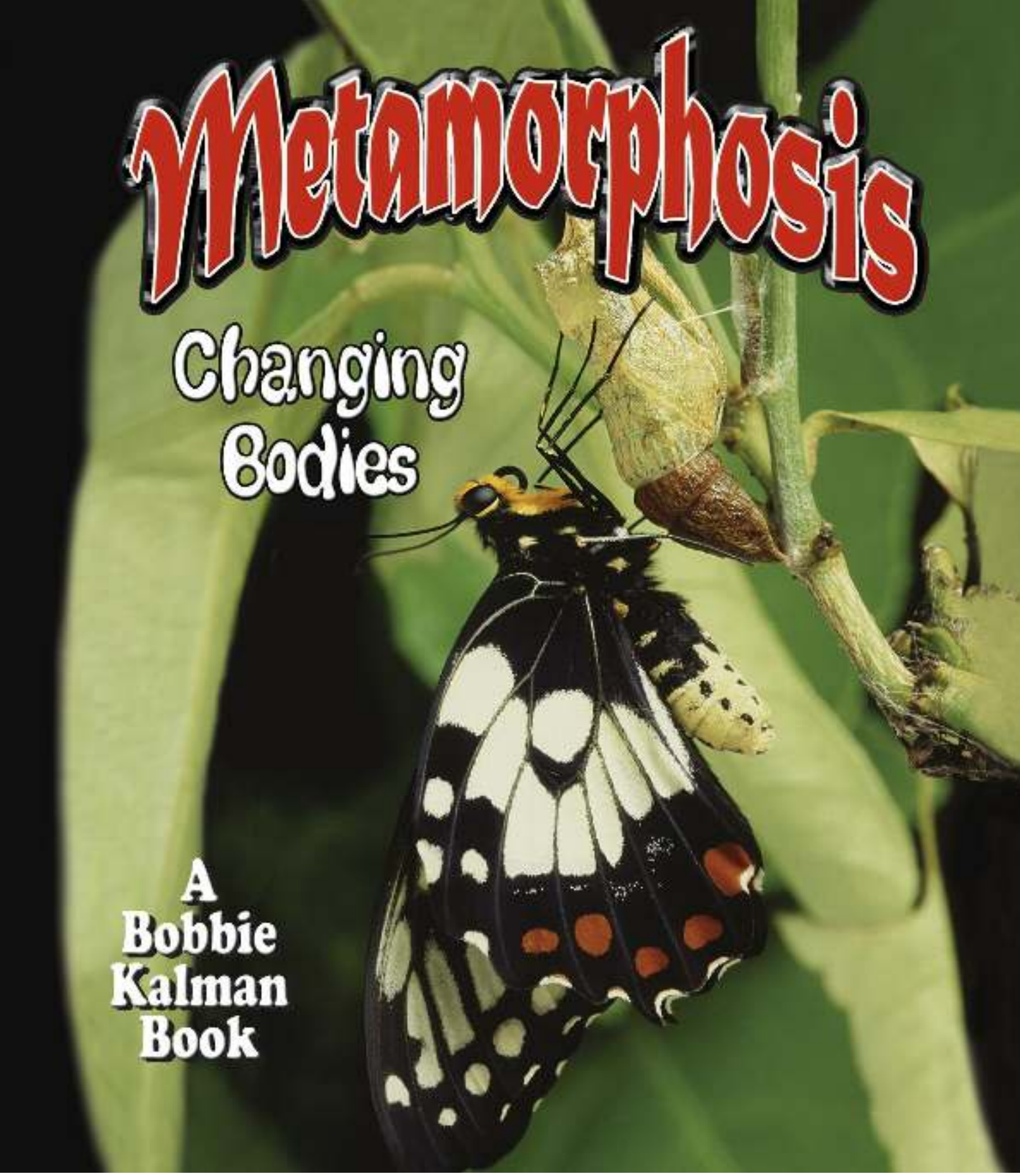
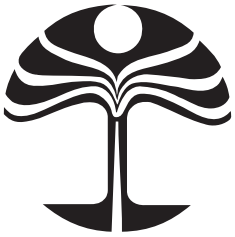

Metamorphosis
Changing Bodies
A Bobbie Kalman Book



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Nature's Changes

Metamorphosis

Changing Bodies

Bobbie Kalman

Crabtree Publishing Company

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Dedicated by Bryan Kivell
With love to Mom, Dad, Adam, and Lesley

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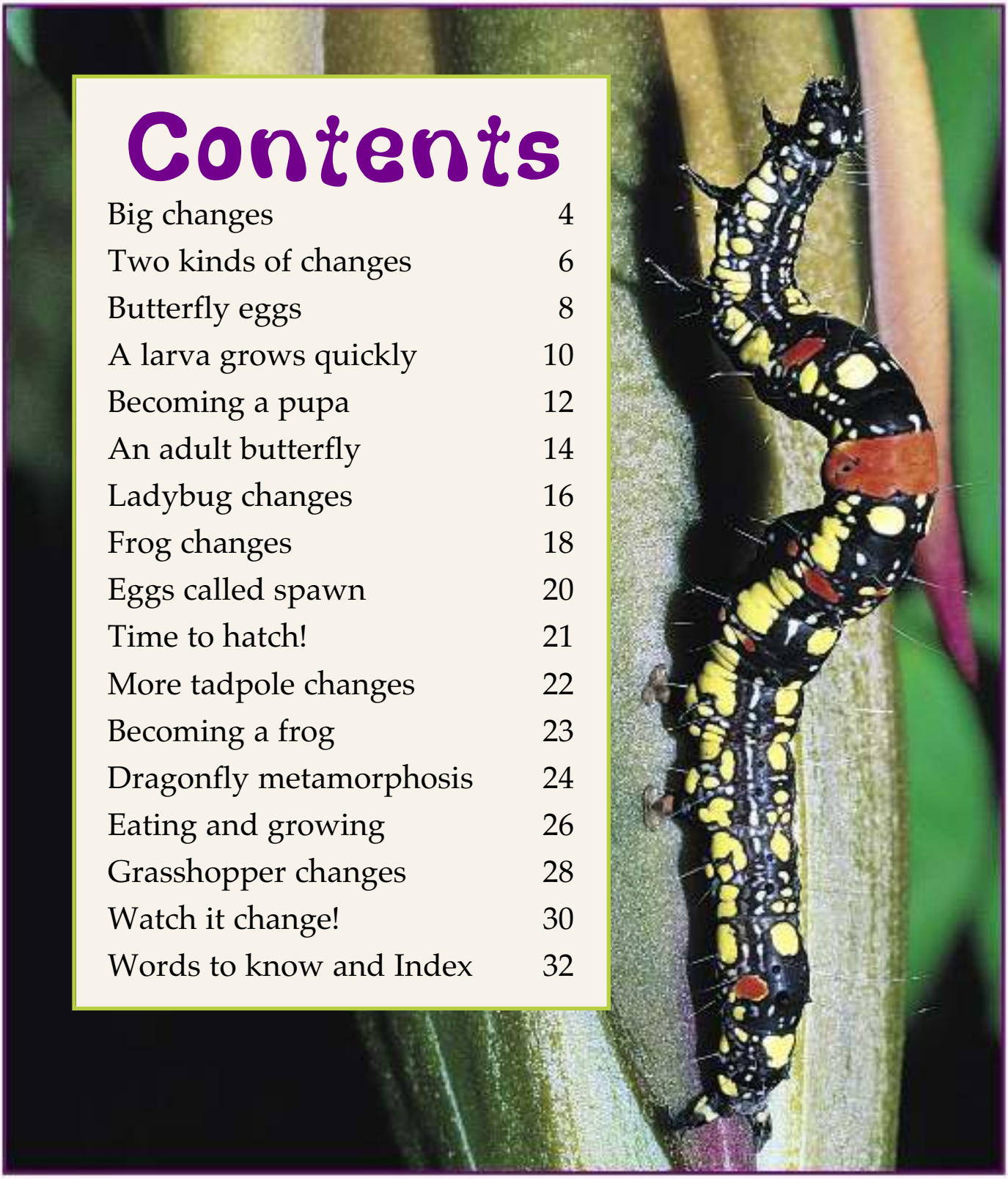


Contents

Big changes

Most animals begin their lives inside eggs. Many animals look like their parents when they **hatch**, or break out of their eggs. These animals do not change very much as they grow.

baby sea turtle

adult sea turtle

Sea turtles are animals that do not change very much as they grow.

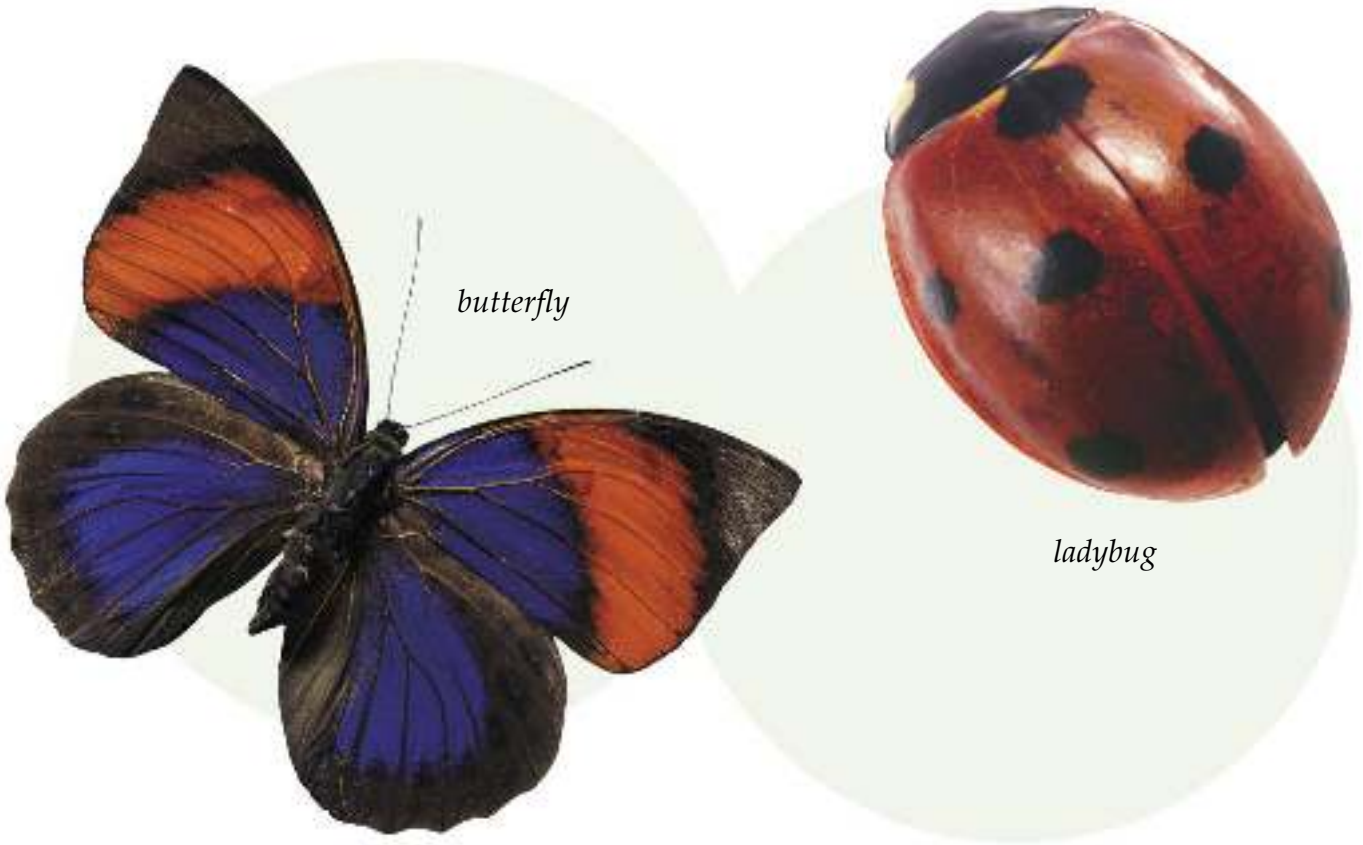
What is metamorphosis?

Some animals look nothing like their parents when they hatch. As these animals grow into adults, their bodies go through many changes. These changes are called **metamorphosis**. Metamorphosis means changing **form**, or shape.

This caterpillar will go through metamorphosis. When it has finished metamorphosis, it will look like the beautiful butterfly on the right.

Two kinds of changes

There are two kinds of metamorphosis. One kind is called **complete metamorphosis**. Insects that go through complete metamorphosis change completely. They have four stages in their lives. The four stages are egg, **larva**, **pupa**, and adult. Insects such as butterflies and ladybugs go through complete metamorphosis.



Three stages

The other kind of metamorphosis is called **incomplete metamorphosis**. Animals that go through incomplete metamorphosis have only three stages in their lives. The three stages are egg, **nymph**, and adult. Dragonflies and grasshoppers are insects that go through incomplete metamorphosis.

This dragonfly is an adult.

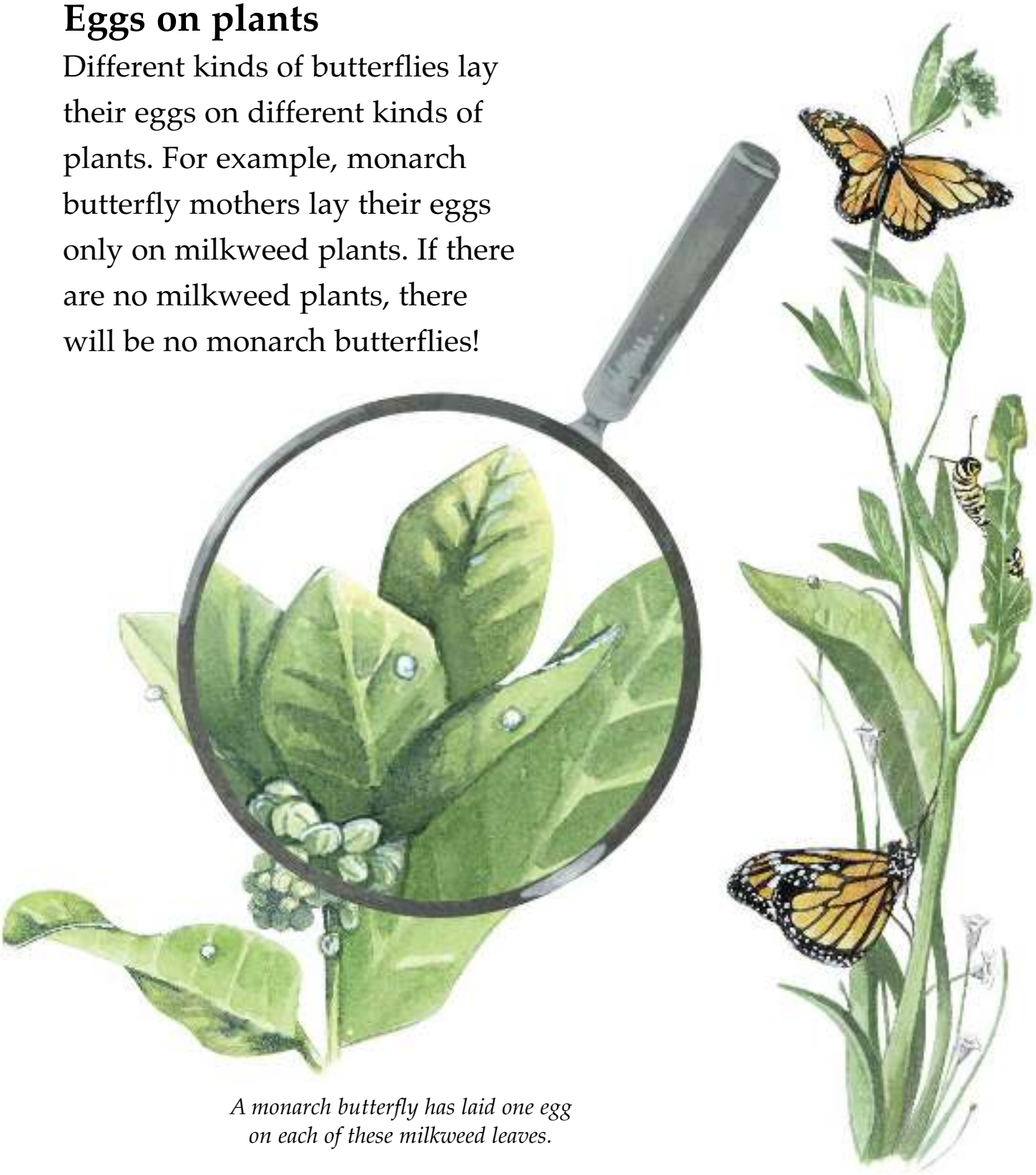
Butterfly eggs

Butterflies go through complete metamorphosis. A butterfly begins its life as a tiny baby inside an egg. The baby looks like a little worm. In its egg, the baby has food to eat. The food is called **yolk**.

A tiny baby insect is growing inside these butterfly eggs.

Eggs on plants

Different kinds of butterflies lay their eggs on different kinds of plants. For example, monarch butterfly mothers lay their eggs only on milkweed plants. If there are no milkweed plants, there will be no monarch butterflies!



A monarch butterfly has laid one egg on each of these milkweed leaves.

A larva grows quickly

After three to six days, the baby hatches from its egg. It chews its way out. It is now a larva. A butterfly larva is called a **caterpillar**. After hatching, the caterpillar eats its egg. The egg is full of **nutrients**. Nutrients help living things grow.

This monarch caterpillar is eating its egg.

Caterpillar bodies

There are many kinds of caterpillars. Not all caterpillars look the same. Some caterpillars are green, some are red, some are yellow, and some have stripes. Different kinds of caterpillars change into different kinds of butterflies.

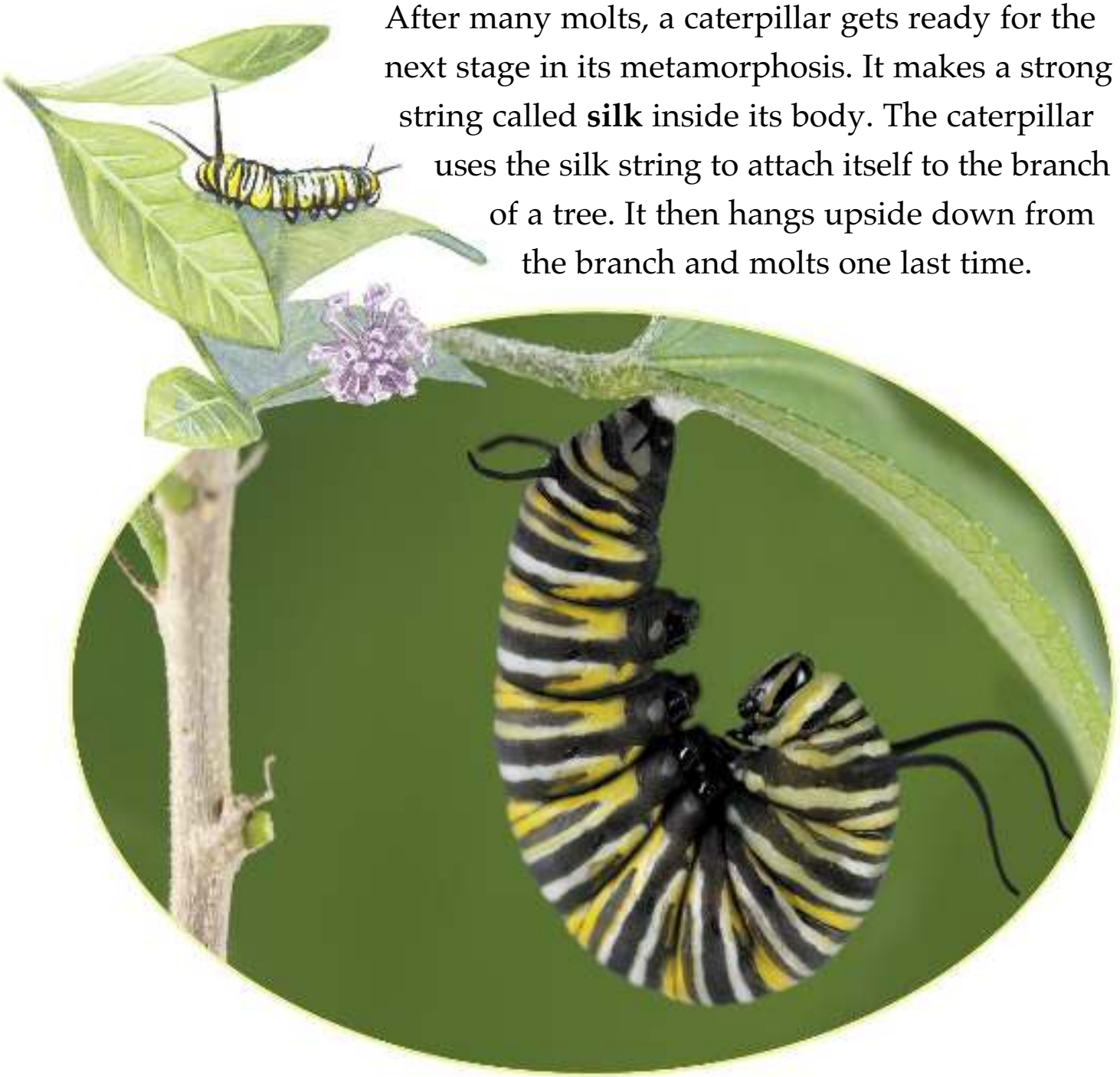
Room to grow

A caterpillar is hungry! It has strong jaws for chewing leaves. It eats a lot and grows quickly, but its skin does not grow with its body. Eventually, its skin becomes too tight. The caterpillar must **molt**, or shed its skin. As it keeps eating, its body gets even bigger. The caterpillar grows and molts several times.

These monarch caterpillars have just finished molting. Their old skin is behind their body. These caterpillars eat their old skin because the skin contains many nutrients. Not all caterpillars eat their old skin.

Becoming a pupa

After many molts, a caterpillar gets ready for the next stage in its metamorphosis. It makes a strong string called **silk** inside its body. The caterpillar uses the silk string to attach itself to the branch of a tree. It then hangs upside down from the branch and molts one last time.



Inside the chrysalis

After the last molt, a hard case forms around the caterpillar's body. The case is called a **chrysalis**. Inside the chrysalis, the caterpillar's body changes completely. It turns into liquid. The insect is now a pupa. Little by little, the pupa grows body parts such as wings. It is changing into an adult butterfly.

A chrysalis starts to form around the caterpillar's body.

Inside the chrysalis, the caterpillar's body is liquid.

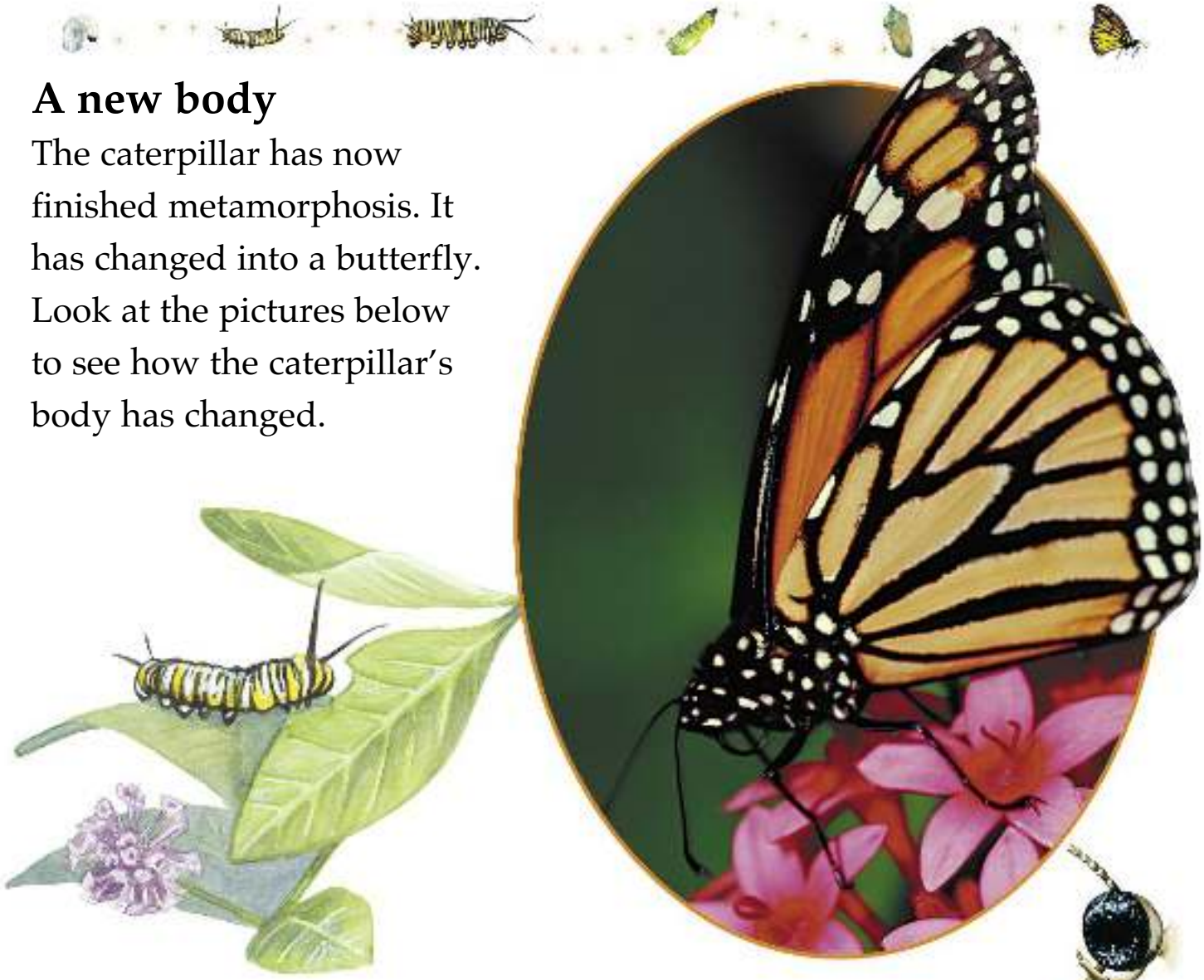
When the chrysalis turns clear, the caterpillar has finished its metamorphosis. The adult butterfly is ready to break out of the chrysalis.

An adult butterfly

When the butterfly is fully formed, it pushes itself out of the chrysalis. It cannot fly yet because its wings are wet and weak. The butterfly hangs upside down from the chrysalis until its wings are dry and strong. The adult butterfly then flies away.

A new body

The caterpillar has now finished metamorphosis. It has changed into a butterfly. Look at the pictures below to see how the caterpillar's body has changed.



The caterpillar

- walked on stubby legs
- did not have wings
- had strong jaws for chewing leaves
- had a long, thin yellow body with black and white stripes

The butterfly

- has six thin legs
- has two pairs of wings
- has a **proboscis** for sucking a sweet liquid called **nectar** from flowers
- has orange wings with black lines and white spots

Ladybug changes

A ladybug is a kind of beetle. It is another insect that goes through complete metamorphosis. Keep reading to learn how a ladybug's body changes as it goes through complete metamorphosis.

Inside the egg

Mother ladybugs lay groups of eggs. The baby ladybugs inside the eggs are in their first stage of metamorphosis. Each baby eats the yolk inside its egg and grows.

Life as a larva

A tiny larva hatches from each egg. Each larva goes off on its own to find food. A ladybug larva eats **aphids**. Aphids are tiny insects. As the larva grows, it molts four times.

Pupa in a chrysalis

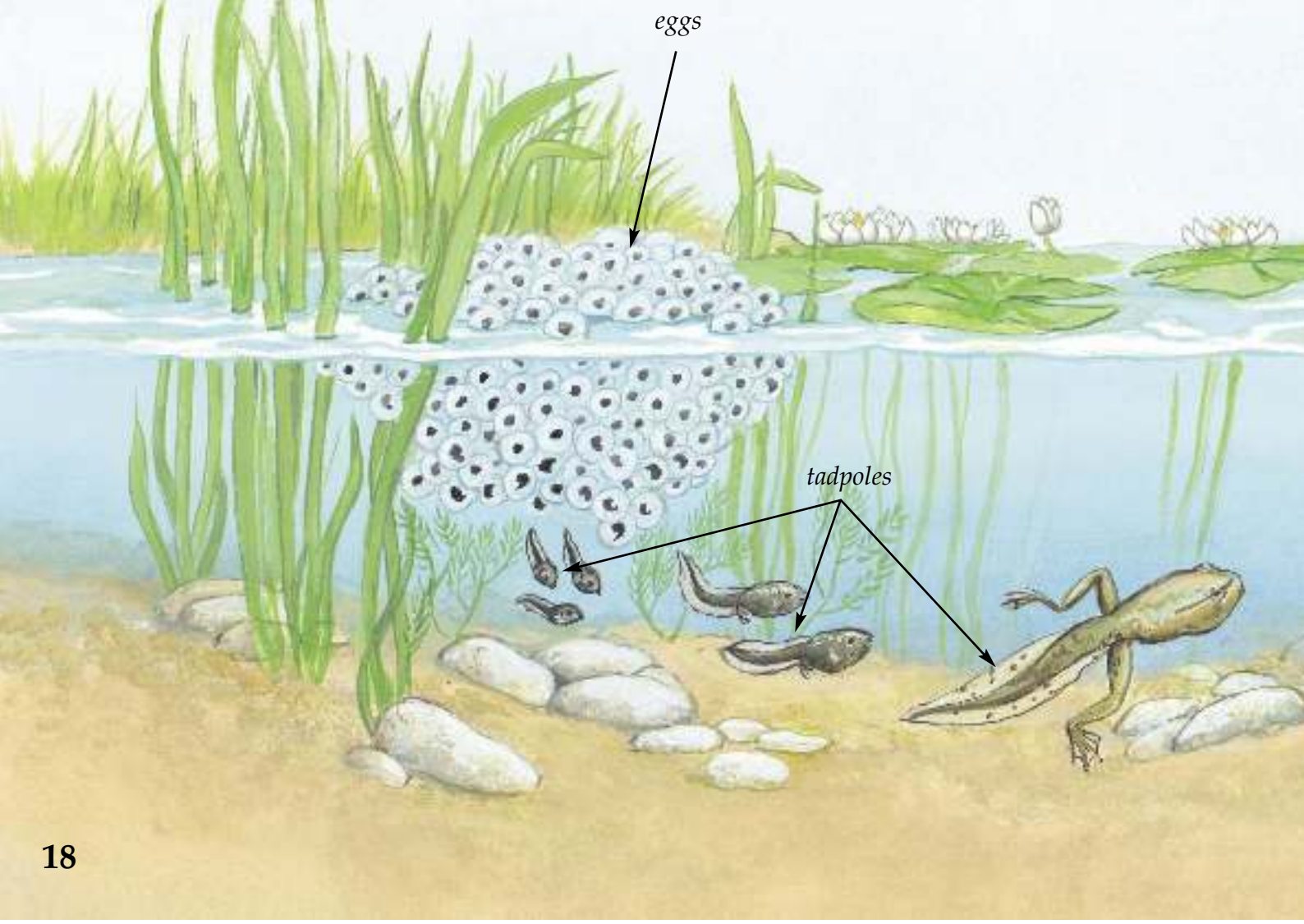
After its last molt, the larva attaches itself to a plant's leaf or stem. It makes a chrysalis around its body. Inside the chrysalis, the larva's body turns into liquid. The insect is now a pupa. Its adult body parts start to grow. When the pupa has all its adult parts, it breaks open its chrysalis.

Fly away, ladybug!

The adult ladybug pushes itself out of the chrysalis. It now has wings and can fly. The ladybug eats aphids, just as it did when it was a larva.

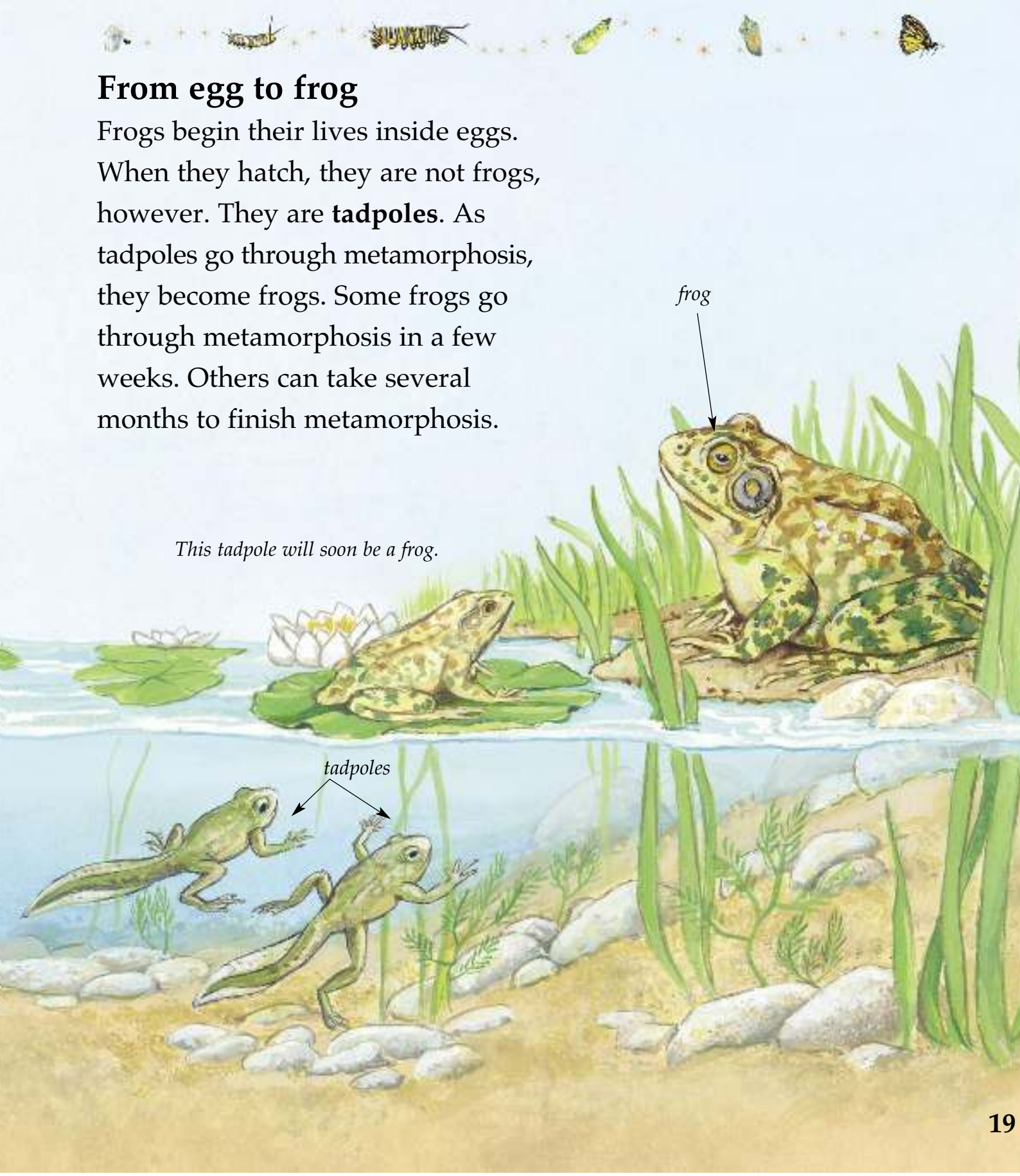
Frog changes

Frogs go through complete metamorphosis. The changes in the bodies of frogs are very different from the changes in the bodies of insects.



From egg to frog

Frogs begin their lives inside eggs. When they hatch, they are not frogs, however. They are **tadpoles**. As tadpoles go through metamorphosis, they become frogs. Some frogs go through metamorphosis in a few weeks. Others can take several months to finish metamorphosis.



This tadpole will soon be a frog.

Eggs called spawn

Frogs lay their eggs in calm, shallow water. The eggs stick together in clumps. Clumps of frog eggs are called **spawn**.

There can be thousands of eggs in a clump of spawn. The eggs look like balls of clear jelly. The jelly helps protect the tiny babies growing in the eggs. Some of the babies will become tadpoles.

Most of the eggs laid by a mother frog will never hatch. They will be eaten by turtles, fish, and other animals.

Time to hatch!

After about a week, a tadpole hatches from each egg. A tadpole has a head and a tail. It breathes through body parts called **gills**, just as fish do. At first, the tadpole cannot swim well. It rests on weeds or on other plants. As the tadpole grows stronger, it begins to swim around looking for tiny plants to eat.

A tadpole swims by moving its tail from side to side.

More tadpole changes

After the tadpole starts swimming, its body begins to change. The tadpole grows legs on both sides of its tail. As its back legs grow, its tail starts to shrink. Skin begins to cover its gills, and **lungs** form inside its body. Lungs are body parts that take in air and let out air. Soon, the tadpole grows front legs.

A tadpole uses its tiny teeth to eat insects and plants.