Check your understanding

1. Why do plants need nitrogen-fixing bacteria?
   Answer: Plants cannot get nitrogen from the atmosphere. They rely on this special type of bacteria to convert atmospheric nitrogen into ammonia, which they can then use.

2. What roles do bacteria have?
   Answer: We know that some bacteria can cause diseases, infections, and food poisoning. But some are important for life. Bacteria help us digest food, protect our immune system, and break down materials in the soil.

3. Why could shorter plants be more useful?
   Answer: Shorter plants need fewer resources like water and nitrogen to grow. Our shorter plants also produced more seeds!

4. How does using chemical fertilizers cause environmental harm? Can you think of any other reasons that we didn’t mention?
   Answer: We talk about nitrogen fertilizers and how a lot of nitrogen is lost to the atmosphere, which contributes to greenhouse gases. These fertilizers also can leach into waters and cause eutrophication. They can cause harm to other organisms and to the soil, too. This can have a negative effect on the food chain, and even to us if it enters our food. Overuse of chemical fertilizers can also cause soil acidification. Sometimes fertilizers damage the plant through chemical burns, too.

5. What environments do bacteria like to live in? Share what you know in your group or class.
   Answer: In this experiment, we saw that bacteria like to grow in less oxygen. But this is dependent on the type of bacteria. Some bacteria can live in crazy places, like in lots of salt, or really high or low temperatures. They can even survive in space!

How was nitrogen uptake affected in the edited plants compared to the control plants?
   Answer: The edited plants show that they took up more nitrogen in comparison to the control plants. When the plants were older, this effect was less. But there is still an increase in nitrogen uptake even in older plants when they are edited to produce more apigenin.