

What on Earth!

First

BIG

Book of

HOW



HOW do polar bears keep warm? **HOW** do keys open locks? **HOW** do spacesuits work? The ultimate book of answers for kids who need to know **HOW!**

How do seeds sprout?

Most plants start life as seeds. Seeds come in many shapes and can be big like a coconut, or small like a poppy seed. Inside the seed, a tiny plant is waiting to grow. All it needs is a dollop of soil, a splash of water and a few rays of sunshine to get things moving. After a while, the seed splits. A root grows down and a shoot grows up... and up... until it pops out of the soil. The seed has sprouted!

This stripy seed will grow into a sunflower.

A root starts to grow from the pointed end.

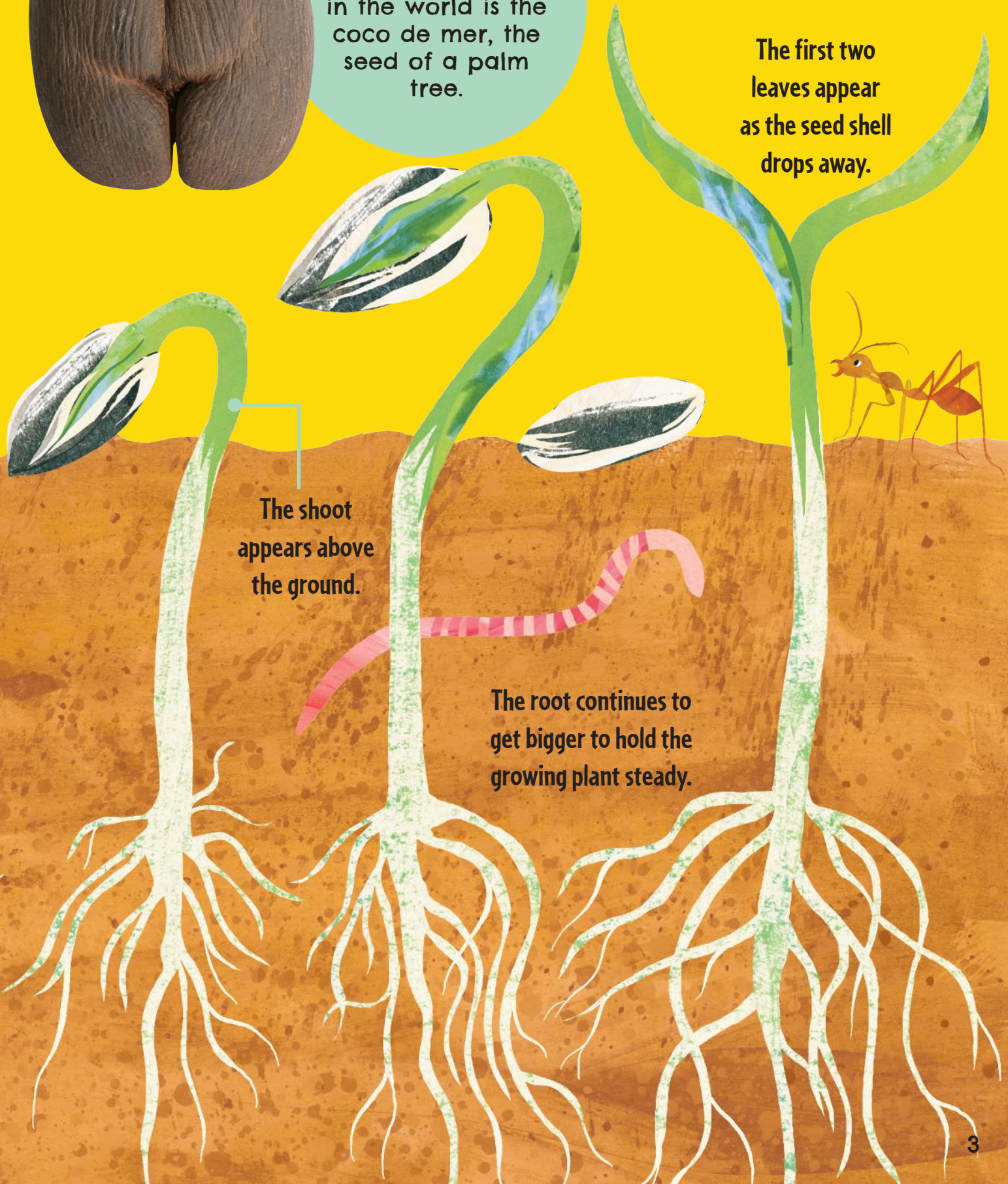
shoot
root

As the root goes down, a shoot begins to grow up.



WACKY FACT

The biggest seed in the world is the coco de mer, the seed of a palm tree.



The first two leaves appear as the seed shell drops away.

The shoot appears above the ground.

The root continues to get bigger to hold the growing plant steady.

WACKY FACT

Polar bears occasionally overheat! They cool down by rolling in the snow or by jumping into the sea.

Polar bear fur may look white, but each hair is actually transparent.

Tufted fur keeps their toes toasty.

How do polar bears keep warm?



Not many creatures can survive the freezing temperatures of the Arctic – but polar bears can! A polar bear has a thick layer of blubbery fat under its skin that stops heat from escaping. The surface of its skin is black, and this dark colouring helps the skin absorb sunshine. Then on top of its skin are two layers of fur: a short, warm, fuzzy layer, and a longer waxy layer on top that keeps water out and warmth in. How cool is that?

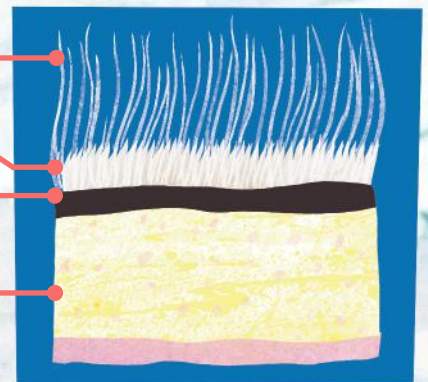


long guard hairs

short fuzzy hairs

black skin

fat



Long, thick guard hairs protect the bear's soft undercoat. It's rather like you or me wearing a raincoat over a warm, fleecy jumper.



Look what's inside a rocket firework



Pointed head
so it flies fast
and straight

Star

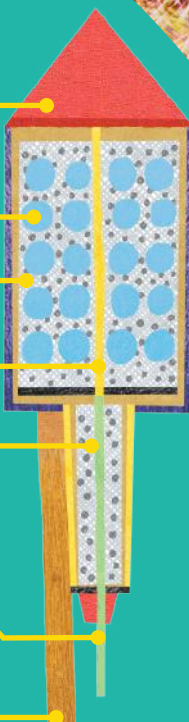
Gunpowder

Inside fuse

Gunpowder

Outside fuse

Stick to stand it upright





How do fireworks explode?



WHOOSH! KABOOM! It might sound like fireworks explode only once, but they actually explode twice (or more)! When someone lights the fuse on the outside of the firework tube, the gunpowder inside burns very quickly, creating gas that shoots the firework into the air.

That's the **WHOOSH!** The second fuse inside the tube sets fire to little balls called 'stars'. These stars are made of powdered metals and salts that burn particular colours and make different sparkling patterns.

And that's the **KABOOM!**

WACKY FACT

Fireworks were invented in China about 2,000 years ago - someone put bamboo stalks on a fire and they burst open with a bang!