

## Sieve Analysis – Classroom Exercise – Instructions

This section provides instructions on how to present a “Sieve Analysis” classroom exercise detailing a step-by-step process. ***Safety glasses and gloves are highly recommended for this exercise.***

**Step 1:** Make sure to review the needed supply list and get all the materials needed on hand. The number of materials may vary depending on the classroom size and number of participants.

**Step 2:** Use the U.S.A. Standard Test Sieve’s to separate sand & gravel in the specified gravel sizes matching the mesh screens. For this example we needed 4 sizes of gravel:

### Sand & Gravel

1. **Gravel A** > 3/8” (Largest gravel) (6 cups needed for this example)
2. No. 4 < **Gravel B** < 3/8” (6 cups needed for this example)
3. No. 8 < **Gravel C** < No. 4 (6 cups needed for this example)
4. **Gravel D** < No. 8 (this material is left in the catch pan)(smallest sand) (6 cups needed for this example)

**Step 3:** Weigh 1 cup of each material to determine the approximate weight of each material using the kitchen food scale and document. Weigh an empty ½ gallon mason jar and document. Ounces are the best unit of measurement for this exercise.

**Step 4:** Label 4 ea. ½ gallon mason jars 1 – 4 to keep track of how much material is going into each specified jar. For this exercise each jar received a minimum of 1 cup of each material along with an alternating 1 cup from 2 different materials. The total amount of material in each jar is 6 cups.

Example:

Jar 1: Gravel A = 2 cups, Gravel B = 2 cups, Gravel C = 1 cup, Gravel D = 1 cup

Jar 2: Gravel A = 1 cups, Gravel B = 2 cups, Gravel C = 2 cups, Gravel D = 1 cup

Jar 3: Gravel A = 1 cups, Gravel B = 1 cup, Gravel C = 2 cups, Gravel D = 2 cups

Jar 4: Gravel A = 2 cups, Gravel B = 1 cup, Gravel C = 1 cup, Gravel D = 2 cups

**Step 5:** Weigh each jar to get a total weight and to double check the math on to make sure nothing seems unordinary. For this example, each type of gravel weighed between 14 ounces and 16 ounces, so take an average of 15 ounces to double check the weights of the jars. **HINT:** Create an Excel Spreadsheet to enter the weights and calculations to be able to quickly check the math. See attached examples.

**Step 6:** Pour each jar of material in the U.S.A. Standard Test Sieve’s and shake side-to-side for approximately 10 minutes. Remove the top screen (3/8”) and pour the material into a measuring pour container. Place the lid back on the sieve and shake side-to-side for an additional minute. Remove the next top screen (No. 4) and pour the material into a measuring pour container. Place the lid back on the sieve and shake side-to-side for an additional minute. Remove the next top screen (No. 8) and pour the material into a measuring pour container. Finally pour the remaining material caught in the catch pan into a measuring pour container.

**Step 7:** Pour 1 each of the materials from the measuring pour container into the ½ gallon mason jar and taking a weight. \*Make sure to only pour 1 type of material into the jar. Also, make sure the lid is also on the jar. Document this weight on the activity handout. Pour the material from the jar back into the measuring pour container.

**Repeat Step 7** until all materials have been weighed and documented on the activity handout. You should have completed Step 7 a total of 4 times!

**Step 8:** Complete the classroom activity handout by performing the math calculations to find the end results. You are looking for both the weight of materials being retained on each screen along with the weight of the material passing through the screen.

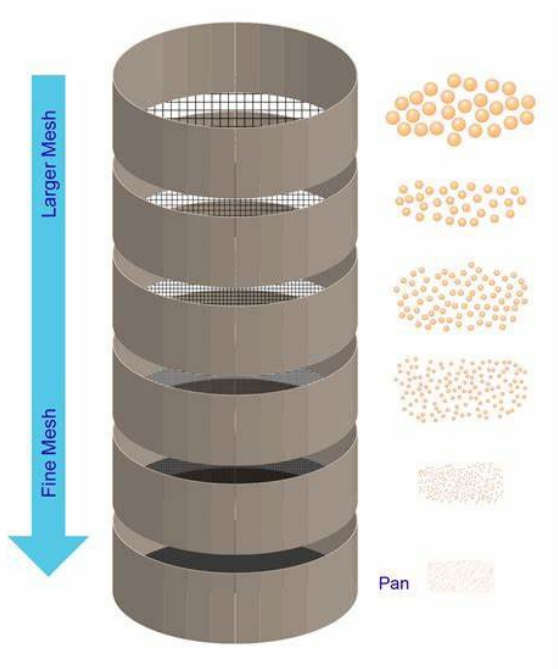
**Step 9:** Q&A \***HINT** – make sure to emphasize how this is used in an actual construction project along with the job opportunities this type of work provides.

**Step 10:** Return all materials back into the ½ gallon mason jars and cleanup.

**Congratulations you have completed a hands-on activity!!**

**Tips:** For materials, contact your local Sand & Gravel company, Earthwork Contractor, Materials Testing Lab, Department of Transportation, or Municipality for donations.

**Example Photos:**



Sieve Size (mm)	TPI	
	Passing %	Retained %
75	100	
63	100	
50	100	
37.5	100	
28	100	
20	100	
14	100	
10	98.25	1.75
6.3	90.04	9.96
5	84.08	15.92
3.35	75.47	24.53
2.0	62.23	37.77
1.18	46.34	53.66
0.600	25.82	74.18
0.425	13.24	86.76
0.212	5.30	94.70
0.150	0.66	99.34
0.075	0.00	100.00
0.063	0.00	100.00