Dropping Water

Materials

- Plastic cup
- Pen or scissors for making a hole in the side of the cup
- Water

Instructions

1. Make a hole in the side of a plastic cup, close to the bottom.
2. Fill the cup with water and observe how the water pours out through the hole.
3. Cover the hole with a finger and refill the cup with water.
4. Ask the children to predict what will happen if the cup of water is dropped from high above the ground.
5. Drop the cup and notice that the water falls with the cup and does not pour out of the hole in the side of the cup while the cup is falling.

What happens?

When the cup is held still, the water pours out through the hole in the side of the cup because gravity is pulling the water down towards the Earth. The cup stays where it is because of the hand holding it. However, if the cup is dropped, the cup and the water both fall downwards because of gravity. The cup and the water fall at the same rate, so there is no way for the water to pour out through the hole, until the cup stops moving.

When the water pours out through the hold, the stream of water moves out to the side and down to the ground. This is due to water pressure from the water in the cup pushing the water sideways.

Related activity

Hold a metal Slinky spring high above the ground. Let most of the spring hang down towards the ground and predict what will happen to the bottom of the spring of the top of the spring is dropped. Let go of the spring and see how the bottom of the spring remains stationary until the top of the spring catches up with it. There are slow-motion videos of this activity here: https://youtu.be/Tdh_R7po6Dw

Although gravity is pulling down on every part of the spring, the upper parts of the spring are pulling up on the lower parts of the spring, causing the bottom of the spring to stay still for a split second.

