

# Parking Lot Gravel

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Gravel parking lots are an easily accessible but often overlooked geologic resource for teachers and students at most rural schools. The type of gravel found is usually indicative of an abundant nearby source. So, even though it is not *in situ*, it does give some clues about local rock types. In this way, comparisons can be made about different regions. This is also a good way to begin considerations of human impact on the land and the use of natural resources. In this activity, models are used to determine why gravel is used on parking lots.

**TIME:** 30 minutes for Pre-lab and Procedures; 30-60 minutes for Further Challenge.

## PROCEDURES:

**Pre-lab preparation:** Cut the top off of two of the soda bottles close to the curve. Use a graduated cylinder or measuring cup to measure out a known quantity of water. Pour this into the soda bottle and mark this level with a marker. Do the same to the other soda bottle. Cut the bottom off of the other two bottles. Using the rubber bands, put netting over the mouths of the two bottles that still have tops. Invert these into the first two bottles. A small hole must be cut in each of the lower bottles in order to allow air to escape during the investigation.

The following may be done in groups or as a whole class experiment:

1. Place some gravel in the top section of one of the soda bottle columns.
2. Put soil in the other column to the same level.
3. Pour water into the top of the gravel column, timing how long it takes to reach the marked level; or time how long it takes for a certain quantity of water to drain through. Repeat for the soil column and any other materials. Record data and observations.
4. Students should provide a well-worded hypothesis to explain the observations and data.
5. The economic and environmental impact of simple crushed stone versus soil versus pavement should be explored.

## OBJECTIVES:

- Increase awareness of human impact and use of a natural resource.
- Use models to observe differences in properties of materials.
- Determine why gravel is in parking lots.

## Materials and Equipment:

- 4 plastic soda bottles (1 or 2 liter)
- Plastic or cloth netting (gauze or cheesecloth)
- 2 rubber bands
- Gravel
- Soil
- Sand, asphalt, clay, or other material (optional)
- Container for water
- Timer or watch
- Sample data table (sample included)

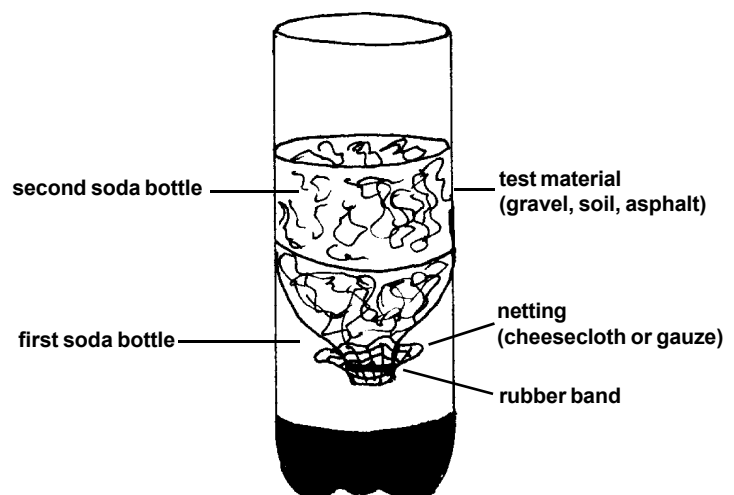
## ASSESSMENT:

Tell students they are preparing a report for an environmental company evaluating parking lot construction. Students can prepare a short written description of their findings. In the course of their paper, they seamlessly incorporate answers to the following questions:

- What would happen to rain that landed on packed soil? Describe what a dirt parking lot would look like after a heavy rain.
- What would happen to rain that landed on a parking lot that was covered with a thick layer of gravel? What would this parking lot look like after a heavy rain?
- Many parking lots are paved. What would be the advantages of this? What would happen to rain that landed on a paved parking lot?
- Why do people put gravel on parking lots?

## Teaching Suggestions:

- Use a key or field guide to identify the rock types in the samples.
- Use a geologic map showing exposed rock types and locate the collection sites for the samples. Is there any correlation between the exposed rock types and the gravel sample?
- Test the pH of water before and after it runs through the gravel sample.
- Observe gravel samples from other states. Compare these and hypothesize why they are different or similar.



**Further Challenge:**

- Is all parking lot gravel the same?

**Further Challenge Questions:**

- a. Describe the properties of the rocks in your gravel sample. Include any similarities and differences that you noticed.
- b. Did any of your observations give any clues about the type of place where this rock was formed or where this rock has been?
- c. Compare your sample to those of the other groups. Is there anything that is unique about your sample? Explain. Describe the similarities and differences among the various samples.

**Materials:**

- Various samples of gravel (these could include student- or teacher-collected samples. Samples could be collected as a class activity).
- Each group of students conducts an open-ended investigation to determine as much as possible about the properties of the gravel pieces in a given sample. Students should also look for weathering effects and fossils. Each group presents their findings and explanations of the rocks' geologic and economic history.