

Eggshell Chalk

Make Chalk with Leftover Eggshells

Do you know what eggshells and chalk both have in common? Calcium carbonate (CaCO_3)! CaCO_3 , commonly found in the mineral limestone, can be used to make sidewalk chalk. Homemade chalk is easy to make, works well on sidewalks and asphalt blacktop, but is too scratchy to be used on blackboards.

Activity Challenge

Make chalk with leftover eggshells and draw words and pictures on concrete or asphalt blacktop.

Preparation

1. Review the Materials Needed list and collect materials.
2. Have family members collect and save six clean eggshells.
3. Carefully wash and dry the eggshells. Remove the thin membrane on the inside of the shells. Place in the sun for about two hours to dry, or bake them on a cookie sheet in a 200 degree F oven for about 15 to 20 minutes. **Adult supervision required to use oven!**

To Do

1. Use a mortar and pestle, coffee grinder, or smooth rocks to grind or crush the eggshells to produce a fine eggshell powder. Alternatively, put the eggshells into a plastic bag and crush them with a rolling pin.
2. Add 1 teaspoon (tsp) flour and 1 tsp hot water to a bowl and mix with the back of a spoon to make a paste.
3. Add one tablespoon of the eggshell powder to your paste. Mix well.
4. Mix in 1 to 2 drops of food coloring.
5. Roll into a log shape and wrap in a paper towel.
6. Repeat steps 2 to 5 until you run out of eggshell powder to make several chalk sticks.
7. Set wrapped logs aside for 4 - 5 days to harden.
8. Draw pictures and write words on concrete or asphalt blacktop with your finished chalk.

Observations

What happens when you combine flour and water? Is the change physical or chemical? What is the purpose of adding flour to the eggshells? Does a chemical reaction or physical change happen when food coloring is added? Observe the chalk on each day of the drying process. Why does it take 5 days for chalk to fully solidify?

Extensions

- Research and learn more about calcium carbonate. What other household items contain this compound?
- Try this activity again but vary the proportions of ingredients. Describe the results of your experiments.
- Can you make chalk from other ingredients?
- Try selling your chalk to family members.

Materials Needed

- 6 eggshells (white if possible)
- 1 teaspoon of flour
- 1 teaspoon of hot water
- Bowls
- Paper towels
- Spoon
- Mortar and pestle, or coffee grinder, rolling pin, or smooth rocks
- Food coloring

Grade Range

K-2
3-5

Topics/Skills

Science: Chemical & Physical Reactions, Mixtures, Matter

Learning Standards

NGSS: [Matter and its Interactions](#)

Duration

30 minutes
5 days to let chalk solidify

Prep Time

10 – 15 minutes plus up to 2 hours drying time

The Science behind the Activity

Calcium carbonate, written chemically as CaCO_3 , is a primary compound found in limestone. Limestone is formed over a long period of time, by the settling of the skeletal remains of sea creatures, such as clams, oysters, snails, corals, and mussels, in layers on the floor of the ocean. Plants, such as algae, also contain calcium carbonate. Chicken eggshells, as well as the eggshells of other birds, are made largely from CaCO_3 . In addition to food, birds must consume minerals, including CaCO_3 , to build bones, and to make shells for their eggs. The source of the minerals may be the ancient remains of sea creatures, deposited in previously submerged land. Humans, and many other animals, must also consume minerals containing calcium to build bones.

Eggshells protect developing **embryos** of birds and other egg laying animals. Eggshells are about 95% calcium carbonate (CaCO_3) with the remaining 5% a combination of organic material and other minerals. The shape and materials of eggshells provide a strong, protective structure. Eggshells are semi-permeable, which means that air, water and other nutrients can pass in and out of the shell. Used eggshells can be used to make products such as chalk and **gypsum** and can also be used to fortify garden soil by providing nutrients that are beneficial to plants and the animals that consume them.

Some natural limestones, and all chalks, are soft. The softness makes them suitable as a writing material when rubbed (**abraded**) against harder surfaces, like concrete and asphalt.

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