

# Kiewit Build Like a Girl: Concrete Creativity

**Kiewit**

**girl scouts**   
of colorado

Discover the exciting world of construction and engineering with Girl Scouts of Colorado's Build Like a Girl program, powered by Kiewit. In partnership with one of North America's leading engineering and construction organizations, this unique on-demand experience brings hands-on activities led by Kiewit experts through engaging video tutorials. Girl Scouts will explore concrete crafting, structural design with spaghetti towers, and/or bridge construction to learn critical engineering concepts—all while gaining insight into careers in this dynamic field. Upon completion of one activity, Girl Scouts will earn their exclusive Build Like a Girl patch, but Girl Scouts may complete as many of the Build Like a Girl Activities as they would like.

# Introduction:

## What is Concrete and Curing?

### What is Concrete?

Concrete is a mixture made from four key ingredients:

- Water (from the sky)
- Coarse aggregate (like gravel)
- Fine aggregate (like sand)
- Cement (a finely ground limestone heated to high temperatures)

Concrete is widely used in construction due to its durability, strength, and relatively low cost. It forms the foundation of buildings, infrastructure like airports, bridges, highways, and rail systems, and is found in homes, schools, and hospitals. Concrete is also low-maintenance, fire-resistant, and can be shaped into almost any form.

### What is Curing?

Curing is the process through which concrete hardens and gains strength. This happens through a chemical reaction called hydration, where the ingredients bond to form a solid, rock-like material. The curing process begins to strengthen the concrete over 7 days, continuing for up to 28 days. During this time, the concrete must be kept at the right moisture and temperature levels to achieve maximum strength.

The most common types of concrete curing methods include:

- Water curing
- Curing compounds

Check out this video explaining the activities below: <https://vimeo.com/1031712622?share=copy>

# Activity 1

## Concrete Cake

### Supplies:

- 1 pair of safety glasses
- 1 pair of gloves
- 1 t-shirt to protect clothing
- 1 silicone mold, placed within a 2" x 6" x 1' wooden support frame (prepared with a hole)
- 1 cup containing 0.50 lbs of quickset cement already sieved.
- 1 cup containing 0.20 lbs of water
- 1 bowl to stir the cement and water in
- 1 spoon to stir
- 1 flat piece of wood to screed (level) the concrete
- 1 cloth for cleaning

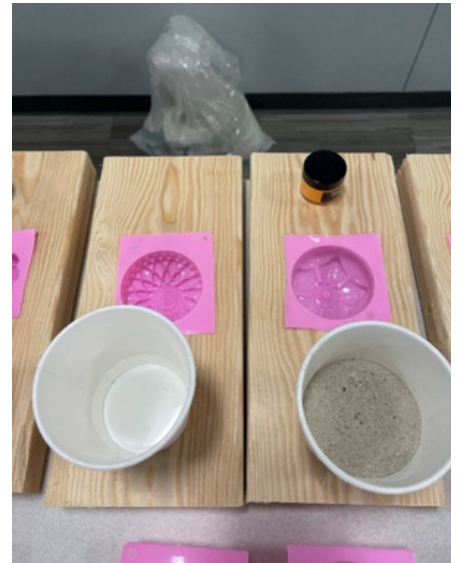
### Instructions:

1. Put on your gloves and safety glasses.
2. Practice gently shaking your empty mold to get used to how it feels.  
This will help when you fill it with concrete.
3. Start mixing the cement and water really well, so it's nice and smooth.
4. Slowly spoon the concrete into the mold, doing one layer at a time.  
After each layer, gently shake the wooden piece with the mold to help the concrete settle.
5. When the mold is full, carefully write your name on the wooden frame.
6. Let the concrete dry without moving it so it doesn't crack

Below are pictures of the activities to review prior to completing the tasks.

# Concrete Cake

Examples of stations set up:



The quickset cement and the water must be stirred in the bowl and stirred in less than 5 minutes to avoid initial hardening:



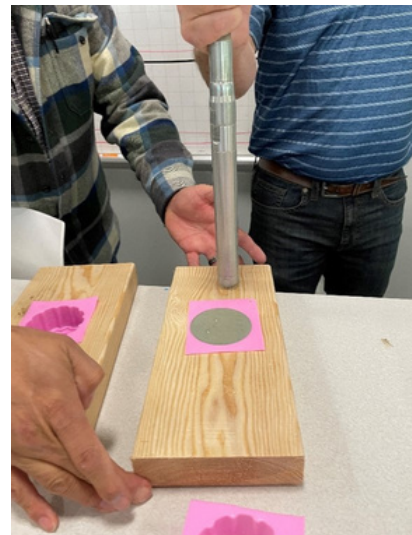


# Concrete Cake

After stirring, the newly mixed concrete must be carefully poured into the silicone mold in layers or spooned into the mold in layers:



After each layer of concrete is spooned into the mold, the wooden form needs to be shaken by hand to get the internal bubbles in the wet concrete out. You should be able to see the bubbles burst on the surface of the concrete, if no more bubbles come out you can continue with the next layer or next step. In the photo below you will see they are using a concrete vibrator to remove the bubbles. You will be done by hand by tapping and vibrating the wood mold until bubbles in the concrete are fully released.



# Concrete Cake

The poured pieces must dry for 1.5 hours before unmolding. Please write the name of the girl on the piece of wood to identify the owner later once the piece has hardened.



The dried pieces can be unmolded by lifting the silicone from the newly set concrete. Notice in the pictures that in some cases the bubbles were not totally removed, and cavities were created on the surface.



# Concrete Cake

Optional: After it is dry you can use craft paints to paint your new creation. You can opt to use different types of molds to get different shapes. You can also use different colored concrete like the ones you see below.





# Activity 2

## Concrete Stepping Stone

### Supplies:

- 1 pair of safety glasses
- 1 pair of gloves
- 1 – 8” circle or hexagon stepping stone mold
- 1 cup containing 2 lbs of pavement
- 1 cup containing  $\frac{3}{4}$  cup of water
- 1 bowl to stir the cement and water in
- 1 spoon to stir
- Colorful rocks or other decorations



### Instructions (Steps 4-7 must be complete within 5 minutes since it is rapid setting concrete):

1. Choose a space to work, preferably outdoors or a workspace with a disposable cloth underneath.
2. Select the decorations you want to use in your mold and practice the design you want to make.
3. Put on your safety glasses and gloves
4. Mix the concrete with the water in the bowl and stir. Mix until the concrete is even and smooth.
5. Pour the concrete mix into the mold.
6. Carefully tap the mold on the table to level the concrete in the mold and to get rid of air bubbles.
7. Insert decorations into the wet concrete.
8. Let concrete set up for 1 hour. It will get hot as it cures so don't touch. Mold can be removed after 1 hour.



# Kiewit Build Like a Girl: Concrete Creativity

Congratulations! You finished the Kiewit Build Like a Girl patch program. We hope you take this information you learned about engineering and share it with your friends and family.

Click [here](#) to request your FREE Kiewit Build Like a Girl patch!



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