



Concrete Structures

STEM Sims

Lesson 3: How Does Gravel Content Affect Concrete Strength?

Concrete consists of different materials, which includes gravel or rock. Gravel is the main substance that makes up the bulk of the volume of concrete. Is there a best mixture of gravel that produces the strongest concrete?

Doing the Science

1. Start the Concrete Structures Simulation by clicking on the “Sim” tab.
2. Click on the “Rebar Center” button. Do not select any rebar for this test.
3. Click on the “Mixing Center” button at the bottom center of the screen.
4. Select five bags each of cement, water, air, and sand. Do not add gravel. You must choose a total of 20 items to complete your mix.
5. Set the curing time to 10 days then click on the “Mix & Cure” button.
6. Test the strength of your concrete beam by adding weights. Record your results in Table 1 below.
7. Select the “Mixing Center” button to create a different mix of concrete.
8. Click on one bag of air, sand, cement, and water to remove them from the mixing table.
9. Add four bags of gravel to the mixing table.
10. Repeat steps 5 - 7.
11. Repeat steps 7 – 9, then steps 5 - 6 to test your new batch of concrete.

Table 1.

Trial	Gravel (bags)	Air (bags)	Sand (bags)	Cement (bags)	Water (bags)	Weight Supported (kg)
1	0	5	5	5	5	
2	4	4	4	4	4	
3	8	3	3	3	3	

Do You Understand?

1. Which mix of gravel resulted in the strongest concrete?
2. Discuss your results from the experiment. Why did one mix of gravel provide the strongest mix of concrete as compared to the other mixes of gravel?