Revisit the Concept of Air

Reflecting on Air

1. Immediately following the investigations above, ask your students to share their drawings.
2. Begin with the cup investigation, and confirm that everyone drew or circled the same arrangement. (*If different arrangements were chosen, ask someone to repeat those arrangements to test the wetness of the material in the bottom of the cup.*)
3. Ask the students to explain why the straight down approach worked while the others did not. Coach the students as they respond until everyone gets the idea that the cup was filled with "something" that kept the water from getting to the puffs. What might that something be? Ask the students to label this space on the drawing as "Air".
4. Now have your students reflect on the wood, mallet and paper experiment. Ask them how air is involved in what happened. (*They should be able to conclude that the air acted like hands holding down the wood. You might need to explain that the newspaper allowed for even more air to push down since a bigger surface was involved.*)
5. Ask students to add an arrow to their drawing labeled with the word "air" to show that air was responsible for holding down the wood on the table.
6. Finally ask the students what they have learned about air. (*A concept map would be an ideal way to organize their understanding.*)

Linking to Weather

As a result of their observations and experiences, students should be ready to understand that, although they live "ON" Earth, they live "IN" air. They may need your help in beginning to understand that the weather conditions they experience, the ones that scientists measure and track, are actually air or atmospheric conditions that we refer to as weather. The properties of air that have been addressed in these activities (i.e. that air is matter; exerts force on things, takes up space and exerts pressure) are just some of the properties that influence weather.
In further experiments, you will invite your students to make air measurements and atmospheric observations similar to those used by scientists to make predictions about everyday weather.

Digging Deeper

Atmospheric Pressure

Air has weight. That idea might seem strange to you, because air seems very thin, even at sea level. Remember however, that the atmosphere extends to great altitudes. The pressure of the air is equal to the weight of a column of air above a unit area on the land surface. The column of air above a square area that is one foot on a side is about 14.7 lb., at sea level. In the metric system, that's about 72 kg per square meter. If you try to pump the air out of a closed container, the container will collapse inward from the outside air pressure, unless it is very strong. The reason you don't feel the air pressure is that the pressure inside your body is adjusted to be exactly the same! Air pressure decreases upward in the atmosphere. That's because at higher levels in the atmosphere there is less air above to cause the pressure.
Detailed weather maps show the atmospheric pressure by means of curved lines called isobars. As with an isotherm for temperature, an isobar connects all points with the same atmospheric pressure. There is one difference with isobars, however. The pressure at the land surface is less where the elevation of the surface is high, so the pressure is "corrected" to sea level. The corrected pressure is what you would measure at the place if you could dig a very deep mine all the way down to sea level and put your barometer at the bottom of the hole. The corrected pressure is used on weather maps.

High-Pressure Areas and Low-Pressure Areas

Most weather maps show areas, labeled with an H, where the atmospheric pressure is relatively high, and areas labeled with an L where the atmospheric pressure is relatively low. The isobars around such areas are closed curves with the approximate shape of circles. High-pressure areas are places where the atmosphere is relatively thick. Winds blow outward from these areas, although in a spiraling way. As air leaves the high-pressure area, the remaining air sinks slowly downward to take its place. That makes clouds and precipitation scarce, because clouds depend on rising air for condensation. High-pressure areas usually are areas of fair, settled weather. Low-pressure areas are places where the atmosphere is relatively thin. Winds blow inward toward these areas. This causes air to rise, producing clouds and condensation. Low-pressure areas tend to be well-organized storms.

Weather Unit Sections

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Air
What is there between you and me?
How can you tell air is "something?"
What can air do when it presses on things?
Revisit the concept of Air
Temperature
Wind
Clouds
Weather
