EARTH DAY 2021

Activities from the Department of Environmental Health and Quality
Food and Housing Division

REPURPOSE FOOD WASTE - How to Make Geodes (Crystal Rocks) Using Eggshells

Source: www.education.com, 2019 (https://www.education.com/download-pdf/activity/106460/)

Is your little scientist up for an exciting challenge? Let them make their own geodes! Geodes are rocks with a crystal center that you and your child can make right at home by using simple kitchen materials.

What You Need:

- Eggs
- Glass
- Measuring cup
- Epsom salts
- Spoon
- Egg carton

What You Do:

1. Crack open the egg and remove the egg from shell. You'll need to also take out the inner membrane so that mold doesn't develop.
2. Run very hot water into the shell. Let it sit. Now, roll the membrane out with your fingertips.
3. Place eggshell in egg carton and allow to dry.
4. Put ¼ cup water in measuring cup and microwave it until the water is very hot, but not boiling.
5. Add ¼ cup of Epsom salts and stir. If all of the salt dissolves, add more and stir. Stop when no more salt dissolves – at this point your solution is super-saturated.
6. Carefully pour hot water into eggshell. Do not pour undissolved salts into shell.
7. Refrigerate. As water cools and evaporates, the salts will settle, and crystals will form. Allow water to sit at least overnight. Being careful not to dump out the crystals, pour excess water out of eggshell.
8. Take out your new geode and put it on display!

If you want to create several geodes at once, let the crystals form for different lengths of time – emptying one shell at 12 hours, the next at one day, etc. You might even want to use different crystal solutions (borax, sugar, salt or baking soda) for a fun and scientific comparison.

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REPURPOSE FOOD WASTE
How to Grow a Fruit Tree from Fruit Seeds that are Saved

Source: https://homesteading.com, 2019 (https://homesteading.com/growing-fruit-trees-seeds/)

Did you know you can grow fruit trees from seeds that you save? If you want to start harvesting fruit trees, you'll love this easy way to grow your own fruit trees for free. You could save money on fruit and enjoy the benefits of homegrown produce!

Most of us throw out the seeds from the fruit we eat. Did you know that you can grow trees from those seeds? Here's a way to grow trees from seeds that will produce healthy fruits!

1. **Germinate Seeds**
   Clean the fruity flesh off the seeds. Pick it off using your fingers. Or if it's too hard to do, try to soak the seeds in warm water for 2 minutes first. Click here to learn more about germinating seeds

2. **Choose the Soil**
   Some people say you must use seed-starting soil, but any soil is fine. Even old soil from your garden beds would work perfectly.

3. **Choose Where to Plant**
   Choose where you will plant the seeds. Don't plant the seeds outside or in garden beds, because it may be too cold outside. You also want to plant in a smaller confined space to better manage and track the growth of your seed. Plant your seeds in a pot or container. You can use a chopstick or finger to dig small holes in the soil. You can keep them on a windowsill until they grow bigger.

   How deep to plant your seeds:

Seed Size:	Depth:
1 inch	2 inches
¾ inch	1 ½ inches
½ inch	1 inch
¼ inch	¾ inch

4. **Care for Your Seeds**
   Water your seeds often. Fertilize them once the trees are over 3 inches tall. You could use store-bought fertilizer or make it yourself out of compost (see the composting activity below). The choice is yours. Once the tree becomes twice as tall as the pot it is in, transfer it into a larger pot.

From there you can watch your trees grow big and strong!

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REPURPOSE FOOD WASTE - How to Compost Food Waste

Brooke Greco, www.education.com, 2010 (https://www.education.com/science-fair/article/composting-recycling-food-scraps/)

Did you know that your food scraps can be composted? You can put your composted materials to good use!

What materials are required?

- Plastic bin
- Soil (part 1, 2 shovels worth needed; part 2, 1 1/2 planting pots worth needed)
- Saw dust (2 shovels worth)
- Leaves, grass clippings, weeds (2 shovels worth)
- Food scraps – vegetables, fruits, coffee grounds (2 shovels worth)
- Water
- Newspaper (2 shovels worth of shredded paper)
- 3 Planting pots
- Lettuce seeds (handful)

Part 1: Create your own compost

1. Set up your composting bin (a large plastic storage bin or a plastic garbage bin will work)
2. Place bin in an accessible outdoor area with plenty of space around it. The locations should have a water source nearby.
3. Put old plant leaves, grass clippings/weeds, fruit/vegetable food scraps, coffee grounds, etc. into the bin.
4. Sprinkle the mix with water. The mix should be moist, but not overflowing with water.
5. Add shredded newspaper and sawdust.
6. Sprinkle the mix with water.
7. Add soil.
8. Sprinkle the mix with water.
9. If desired, you may add earthworms to the compost after one week. This will speed up the composting process but is not necessary.
10. Sprinkle water on the compost mix every week and stir if desired (stirring not necessary).
11. After 4-6 weeks, your mix should be a dark compost mix (it should look like soil).

Part 2: Test compost effect on plants

1. Fill one plant pot with compost (leave one inch of space from the top of the pot).
2. Label this pot 'Compost Only'.
3. Plant 5 -10 seeds in this pot.
4. Fill second plant pot with a mixture of ½ soil and ½ compost (leave one inch of space from the top of the pot).
5. Label this pot “Compost and Soil Mix”.
6. Plant 5-10 seeds in this pot.
7. Fill the third plant pot with soil (leave one inch of space from the top of the pot).
8. Label this pot “Soil Only”
9. Plant 5-10 seeds in this pot.
10. Water all pots evenly and set in an area of partial to no sunlight.
11. Monitor lettuce growth over several weeks and record any differences in physical characteristics of the plants (color, size, etc.).

When lettuce is full grown, pick and enjoy!

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Another Fun Activity - How to Make a Thermometer

Source: www.education.com, 2020 (https://www.education.com/science-fair/article/make-thermometer/)

Thermometers tell us important information, like whether we should bring a parka or swimsuit when we go on vacation! There are two well-known temperature scales: **Fahrenheit** (F for short) and **Celsius** (C for short). Most people in the United States use the Fahrenheit scale; scientists and the rest of the world use the Celsius scale. The same number means very different things in the two scales. For instance, a comfortable room is 22 degrees in Celsius, but if a room was 22 degrees Fahrenheit, it would be below freezing, and your fingers would be frostbitten in no time.

Temperature scales are cool, but it's more fun to investigate how thermometers actually measure temperature changes. The key component is the liquid inside that moves up and down to indicate different numbers. What causes the liquid to move up and down? How do scientists choose what liquid to put inside?

Did you know you can make your own thermometer? In this project, you can investigate which liquids work best for thermometers by making three of them—each with a different liquid.

Materials needed:

- Refrigerator
- At least three equally sized small glass bottles or jars, ideally with metal lids. Baby food jars work great.
- Small nail
- Hammer
- Drinking straws (the narrower the better—short, hollow beverage stirrers work great. Transparent straws are best—this way, you can see colored liquid through it)
- Masking tape
- Waterproof marker
- Modeling clay or hot glue gun
- Water
- Rubbing (isopropyl) alcohol
- Food coloring
- Spoon

Optional:

- Hot water (just slightly warmer than bathtub water)
- Heat-resistant bowl or large measuring cup

Procedure:

1. Chill your containers of rubbing alcohol and water in the refrigerator.
2. Using the masking tape and waterproof marker, label your three containers. The first one should be labeled **water**, the second should be labeled **rubbing alcohol**, and the third should be labeled **water + rubbing alcohol**. The type of liquid in the thermometer is your **variable** in this investigation.

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How to Make a Thermometer Continued:

3. Remove the lid from each of your glass jars.
4. Have your adult helper hammer a small nail through the center of each container's lid. These holes should be about the same diameter as that of your straws.
5. Carefully push a straw though each of the holes. The straws should fit snugly in the holes, but not be pinched. At least an inch of the straw should be below the lid. This will vary depending on the size of your container and length of your straws.
6. Use the modeling clay or hot glue gun to completely seal the base of the straw around the openings. (If air can escape from the hole around your straw, your thermometer will not work!)
7. Fill container you labeled **water** with the chilled water.
8. Add a couple drops of food coloring. Stir.
9. Adjust your lid so that the bottom of the straw is submerged in at least 1/2 inch of liquid. The bottom of the straw should not touch the bottom of your container.
10. Screw the lid on tightly while making sure that your clay is still sealing the hole. We want to make sure that the jar is completely air tight.
11. Record how high the liquid is in the straw. Put the thermometer back in the refrigerator.
12. Repeat steps 6-11 using chilled rubbing alcohol instead of water.
13. Record where the line of liquid is in the straw. Put this thermometer back in the refrigerator.
14. Mix equal parts chilled water and alcohol. The actual amounts will depend on the size of your container.
15. Repeat steps 6-11 using the water-alcohol mixture to make a third thermometer.
16. Record where the line of liquid is in the straw. Put this thermometer back in the refrigerator.
17. Now, put your thermometers in a warm place. Every minute for ten minutes, observe the level of liquid in each straw (if you don't notice any change, recheck the seals on your thermometers).

Hint: If you still aren't seeing much liquid movement, you might try creating more of a temperature change by placing your thermometers in a container of hot water.

Results:

The thermometer made with the rubbing alcohol should show the fastest and most significant liquid movement. The thermometer made with water should show the slowest and least significant liquid movement. The thermometer made with alcohol and water should fall somewhere in between. Your results may vary because keeping the thermometers sealed can be tricky!

Here's how thermometers work: as the thermometer's surroundings get warmer, the liquid inside a thermometer expands and travels up the tube. As the thermometer's surroundings get colder, the liquid inside the thermometer contracts, causing the liquid travel back down the tube. The liquid is forced up the straw when it expands because that's the only place for it to go. It can't push the air out of the jar, because we made sure the edges of our jar airtight!

So why did alcohol perform the best? Water is very slow to expand or contract when it is exposed to hot or cold compared to alcohol. Water can absorb or lose a lot of energy without changing very much—that's part of the reason why water is such a great home for living things, but also why it doesn't make for the greatest thermometer liquid.

Going Further: You might try other liquids, like oil or liquid soap. If you want to do some research, you might find out why thermometers used to be filled with liquid mercury, and why mercury is no longer used.