Try This at Home Science:
Shaving Cream Clouds

Activity Overview:
Observe how the precipitation portion of the water cycle works!

Materials:
- 1 clear glass
- At least 1 additional glass or bowl
- Water
- Liquid food coloring
- Shaving cream
- Pipette or dropper
- Towels

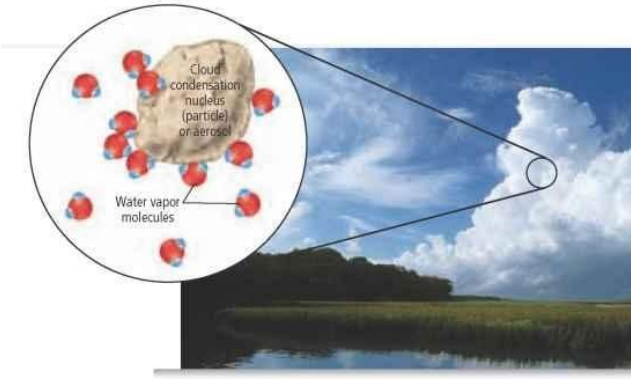
Try this!
1. Fill your clear glass halfway to two-thirds full of water.
2. Fill the remaining space with a shaving cream “cloud”.
3. Place 3-5 drops of food coloring into your additional glass or bowl and fill with water until the water has reached your desired shade. *darker or bright colors will show up better.
4. Fill your pipette or dropper with colored water, or use a spoon to slowly drip the colored water on top of the shaving cream.
5. Continue to add colored water until you see the colors start “precipitating” out of the bottom of your “cloud”.

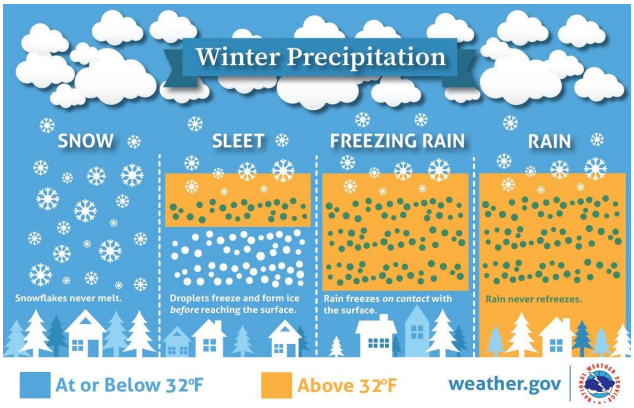
What’s happening?
The water in the clear glass is representing the atmosphere between the Earth and the clouds. The shaving cream represents the condensation of the cloud, and the colored water represents the water droplets condensing within the cloud in the upper atmosphere. Finally, the colored water coming out from the bottom of the “cloud” represents precipitation falling to Earth.

In order for the colored water to make its way through the shaving cream cloud and into the clear water, a collection needs to form in a single place on the cloud. Once that collection has grown heavy enough, the colored water will force its way through the shaving cream and out the bottom of the “cloud” creating a cascade of color.

How does this relate to how clouds form and create rain and precipitation?

When the sun warms collections of water on Earth, like ponds, lakes, puddles and oceans, the water increases in temperature causing the molecules to become excited. As the water molecules are warmed, they collide with one another. The molecules that are closest to the surface get bumped so hard that they are knocked loose from the liquid, forming water vapor. This process is known as evaporation. Water molecules will rise into the atmosphere until they reach cooler temperatures.





At this point, if there are condensation nuclei present (dust particles, ice crystals, pollutions, etc.) the water vapor will attach to the nuclei which form clouds. Once the nuclei have had enough water vapor condense on it, the mass becomes too great to continue to be held up by the cloud. The droplets of water fall back to the Earth as precipitation and can occur in many forms including rain, sleet, snow, freezing rain, and hail. What form we observe on the surface of Earth is determined by the air temperatures between the clouds and the ground.

Now try…

- Use warm water for the “atmosphere”, and cold water for the colored “rain”. What did you notice? Did the experiment run faster or slower than before? Was it easier or harder to see the “precipitation”?
- Use cold water for the “atmosphere”, and warm water for the colored “rain”. What did you notice? Did the experiment run faster or slower than before? Was it easier or harder to see the “precipitation”?
- Add small beads into the cloud as larger “condensation nuclei” and repeat the experiment. What did you notice? Was the rate of “precipitation” faster or slower than before?

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