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## SCIENCE OF CONCRETE: Concrete Making Activity

<b>STANDARDS COVERED</b>
<b>NGSS</b>
<b>MATTER &amp; ITS INTERACTIONS</b>
2-PS1-1, 2-PS1-2, MS-PS1-2, MS-PS1-3, 5-PS1-1, 5-PS1-2, 5-PS1-3, 5-PS1-4

**INTRODUCTION:** Concrete is a man-made building material created by mixing construction aggregate (i.e., sand and gravel), cement and water. It can be used in building foundations, road construction, decorative pieces and much more. The ancient Romans were the first society to successfully utilize this material on a grand scale. In this activity, students mix their own small batches of concrete.

Recycled aggregate (concrete) is generally not used in final concrete due to public agency requirements, but it is commonly used as base material for roadways and other construction projects to level the ground surface. This is a good point to discuss the human impact on the environment and how using recycled concrete reduces the need for virgin aggregate materials and avoids placing the material in landfills.

**DURATION:** 20 - 25 minutes

**PURPOSE:** To introduce students to the chemical reaction known as hydration that causes liquid concrete to change into a solid building material.

### **MATERIALS:**

- Pair of gloves
- Safety glasses
- Apron (*recommended*)
- Disposable plastic cup
- Wooden stir stick
- Tablespoons
- Bowls or containers for each material
- Plastic baggie (*optional*)
- Plastic to cover the desk
- River (concrete) sand
- 3/8" gravel
- Recycled aggregate (concrete) (*optional*)
- Cement powder
- Water

### **ACTIVITY**

- 1) In a cup, mix the following ingredients in this order:

- 6 tablespoons river sand
- 6 tablespoons 3/8" gravel
- 1 piece/pinch of recycled aggregate
- 2 tablespoons cement
- 3 tablespoons water

Note: to reduce the amount of material used in this activity, students may use smaller molds and reduce the ingredients to 2 tbsp river sand, 2 tbsp 3/8" gravel, 1 piece of recycled concrete, 1 tbsp cement and 1 tbsp water.

- 2) Thoroughly, mix all ingredients using a wooden stir stick. You may add a small amount of concrete pigment, if available.
- 3) Carefully, pour the mixture into the silicone mold. Gently, tap the mold on the table to get rid of air bubbles.
- 4) Have the students put their name on a plastic baggie. Then, place the concrete-filled mold inside a plastic baggie. Leave the baggie open so air can get into the baggie. Let the concrete cure. **This may take up to 24-48 hours.**
- 5) Once the concrete is hard to the touch, gently pull the silicone mold away from the edges of the concrete.
- 6) Turn the mold upside down in your hand or on the table to release the concrete from the mold.



## EVALUATION

Once the concrete has cured, ask the students to evaluate their concrete projects. Did the concrete hold together? Did the concrete crack or break?

