



Making rocks at home

Rocks are all around us. We see them in the landscape, in buildings and roads but even when we cannot see them rocks are always there beneath our feet underground.

Have you noticed that some rocks are made of lots of little pieces of sand, pebbles or shells? These are called sedimentary rocks and the pieces are known as 'sediments'. The particles were transported by water or wind or even ice, before being deposited in places like deltas, river beds or oceans. The layers of sediment build up over time and bury older layers deep underground. Gradually the weight of the layers above, and the formation of a 'cement' that sticks the grains together, turns the sediments into solid rock.



Would you like to make your own rock? In the following activities you can simulate the natural processes that form sedimentary rocks in just a few hours, instead of taking millions and millions of years. All the activities can be undertaken using readily available materials.

Audience

Primary aged children with adult supervision.

Conglomerate in a cup

Materials

- Plaster of Paris (*please follow manufacturer's safety directions*)
- Gravel
- Sand
- 2 paper cups
- 30 ml water – roughly equivalent to 6 teaspoons
- Spoon or paddle pop stick
- $\frac{1}{4}$ cup measuring cup

Method

1. Create a mixture of sand and gravel in the first cup.
2. Put 30 ml of water into your second cup.
3. Add $\frac{1}{4}$ cup of plaster of Paris powder (75 g).
4. Use a paddle pop stick to mix until smooth like pouring custard and with very few bubbles.

5. Pour some sand and gravel into the plaster and stir together. Make sure there are plenty of gravel grains included.
6. Leave the plaster to set in the cup. It will become hard in a few minutes but it is best to leave it for a few hours before you gently tear the paper cup away from your 'rock'.

NOTE: when the plaster of Paris sets, it will get warm due to an exothermic reaction.

7. Rub the surface of your conglomerate rock so the grains inside it are easy to see.

Extension activities

1. Experiment with changing the texture on the outside of your 'rock'. Instead of using a cup, create a mould to pour the plaster of Paris into. Crunch up a piece of aluminium foil, then gently open into a cup shape and sit it in a small bowl.
2. You could even find a rock with an interesting texture and press your aluminium foil into the rock surface to copy the texture and transfer it to your rock.
3. Try making an edible version of a conglomerate rock like rocky road using chocolate, marshmallows and nuts.



Figure 1: Conglomerate rock, and rocks made in plaster of Paris. Left to right: real conglomerate, plaster of Paris conglomerate, plaster of Paris sandstone, making plaster rock in a crumpled foil mould.

Sugar sandstone

Materials

- Warm water
- Sugar
- Spoon
- Sand
- Paper cup or disposable container

Method

1. Put about 50 mL of warm or hot water into a container.
2. Add a spoonful of sugar and stir until dissolved. Continue adding more sugar until it stops dissolving.
3. Quarter fill your paper cup with sand.
4. Pour the sugary solution into the paper cup until the sand is covered – you won't need much water.
5. Let the 'rock' dry. This might take several days and even if the top is dry it may still be moist underneath. Perhaps leave it in the sun (but don't let it attract ants!!)
6. Gently peel or cut away the paper cup to reveal your rock.

Explanation

The water will evaporate over time, leaving the sugar crystals behind in the spaces between the sand grains. The sugar will stick (cement) the sand grains together but is not a very strong cement. In nature, water with naturally-occurring materials (such as silica) dissolved in it, can wash through the layers and deposit quartz or other minerals that stick the grains together.

Extension activities

1. Try the same experiment again, but using salt instead of sugar. Compare if your sugar sandstone or salt sandstone is stronger.
2. Next time you go for a walk, look at the rocks around you. You will see rocks in buildings, in gardens, or just in the wild. Can you see grains in the rocks, and layers? If so they are sedimentary rocks rather than igneous or metamorphic that form quite differently.



Figure 2: Left to right: real sandstone, a sandstone being made with sugar, sandstones made with sugar and salt (the salt sandstone is more crumbly).

Glued sandstone

Materials

- PVA glue
- Sand – two types/colours if possible
- 2 paper cups
- Spoon or paddle pop stick
- Aluminium foil

Method

1. Line the inside of your first paper cup with aluminium foil all the way to the top. It's ok if it's not smooth, as long as it's not ripped or split.
2. Choose one of the sands and pour a thin layer into your second paper cup and mix in some PVA with the paddle pop stick until all the sediment is lightly coated in glue.
3. Pour this sand/PVA mix into your first aluminium foil lined cup.
4. Wait for the glue and your rock mixture to dry. This might take a full day.
5. Repeat steps 2, 3 and 4 by pouring the differently coloured sand on top of the first layer, allow to dry. Continue adding alternating sand and glue mixtures to make multiple layers in your cup. This may take several days to complete – but it's worth the wait.
6. When it's completely dry, remove your 'rock' by pulling out the whole aluminium foil mould or breaking away the cup. Then peel away the foil to reveal your 'rock'.

Extension activities

1. Try adding food dye to your PVA to colour the layers.
2. Think about how long each layer took to dry. Now think about how long this would take in the natural world for sediments to stick together when there's no PVA glue.



Figure 3: Mixing glue and sand in a cup, sand layer setting in a foil-lined cup, new glued sandstone rock, real layered sandstone.

Safety Warning

Adult supervision is required for this activity, especially when handling chemicals. Please adhere to the manufacturer's Safety Directions, this is the sole responsibility of each individual.

Further information

For more activities, visit www.ga.gov.au/education.

To learn more about rocks, check out this webpage and videos <https://www.ga.gov.au/education/classroom-resources/rocks>.

For Further Information:

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