

Environmental Management: Lithosphere practicals

The Rock cycle

Aim:

To demonstrate how rock transitions from one type to another.

Equipment needed:

- Picnic/toffee crisp or similar chocolate bar
- Mars/Snickers/anything with layers, but not Kit Kat
- Wispa or similar
- Crunchie or similar
- Knife
- Tin foil
- Greaseproof paper
- Two stacking glasses
- Cheese grater
- Four small containers

Method:

Experiment 1: Identifying types of rock

1. Cut the chocolate bars into quarters, and look at how they are made up.
2. Sort them out into whether the characteristics are more similar to that of igneous, metamorphic or sedimentary rock.

Results and explanation:

Wispa and Crunchie:
igneous - Made of just one material (but multiple 'minerals') (if you ignore the outer chocolate shell), with little air holes, as might be found in a pumice or scoria stone.



Picnic: metamorphic - the rice crisps, peanuts and raisins are mixed in with the caramel when it was in its liquid state, and then left to harden.

Mars:
sedimentary - layers built up, one on top of the other.

Experiment 2: Creating sedimentary rock

1. (Don't need to do step 1 with the Crunchie bar.) Put a quarter of each chocolate bar in the freezer for half an hour or so, or until hardened.
2. Grate the frozen quarters and a Crunchie quarter into four separate dishes.
3. Line a glass with greaseproof paper, by cutting a square of greaseproof paper that is big enough to be twice the height and once the length of the base of the glass you are using. Gently, push the centre of the square to the bottom of your glass with another glass that stacks perfectly inside it. If the top glass doesn't quite touch the base of your glass, take the top glass out and push the paper down to the bottom by hand.
4. Put a layer of Wispa at the bottom of your lined glass.
5. Cut a disc of greaseproof that is the same size as the bottom of your glass, and put it on top of the Wispa layer. Then put your stacking glass on top of that, so that the chocolate layer is being squidged down by the top glass.
6. Push down with the glass on the layer of chocolate until it is an even height all over.
7. Take the glass and the top disc of greaseproof paper off the Wispa layer, and add the Picnic gratings.
8. Put the disc of greaseproof paper back on, and squidge down with the glass again.
9. Repeat with the Crunchie layer and finally the Mars layer.
10. After adding the disc of greaseproof paper to the fourth layer, and flattening down, leave the top glass in place, and fill with baking beans, marbles or anything that is a little weighty.
11. Place the entire thing in a warm place for half an hour, then move it to the fridge for another half hour.
12. Take the top glass off and pull out the lining paper. Take off the top disc and open the lining up.

Results:

You should now have a chocolate disc made up of four distinct layers of 'rock'.

Explanation:

Sedimentary rock can be made up of fragments of any type of rock, including other sedimentary rock. The particles come from **weathering** and **erosion** of these other rocks. (See Rock to Clay activity to learn more about weathering and erosion.)

Experiment 3: Creating metamorphic and igneous rock

1. Put a quarter of each bar into a piece of tinfoil, and cover like a present.
2. Put the little parcels onto a baking tray and place in the oven at around 180 degrees Celsius. Leave in until you can strongly smell the chocolate... maybe around 20 mins or so.
3. Take the parcels out of the oven and leave to cool.
4. Meanwhile, take another quarter of each chocolate bar and wrap up in greaseproof paper or the chocolate wrapper.
5. Place between your hands and squidge, holding your hands together firmly for a good five minutes. (If that is too boring, double wrap the bar (you don't want an unfortunate stain on your clothing) and sit on it instead. Then you can use your hands to read a book while you wait.)
6. Once the bars that have been in the oven have cooled, open up all the parcels and compare the insides with the original bar and with each of the other chocolate bar types.

(If you plan on eating it all, try melting in a 'double boiler' (<https://www.food.com/how-to/melt-chocolate-24>) instead, so that the chocolate doesn't burn, and then scooping it out on to greaseproof paper to cool... or just dunk breadsticks in the molten 'rock' and eat as is.)

Results:

Cooked Mars:

Igneous

The layers have very nearly completely mixed (left for long enough in the oven it would). The bar has changed its characteristics becoming much more glass like, rather than sticky.



Crushed Mars:

Metamorphic

The layers have started to melt and mix together, but you can still see some distinction between which bits are caramel, which are chocolate etc.

Explanation:

As layers build up over a rock (be it igneous, sedimentary or metamorphic), it puts huge amounts of pressure on that bottom rock. The more pressure there is, the greater the heat. Pressure and heat will change the characteristics of the rock. The greater the pressure and heat, the greater the changes. This changed rock is the metamorphic rock.

If the rock is completely melted and mixed up, it becomes magma again. When cooled it becomes igneous rock once more.

Other links:

More chocolate activities - <http://www.lochlomond-trossachs.org/wp-content/uploads/2016/07/Outdoor-learning-resource-Chocolate-geology-Activity-Sheet.pdf>

Picture rock cycle - <http://losttimelady-geologist.blogspot.com/2013/08/the-chock-cycle.html>

Identifying rocks - <https://fitz6.wordpress.com/2012/06/07/identifying-rocks/amp/>

Rocks and definitions - <https://geology.com/rocks/>

The rock cycle - https://www.nationalgeographic.org/encyclopedia/rock-cycle/?utm_source=BiblioRCM_Row