



Patterns:

Do You See What I See?

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P a t t e r n s : *Do You See What I See?*

by Dorothy Spangler

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Introduction

Have you ever noticed how nature sometimes repeats itself? Look at the wings of a butterfly. The one on the left is exactly the same as the one on the right, only backward. Look at the shape of the wings. All butterflies have wings with the same general shape—a larger part toward the butterfly's head and a smaller part below.

Something that repeats is called a pattern. A pattern can be something you see, like the way that colors repeat on a butterfly's wings. A pattern can also be something you hear, like the repeated song of a bird. A process, the way things happen, can also make a pattern.

Nature is full of patterns. Nature's patterns are found in the sky, on the ground, and in animals and plants. Scientists often use patterns to classify things. For example, scientists classify all butterflies with the same design on their wings in the same species.

The two wings of a butterfly are the same, only backward.



Patterns You Can See

Many patterns in nature are patterns you can see. A bee's honeycomb is a good example. It contains one basic shape, a six-sided figure called a hexagon. In a honeycomb, the hexagon shape is repeated many times. Honey bees in different hives all build honeycombs using this repeated hexagon shape.



A bee's honeycomb has lots of hexagons.

Sometimes, the things that repeat aren't exactly the same. They can also form a pattern. For example, a sea star, an apple blossom, and an apple fruit all look different. But they all have shapes based on the number five. The sea star has five legs, and the apple blossom has five petals. If you cut an apple in half from side to side, you would see that the core makes a star shape with five points. This repetition of shapes based on the number five forms a pattern.

■ The nautilus seashell is a spiral curve. The divisions mark internal chambers in the shell. The nautilus adds on chambers as it grows.



Spirals

■ Another shape that is common in nature is the spiral. A spiral is a curve that winds around, gradually approaching a center. Nature repeats this shape in many places. The nautilus seashell is one example of a spiral. The nautilus is a sea creature that lives in its shell. As it grows, it builds its shell in the form of a spiral. The horn of a ram is another spiral.

■ Some of nature's spirals are very large. A hurricane can form a spiral hundreds of kilometers wide. Some galaxies are huge spirals. A galaxy is a star system in space. Our own galaxy, the Milky Way, is shaped like a spiral.

Patterns on Your Fingers

▶ You have patterns, too. One pattern is on your fingers. Look very closely at the tips of your fingers. Do you see the lines on the skin of each finger? These lines repeat in a way that is very important. No one else has exactly the same arrangement of lines on his or her fingers as you do.

▶ When you touch things, your fingers leave a print of the lines on your finger tips. These prints are called fingerprints. If you touch a clean glass or a piece of clear tape, you can see your fingerprints.

▶ People have classified fingerprints by their shapes. There are three main fingerprint patterns: loops, whorls, and arches. These main patterns describe how the shape and direction of the ridges and swirls are repeated on a person's fingers.

▶ Even identical twins have different fingerprints. That is why fingerprints are used to identify people. Police have used fingerprints to solve crimes.

Fingerprint patterns



▶ LOOP

In a loop pattern, the ridges enter from either side, re-curve, and pass out or tend to pass out the same side they entered.



▶ WHORL


In a whorl pattern, the ridges are usually circular.





▶ ARCH


In an arch pattern, the ridges enter from one side, make a rise in the center, and generally exit on the opposite side.


Patterns You Can Hear


 If you listen, you will hear that nature is very noisy! Dogs bark, bees buzz, and water rushes and drips. Thunder makes a sound so loud that we often cover our ears. Even the wind makes a sound as it moves through the trees.

 Are some of these sounds patterns? Of course! Sounds that repeat are patterns.

 Animals repeat particular sounds when they communicate. These repeated sounds are patterns. Some sounds are calls to other animals in the group to gather. Other sounds warn of danger.

 Some animals make sounds that people call songs. Birds are the most famous “singers” in the animal world. When they sing, birds repeat particular sounds. The notes in the song, and the timing of those notes, are what make the pattern. The pattern can be very simple, or long and complex. Either way, the bird repeats the same pattern over and over.

 Each species of bird has its own song or songs. A robin’s song, for example, is not the same as another bird’s song. That is how a robin can tell when another robin is calling it.

 Some songbirds are especially talented singers. The northern mockingbird is able to mimic, or imitate, the songs of other birds. The gray catbird gets its name from the catlike “mee-ow!” sound of its call.

Cricket Sounds

🔊 Crickets make very interesting patterns of sound. They make repeated chirping sounds. Crickets don't make the chirping sound with their mouths. Instead, they use their wings. A cricket rubs the sharp edge of one front wing against a ridge on the other front wing. The sound of the rubbing is the chirping sound you hear.

🔊 Did you know that a cricket's chirping can help you tell the temperature outside? It's true! A cricket's chirp changes with the temperature. The hotter it is, the more chirps a cricket will make. Here is how you can use a cricket's chirp to tell the temperature:

🔊 Count the number of chirps in 15 seconds. Then add the number 37. The number you get will be roughly the temperature outside in degrees Fahrenheit.

🔊 **Music maker:
the male cricket**



Things That Happen Can Be Patterns

🔊 Shapes that repeat form patterns. Sounds that repeat form other kinds of patterns. If something happens over and over again, it, too, forms a pattern.

🔊 Suppose, for example, that you get up every morning at about 7 A.M. You get dressed and then you eat breakfast at about 7:30 A.M. If you repeat this many times, it becomes a pattern. If you ride the bus to school every day, that is a pattern, too. Having music class every Wednesday is a pattern. So is going to school five days a week and having Saturday and Sunday off. Any event that happens over and over becomes a pattern.

Patterns of Development

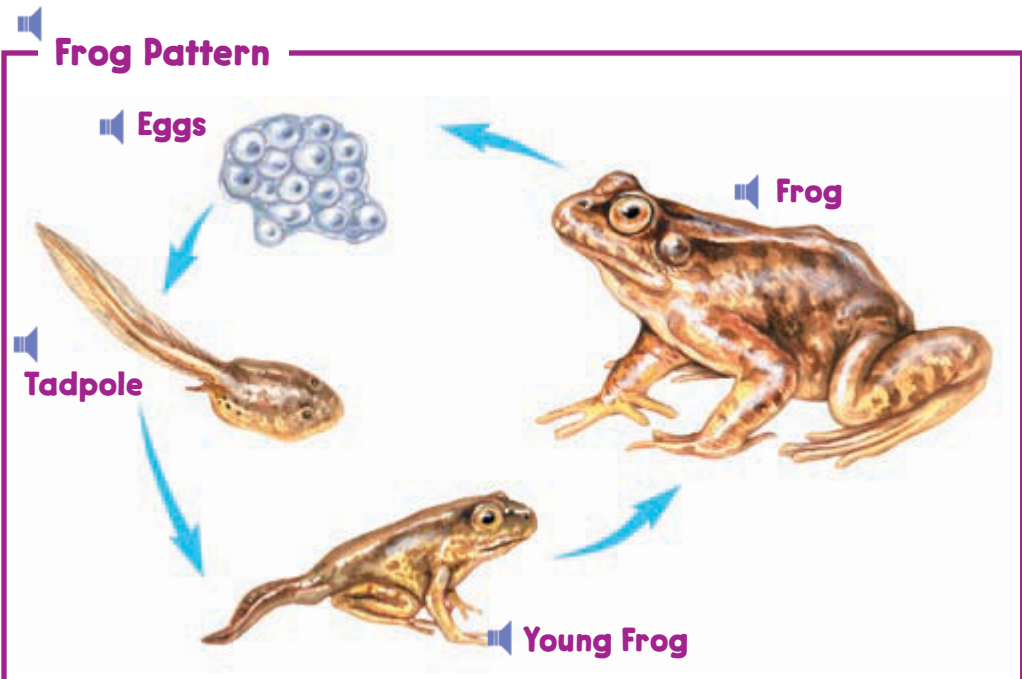
🔊 One set of events that happens over and over in nature is the way that living things grow. Seeds grow into plants. Young animals grow into adults.

🔊 Each living thing goes through certain stages as it grows. For example, when a human baby is born, it is small. It can't see very well, and it can't work its muscles very well. As the baby grows, its eyesight improves. The baby learns to lift its head and learns to roll over. Eventually the baby learns to crawl and then to stand up and walk. Because these stages repeat over and over again by different babies, they form a pattern. This type of pattern is called a pattern of development. Each different living thing has its own pattern of development.

Different Patterns of Development

With some animals, young look like small adults. A young elephant looks like a small adult elephant. It has ears, eyes, a trunk, legs, a thick body, and a tail. The only difference is that a young elephant's features are all smaller than those of an adult elephant.

With some animals, the very young do not look anything like the adults. Frogs, for example, develop differently. Frogs start life as tiny eggs. A frog egg hatches into a tadpole. The tadpole becomes a young frog. The young frog then grows into an adult frog. The adult frog then lays more frog eggs. Then the life cycle starts all over again.



How Butterflies Grow

🔊 Butterflies have a completely different pattern of development. Like frogs, butterflies undergo many changes during their life cycle, and the very young do not look like the adults. There are four stages in the butterfly life cycle: the egg, the larva, the pupa, and the butterfly.

🔊 Every butterfly begins life as an *egg*. After mating, the female butterfly lays her eggs in a place where they can safely develop. This might be on the underside of a leaf or on a tree stump. The plant will be the food source when the eggs hatch.

🔊 The eggs of some types of butterflies hatch in a few days or weeks. Others take months.

🔊 The second stage of the butterfly's life cycle is the *larva stage*. You might know larva by another name: caterpillar! Caterpillars live to eat. Eating and growing are the two main things that caterpillars do. Caterpillars grow so much that they must molt, or shed their skin, from four to six times.

🔊 Not all caterpillars look the same. Some are very hairy. Some are very smooth and have no hair. Others have bristles or spines on their bodies. Caterpillars come in many different colors.

🔊 While they are eating and growing, caterpillars must avoid predators. Birds and other animals eat caterpillars. The spines on a caterpillar's body can help defend it. A spiny caterpillar might not be such a tasty meal!

▶ The third stage in the butterfly life cycle is the *pupa stage*. The caterpillar's last skin gets hard. The insect then fixes itself to a stick or leaf. It rests there, encased in this protective skin. This type of skin and the pupa itself are called a chrysalis.

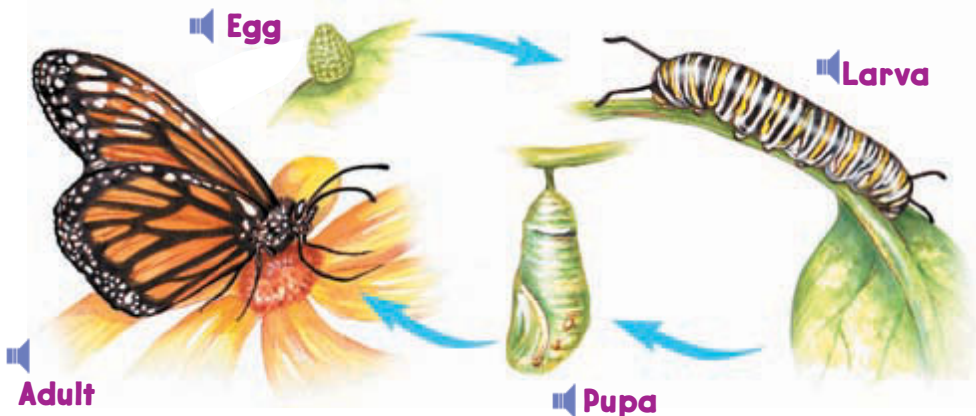
▶ While the pupa rests, it changes shape within the chrysalis. The insect's body becomes soft. Legs, wings, eyes, and other body parts are formed.

▶ After a while, the *adult butterfly* is ready to emerge.

▶ The pupa shell splits, and out crawls the adult butterfly. The butterfly is now fully grown. It unfolds its wings until they dry off from the air. When the butterfly has gained its strength, it is ready to fly!



A butterfly's pattern of development is called metamorphosis.



🔊 This big change in the butterfly, the four stages from egg to adult, is called metamorphosis. All butterflies repeat the stages of metamorphosis as they develop. Metamorphosis is the name for the butterfly's pattern of development.

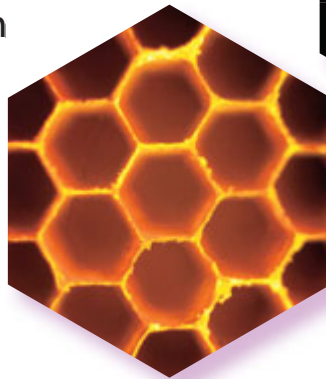
Nature's Many Patterns

🔊 Look and listen for patterns in nature. Watch for ways that nature repeats itself. Patterns will help you learn about how living things are formed, how they grow, and how they communicate.





🔊 Nature gives us plenty of patterns to study and learn. Shapes like spirals are found in many things, large and small. Animals can “sing” in sound patterns. And young animals follow patterns of development as they grow to be like their parents.

🔊 Scientists group together things that follow the same pattern. Classifying things helps us study them. Just think—without patterns, nature would be much harder to study!

🔊 **Another pattern in nature: Honeycombs and snowflakes both have six sides.**



Think and Write







-  **1.** Spirals are repeated often in nature. What are some spirals in nature that are *not* mentioned in this book?
-  **2.** What animal's pattern of development includes a tadpole?
-  **3.** Using the information given on page 7, figure out the temperature if a cricket chirps 25 times in 15 seconds.
-  **4. Descriptive Writing** Think about a time when you heard a bird sing. Write a short paragraph describing where you were and what the bird's song sounded like.

Hands-On Activity

Draw a Diagram Draw a picture or diagram of a butterfly's life cycle.

School-Home Connection

Compare Fingerprints Follow these steps to compare your fingerprint pattern with family members' patterns.

-  **1.** Use a pencil to make a dark, stamp-sized rubbing.
-  **2.** Rub your index finger on the rubbing.
-  **3.** Press your dirty finger onto the sticky side of a piece of clear tape. Lift your finger carefully so that you don't smudge your fingerprint.
-  **4.** Fix the tape onto a clean sheet of paper.
-  **5.** By the same process, get a family member's fingerprint.
-  **6.** Compare his or her fingerprint with yours. Try to identify whether the fingerprints are loops, whorls, or arches.

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