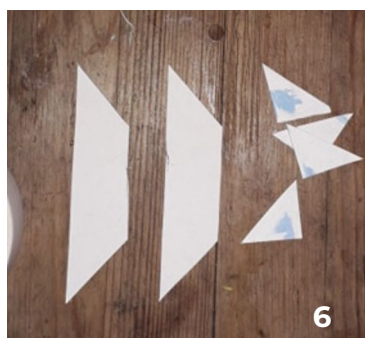


Next, cut your cardboard into a long strip, slightly less wide than both tubes and two squares. (photo 2). Then, cut two smaller strips, each the same length as the side of the square piece (photo 3).

Fold along the bottom of the longest strip to make a flap, then sandwich this flap between the two squares, to make a base (photo 4).



Tape the tubes on to the strip of card so that they protrude over the top (photo 5).



Cut the ends of the two thin strips at a diagonal and tape into place, as shown (photo 6), to stabilise the model (photo 7).

Paint in a colour of your choice, then, when the paint is dry, glue on the lid so you can pretend to focus your microscope (photo 8).





# GAMES



## Valuable gem:

For this game you will need a ball to represent the valuable gem. The first player chooses a value for the gem, say '500 pounds!' and throws it into the air. Whoever catches the gem, gains that number of points. However, if a player tries to catch the gem and drops it, they LOSE that number of points. Keep playing for a pre-decided amount of time, or up to a pre-determined winning number of points.

## R-O-C-K tag:

This game is played with a soft ball which becomes the rock. At the start of the game, decide where the edges of the 'pitch' or playing area are, so that no one can run too far! One player is selected as the tagger and starts counting to 10 while the other players run away, freezing in place when the counting stops. The tagger is allowed to take four giant steps toward any one player before trying to hit them gently with the ball, below the knee. If the player is hit, they get an "R" and become tagger. If the player who is tagger misses, they get an "R" themselves and remain as the tagger. When a player gets four letters, spelling R-O-C-K, they are out of the game. The winner is the last to be eliminated.

## Juggling jewels:

Juggling is an excellent way of practising coordination and also patience and perseverance as it can take so long to get right! It's a great chance for children to practise concentrating for longer periods and can be done without teammates. This is a great introduction for juggling for children (Youtube link, supervision recommended):

<https://www.youtube.com/watch?v=QxzSHRbLAX4>

## Find the precious stones:

In this game of hide and seek, the hiders each carry something to represent a precious stone. When they are found, they hand over their precious stone, then join the seeker to help find all the rest of the stones, until everyone has been found.



# LEARNING LINKS

There are a large number of resources available for online learning at this time. We'd always recommend that you support your child with this and only follow links from reputable names. **Any links provided here have been checked for suitability.**

The UK's geology club for children is called **Rockwatch** and they have a website and produce regular magazines. The site has lots of competitions and lists events such as collecting fairs and meets.

<https://www.rockwatch.org.uk>

**One Geology Kids** has a great site where children will meet The Ranger, a character who teaches them about the work that geologists do to discover more about the history of the Earth.

[http://www.onegeology.org/extra/kids/what\\_is.html](http://www.onegeology.org/extra/kids/what_is.html)

**Earth Observatory** for kids is a site by NASA which shows children how satellite images can reveal information about the earth's geology. Articles include how different minerals can be mapped using light.

<https://earthobservatory.nasa.gov/blogs/eokids/hide-and-see-sandstone-geology-by-satellite/>

Explore a range of rocks and minerals online with this game. (Requires Flash Player).

<https://www.sciencekids.co.nz/gamesactivities/rockssoils.html>

Watch as an amazing machine sorts stones by age as part of an art exhibition:

[https://www.thisiscolossal.com/2016/05/kinetic-rock-sorting-jller/?fbclid=IwAR1lflrsDr7HwmBHRJS07EmB-2BzssyDM4YIm4qTvBpcTZDTJNiz\\_GjIhqk](https://www.thisiscolossal.com/2016/05/kinetic-rock-sorting-jller/?fbclid=IwAR1lflrsDr7HwmBHRJS07EmB-2BzssyDM4YIm4qTvBpcTZDTJNiz_GjIhqk)

## Answers to Maths Challenges:

**Ricky's Rocks:** Ricky's rocks weigh 5 kg, 2 kg and 6 kg.

**How many triangles?** There are 11 triangles