

THE CLINGING WATER STREAMS

A. Question: *Do water molecules have forces between them?*

B. Materials Needed:

1. An empty milk carton or tin can.

C: Procedure:

1. Make three small holes on one of the sides near the bottom of the milk carton- about 1/2cm away from each other.
2. Fill the carton full with water and observe the water streams coming out of the holes.
3. Bring the streams together with the fingers to make one big stream.
4. Separate the streams by pushing one finger through the middle of the large stream (it usually takes several tries to separate them).

D: Anticipated Results:

Students should observe the three separate streams come together due to the cohesive forces between water.

E: Thought Questions for Class Discussion:

1. Why does the water stay in one stream once they are brought together?
2. How far can the holes be placed apart for the water still to be able to cling together?
3. Is it easier to separate (or bring together) the streams with a full or almost empty carton?

F: Explanation:

The closer the holes are placed in the carton, the easier to get a whole stream out of the carton, but the harder to separate it into three separate streams. The farther the holes are, the harder to bring the separate streams together. It is the **cohesive forces** between the water molecules that keep the streams together. The fuller the carton, the larger the pressure, and the easier the separate streams are obtained. With less water in the carton, we will get lower water pressure and thus an easier cohesive whole stream.

We find this phenomenon in daily life in the shower head with the many holes in it. When the valve is turned wide open, separate streams are distinguished, but when the valve is only partially opened, the many small streams will cling together and form one whole stream.