

Visible Elements in Photo



- Fine white/light-colored sand (primary matrix)
- Numerous small pebbles and rocks in varied colors (tan, brown, red, gold, dark gray/black)
- Particles of varying sizes mixed throughout
- Natural, unstructured surface with no human-made objects
- Compact, densely-packed material suggesting coastal or beach environment

Reasonable Inferences

- From mixed rock colors and sizes: This sand comes from multiple rock sources that have been broken down and transported by water, meaning different materials must be separated by size and type for different purposes.
- From fine sand + pebbles combination: The coarser pebbles settling among fine sand suggests gravity and water movement sort particles by density and size—a principle useful for filtering or sorting tasks.
- From compact appearance: The material is stable when dry but may shift or compact differently when wet, presenting structural challenges for building with it.

Engineering Task

K-2 Challenge:

You are a beach builder! Use sand and small rocks to make a tall pile that doesn't fall down. Can you build it higher by mixing the sand and rocks in a special way? Try different ways of stacking and mixing to see what stays up longest.

3-5 Challenge:

Design a filtration system to separate beach sand into three size categories (fine sand, medium pebbles, large rocks) using only classroom materials. Your filter must:

- Separate materials into at least 3 distinct piles
- Work with a single pour-through (no re-filtering)
- Complete separation in under 2 minutes
- Handle a cup of mixed material without clogging

Test your design and measure which particle sizes end up in each layer. Which size was hardest to separate?

EDP Phase Targeted

Ask / Define Problem — This real-world photo of mixed sediment naturally raises the question: "How can we sort materials of different sizes?" Students observe a problem (mixed particles) and must first identify why separation matters before designing a solution. The visible diversity of materials invites curiosity about sorting.

Suggested Materials

- Sand (play sand or beach sand if available)
- Small pebbles or gravel

- Shallow containers or trays
- Mesh screens or strainers (multiple sizes if available)
- Paper cups with holes poked in the bottom
- Funnels and paper towels or coffee filters

Estimated Time

One 40-50 minute session (K-2: shorter; 3-5: includes testing and redesign iteration)

Why This Works for Teachers

This task directly supports NGSS 3-5-ETS1-1 (Define a problem that can be solved with a designed object or tool) by asking students to identify and solve a real materials-handling challenge inspired by natural sediment sorting processes.