



Rain on the Parking Lot

Formative Assessment Probe

Mrs. Gomez brought her students outside to the front of their school on a sunny day. She explained that the weather forecast for the next day called for heavy rain. She asked the students what they think happens when rain falls on the asphalt parking lot outside their school. This is what some of the students said:

Angela said: "The rain will soak into the parking lot and make it change to a darker color."

Carlos said: "The rain will land on the parking lot and then run downhill."

Destiny said: "The rain will evaporate from the parking lot and become water vapor in the air."

Which student do you most agree with? _____

Explain your thinking. What "rule" or reasoning that you used to decide what would happen to rain that falls on the parking lot?

Rain on the Parking Lot – Teacher Notes

Purpose – The purpose of this assessment probe is to elicit students' ideas about how rainwater interacts with impervious surfaces. It specifically probes to find out if students recognize that water on impervious surfaces moves downhill.

Related Concepts – watershed, water cycle, geography, impervious surfaces

Explanation – The best response is from Carlos: The rain will land on the parking lot and then run downhill.

Impervious surfaces such as parking lots (sidewalks, driveways, roads, and rooftops) are covered with impenetrable pavement materials that prevent the absorption of water and other liquids. Therefore, rainwater that lands on these materials are not absorbed, but will instead be carried by gravity downhill, along with whatever surface contaminants (fertilizers, petroleum products, wastes) are picked up along the way. From a 2008 Seattle times article: “While urban areas cover only 3 percent of the U.S., it is estimated that their runoff is the primary source of pollution in 13 percent of rivers, 18 percent of lakes and 32 percent of estuaries.” (Cappiello, Dina. ["Report: EPA Failing to stop Sprawl Runoff."](#) Seattle Times, 16 Oct. 2008). The amount of impervious surface coverage is correlated with urbanization.

Extensions: Fill several 2-liter bottles with water and head outdoors. Identify several types of ground cover (sidewalk, grass, parking lot, gravel, bark chips, etc.) and conduct controlled experiments to determine what happens when a bottle of water is released at each site. Make predictions and test hypotheses.