

Water's Hidden Pull

Read how water's attractions cause visible effects.

8.6.C "describe the properties of cohesion, adhesion, and surface tension in water and relate to observable phenomena such as the formation of droplets, transport in plants, and insects walking on water;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Circle each property name, then write 1, 2, and 3 beside sentences that explain droplets, upward water transport in plants, and walking on water.

Why Water Acts This Way

- ① Water molecules are polar: one side has a slight negative charge and the other side has a slight positive charge. Nearby water molecules attract one another because opposite charges pull together. This attraction among molecules of the same substance is cohesion. Cohesion helps water hold together. After rain lands on a waxy leaf, water often gathers into rounded droplets instead of spreading into a thin, flat layer. The molecules pull inward on one another, helping the droplet stay together.
- ② Water also interacts with other materials. Adhesion is attraction between water molecules and molecules of a different substance. In a plant stem, water adheres to the walls of narrow xylem tubes. Cohesion keeps a connected column of water from breaking apart, while adhesion helps it cling to the tube walls. As water evaporates from leaves, it pulls on the column below it. Together, cohesion and adhesion help move water upward from roots to leaves, even against gravity.
- ③ At water's surface, molecules have fewer neighboring water molecules above them than beside or below them. Cohesion pulls the surface molecules inward, creating surface tension, a tight, stretchy effect at the surface. A carefully placed paper clip may rest on water without sinking because the surface supports it. Some insects, such as water striders, spread their weight over long, water-repellent legs. Their legs press the surface into small dips, but the surface does not break, so the insects can walk on water.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How does cohesion help a water droplet stay rounded on a waxy leaf?

2 Describe the difference between cohesion and adhesion. Then state how each helps water move through a plant stem.

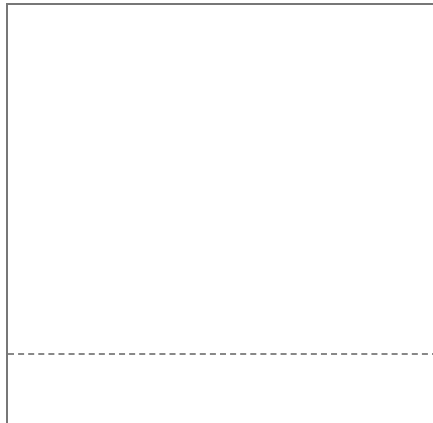
3 What change in the leaves helps pull water upward from a plant's roots? Explain what is pulled.

4 Why can a water strider walk on water without breaking the surface?

3 YOUR TURN _____ Your own words

Create three labeled panels showing water in action: a droplet on a surface, water moving upward through a plant stem, and an insect standing on water. Under each panel, write one sentence that names the property or properties involved and explains the observable effect.







PART 1 • READ AND MARK

Circle each property name, then write 1, 2, and 3 beside sentences that explain droplets, upward water transport in plants, and walking on water. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How does cohesion help a water droplet stay rounded on a waxy leaf?	Cohesion pulls water molecules inward toward one another, helping the droplet hold together instead of spreading flat.
2	Describe the difference between cohesion and adhesion. Then state how each helps water move through a plant stem.	Cohesion is attraction among water molecules, and adhesion is attraction between water and a different substance. Cohesion keeps the water column connected, while adhesion helps water cling to xylem tube walls.
3	What change in the leaves helps pull water upward from a plant's roots? Explain what is pulled.	Water evaporates from the leaves. This pulls on the connected column of water below it.
4	Why can a water strider walk on water without breaking the surface?	Cohesion creates surface tension at the water's surface. The strider's long, water-repellent legs spread its weight, so the surface bends into dips without breaking.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A rounded bead of water on a car hood, labeled cohesion. Cohesion pulls the water molecules together, so the water forms a droplet. Panel 2: Water rising through a plant stem, labeled cohesion and adhesion. Cohesion keeps the water column connected, and adhesion helps it cling to the xylem walls. Panel 3: A water strider making small dips on water, labeled surface tension. Surface tension supports the insect because its legs spread its weight over the surface.

Accept equivalent explanations that correctly distinguish cohesion, adhesion, and surface tension. In the plant panel, students should identify both cohesion and adhesion and connect them to upward water transport.