2 How seeds sprout

A seed contains a tiny plant and a store of food. When conditions are favourable, the seed bursts open and the plant grows out.

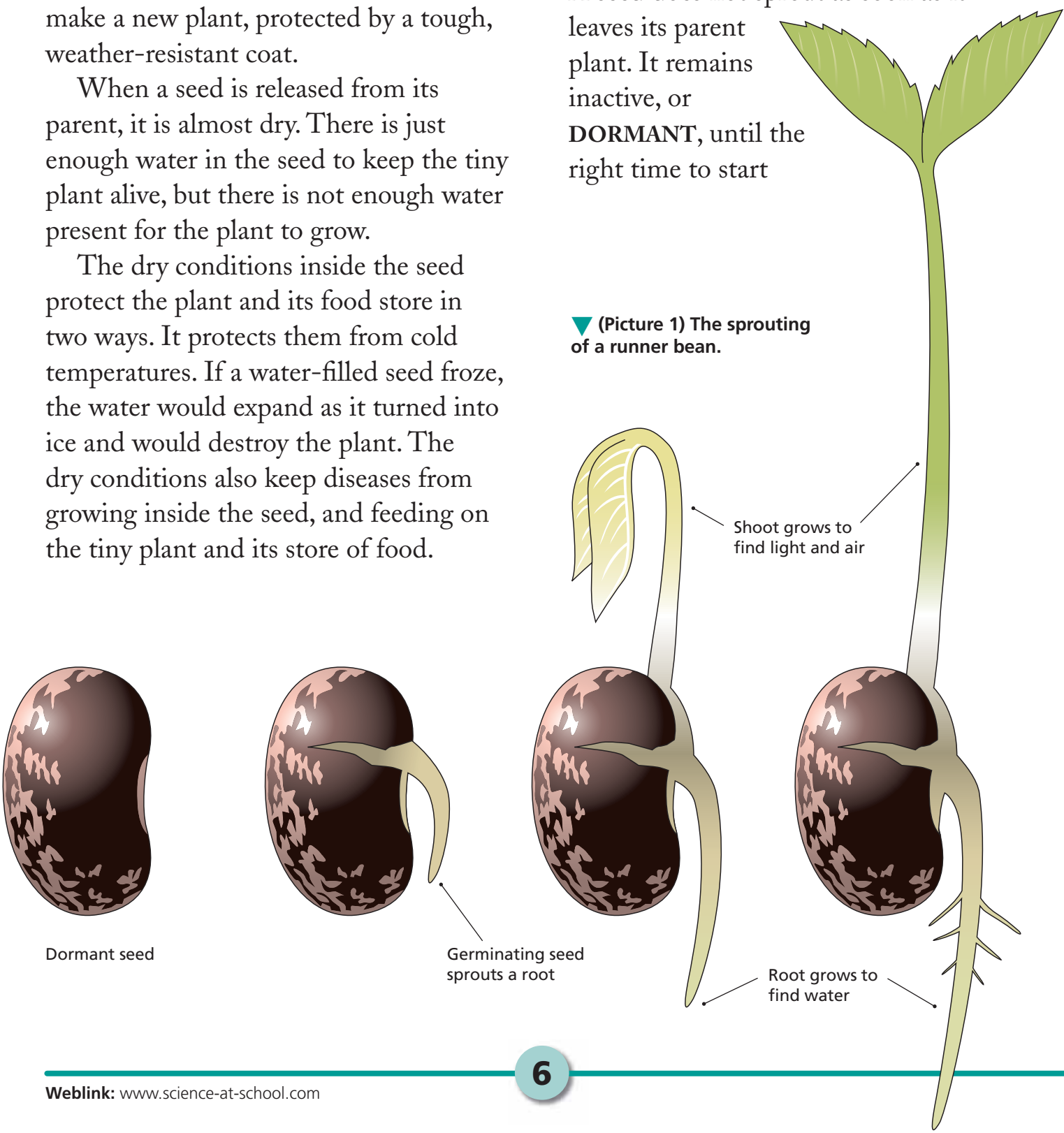
A plant's life cycle begins with a seed. A seed contains all the materials to make a new plant, protected by a tough, weather-resistant coat.

When a seed is released from its parent, it is almost dry. There is just enough water in the seed to keep the tiny plant alive, but there is not enough water present for the plant to grow.

The dry conditions inside the seed protect the plant and its food store in two ways. It protects them from cold temperatures. If a water-filled seed froze, the water would expand as it turned into ice and would destroy the plant. The dry conditions also keep diseases from growing inside the seed, and feeding on the tiny plant and its store of food.

Dormancy

A seed does not sprout as soon as it leaves its parent plant. It remains inactive, or **DORMANT**, until the right time to start



▼ **(Picture 1) The sprouting of a runner bean.**

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growing. For example, it may not start to grow until conditions are warm enough or the soil is moist enough.

Germination

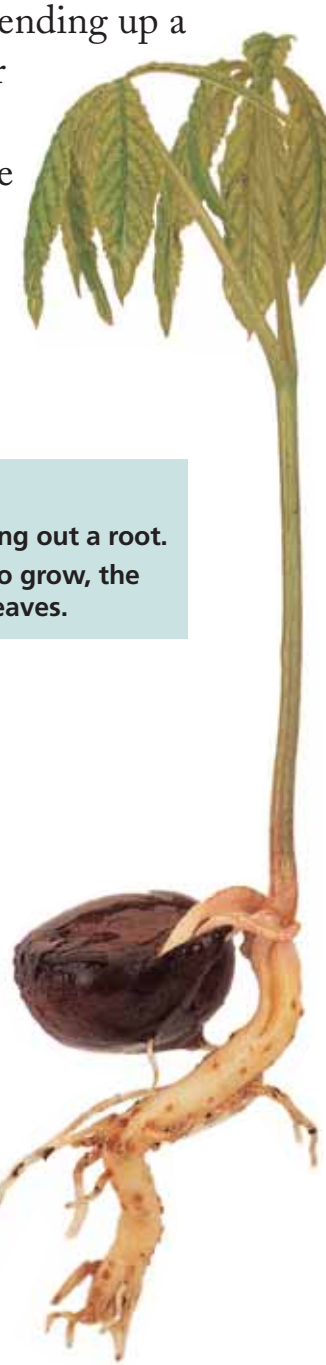
The food stored in the seed is used by the tiny plant to give it the energy and materials it needs to begin growing. However, the seed also needs water and minerals (from the soil), oxygen (from the air) and sunlight (for energy) if it is to grow into a fully grown plant.

The seed begins by taking in water and air through a small hole in the outer coat of the seed.

As the plant grows, the first thing it needs is more water, so the first part of the plant to grow out of the seed is the root. When the seed begins to grow, and the root appears, the seed has **GERMINATED** (Pictures 1 and 2).

The seedling

With a reliable water supply from the root, the plant can grow large enough to split open its seed coat. This allows more oxygen to reach the plant. Then a shoot (which will carry the stem, leaves and flowers) emerges from the seed. By this time the seed's energy is all but used up, so it must get new energy from sunlight. It does this by quickly sending up a stem and growing a pair of leaves. A green-coloured chemical in the leaves traps sunlight and turns it into energy and food for the growing seedling.



Summary

- A seed germinates by sending out a root.
- To get the energy it needs to grow, the seed produces a stem and leaves.

(Picture 2) The stages of the sprouting of a chestnut tree. This is a long-lived (perennial) plant. Compare it to the short-lived (annual) runner bean and you will see that the growth stages are just the same.