Magical Toothpick Stars

Stem Activities

Ages: 3-5

Less than 30 minutes

Grownup needed

How can you transform a loose five-pointed star into a perfect star using just water? This simple experiment will lead children to explore capillary action and water surface tension.

Materials Needed

Plate
Five toothpicks
Dropper
Water

Step-by-step tutorial

Step 1

Fold each of the five toothpicks in the middle, being careful not to break them.

Step 2

Next, arrange the toothpicks on the plate as shown, forming a star shape with some space in the middle.

Step 3

Using the dropper, add 3-4 drops of water to the centre of the star shape, and wait patiently to see what happens.

The Science Behind It:

Surface tension is the attractive force between molecules at the surface of a liquid, which keeps the liquid surface in a "taut" state. When you add water to the centre of the star, the water's surface tension pulls the toothpicks closer together. Additionally, toothpicks are made of wood fibres, and capillary action is particularly noticeable at their broken points. When water is absorbed through capillary action, the toothpick fibres tend to return to their original state and expand (similar to how "paper flowers" bloom). This is why the star first contracts and then expands outward after the toothpicks come together.