



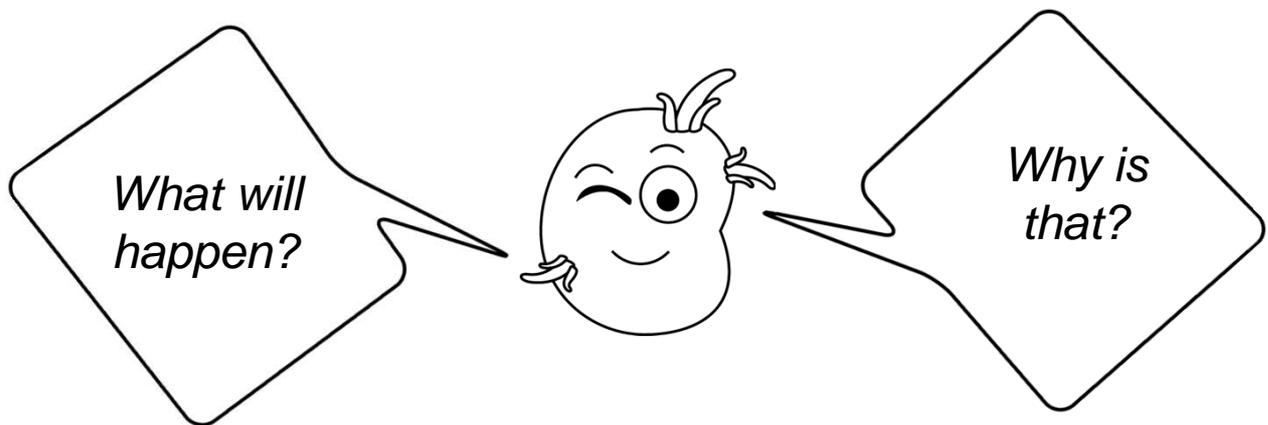
Scientific explanation

The rotating root

The seed's skin stretches and the bean starts to look wrinkled. After two or three days, a white tip appears – the root. It grows about a centimetre a day.

As soon as the root has grown slightly, the glass should be rotated 90°.

You will notice the root will try to grow downwards again. Turning the jar makes the root grow in a circle. If you carry out the experiment over a longer period, you will produce a spiral.



Roots always grow downwards. They are attracted by gravity to grow towards the Earth's centre.

The seeds of a plant contain the germ and the nutrients for the germ. Thanks to the hard seed coat that protects their contents, seeds can lie dormant for a long time. As soon as the seed comes into contact with water, the growth cycle begins. The seed takes on water and grows larger. First, the seed root emerges. A few days later, the seed leaves appear and grow upwards with the shoot (in the glass, only until the nutrients from the seed have been used up, because the cotton wool does not contain any nutrients).

A chemical substance in the seeds called auxin provides the information: grow towards the light and push the root down towards the centre of the Earth. It doesn't matter in which direction the seed points; roots always grow down and the stem always grows up.