

# Porosity and Permeability Activities

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## Where Does the Water or Oil Go? Activity

Materials: Clear bottles of dry sand, cups of water (one for each bottle of sand)

- Pass out bottles of dry sand and ask what will happen if they pour water on top of the sand. Where will the water go? Will it stay on the top or go directly to the bottom? Allow students to come up with a guess about what will happen.
- Pass out cups of water to students and tell them to slowly pour the water in and observe what happens.
- Ask students what happened when they poured the water into the sand. Students should answer that the water went into the sand and spread out, not pooling on the top or the bottom.
- Tell students that the water filled in the spaces between the sand grains.

## Porosity and Permeability Activity

Materials: Students, large open space

- Tell students that they are going to become examples of porous and permeable rocks. Have students stand up and group together in an open space. Have them stand close to one another, but not touching each other. Tell them that they are now grains of sand that are going to become a sedimentary rock.
- Have students reach out and take the hand of another student nearby. Make sure that both hands are not connected to the same person. Tell them that they have just turned into a sedimentary rock. Ask them to look around them without letting go and notice the “pore spaces” between them. Ask if something could flow through easily in their pore spaces.
- Ask if they are a rock with high permeability or low permeability. If they have a high permeability, then things should easily be able to flow through.
- Tell students to take one step towards the middle, being careful not to crush anyone. Ask again if they have a high permeability or low. They should now be a lower permeability because the space between them should be tighter.

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## Enhanced Oil Recovery/Carbon Dioxide Sequestration Activity

This activity is adapted from the Keystone Science School's Climate Status Investigations Curriculum at <http://www.keystonecurriculum.org/>. The original lesson plan from Keystone is also available on our website and contains a diagram of the set up as well as questions for teachers to pose to their students. It is also available at [http://www.keystonecurriculum.org/highschool/week4/lesson\\_16.html](http://www.keystonecurriculum.org/highschool/week4/lesson_16.html).

Materials Per Setup: Three Erlenmeyer flasks, two rubber stoppers with two holes in each, three pieces of plastic tubing, small pebbles, small "catcher" container, dark colored water, baking soda, vinegar, safety glasses, syringe

- Have students set up activity as shown in Keystone lesson plan, but add pebbles and just enough of the colored water to cover them to the center flask. The other should contain about a tablespoon of baking soda.
- One piece of plastic tubing should go from one rubber stopper to another, one should go from one rubber stopper down into the flask with baking soda, one should go from the rocks flask to the catcher container.
- Have students carefully fill their syringe with vinegar. Have them inject a small amount into the tube which goes into the flask with baking soda.
- The vinegar and baking soda will react to create carbon dioxide. The gas will then go into the beaker with rocks and force the colored water (or "oil") out of the rocks and through the tube into the catch flask. The activity may be repeated by pouring the colored water back into the rocks and adding more baking soda and/or vinegar.

## Where In The World Do We Use That? Activity

- Pass out Where In The World Do We Use That? Sheet.
- Ask students to come up with as many things as they can that are made from these minerals. Give them five to ten minutes to complete. This can be done individually, in partners or in groups.
- Ask students to share their answers.
- Pass out the Rock and Mineral Uses sheet. Have students read through and come up with two more things per mineral that it is used for.
- Ask students if they knew that rocks and minerals were used in so many of their everyday items.