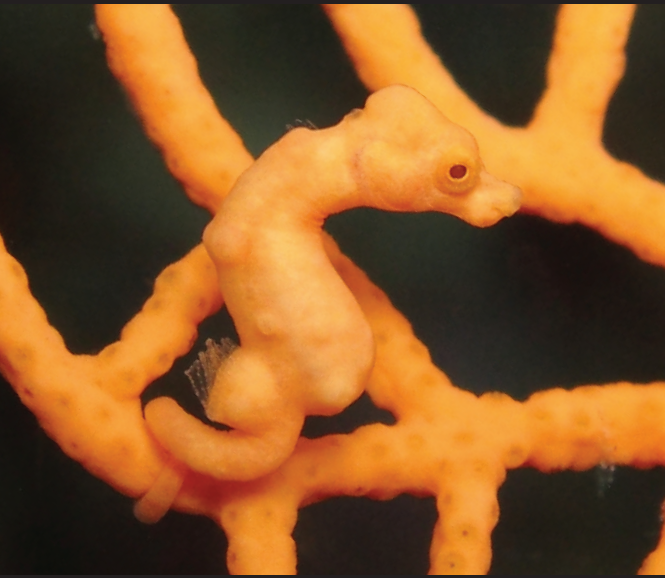


AmplifyScience

Handbook of **Traits**

by Chloë Delafield and Jonathan Braidman



Reference Book

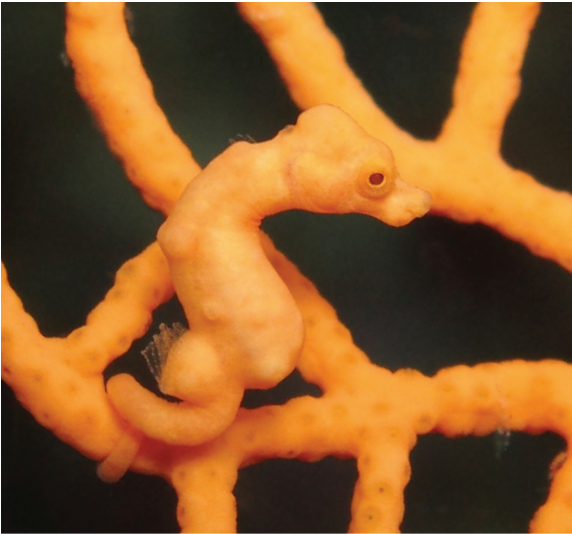
THIS BOOK IS THE PROPERTY OF:			
STATE _____		Book No. _____	
PROVINCE _____		Enter information in spaces to the left as instructed	
COUNTY _____			
PARISH _____			
SCHOOL DISTRICT _____			
OTHER _____			
<i>ISSUED TO</i>	<i>Year Used</i>	<i>CONDITION</i>	
		<i>ISSUED</i>	<i>RETURNED</i>
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

PUPILS to whom this textbook is issued must not write on any page or mark any part of it in any way, consumable textbooks excepted.

1. Teachers should see that the pupil's name is clearly written in ink in the spaces above in every book issued.
2. The following terms should be used in recording the condition of the book: New; Good; Fair; Poor; Bad.

Handbook of Traits

by Chloë Delafield and Jonathan Braidman





© 2018 by The Regents of the University of California. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage or retrieval system, without permission in writing from the publisher.



These materials are based upon work partially supported by the National Science Foundation under grant numbers DRL-1119584, DRL-1417939, ESI-0242733, ESI-0628272, ESI-0822119. The Federal Government has certain rights in this material. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

These materials are based upon work partially supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A130610 to The Regents of the University of California. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.



Developed by the Learning Design Group at the University of California, Berkeley's Lawrence Hall of Science.

Amplify Science Elementary is based on the *Seeds of Science/Roots of Reading*[®] approach, which is a collaboration between a science team led by Jacqueline Barber and a literacy team led by P. David Pearson.

www.scienceandliteracy.org

Amplify.

Amplify.
55 Washington Street, Suite 800
Brooklyn, NY 11201
1-800-823-1969
www.amplify.com

Grade 3
Handbook of Traits
ISBN: 978-1-945191-71-8

Contents

Introduction.....	4
Bottlenose Dolphin.....	6
Brain Coral.....	8
Denise’s Pygmy Seahorse.....	10
Domestic Dog.....	12
Giant Golden Orb-Weaving Spider.....	14
Giraffe.....	16
Harlequin Ladybug.....	18
Harlequin Poison Frog.....	20
House Cat.....	22
Mexican Tetra.....	24
Milk Snake.....	26
Peafowl.....	28
Peppered Moth.....	30
Pitcher Plant.....	32
Snapdragon Plant.....	34
Snowy Owl.....	36
South American Scarab Beetle.....	38
Tomato Plant.....	40
White-Tailed Deer.....	42
White Willow Tree.....	44
Glossary.....	46
Index.....	48

Introduction

All **organisms** have a wide variety of **traits**. Some of these traits are easy to **observe**, like color, shape, and size. Some traits might be harder to observe, like an organism's behavior or **life cycle**. Traits can even include things that are inside an organism, like how its bones are shaped or what its **cells** are like.

All organisms on Earth are related, but they are all different. There is a lot of **variation**, or difference, among organisms. If you **compare** a tomato plant and a giraffe, you will observe a lot of variation. Their traits are very different.

Organisms of the same **species** have most of the same traits as each other. Still, there is variation even among the individual organisms in one species. If you compare two giraffes, you will still observe variations. One giraffe might be taller or have darker spots.

Organisms **inherit** instructions for traits from their parents. This means that **offspring** usually have traits that are similar to their parents' traits. Parents and offspring have more traits in common than other organisms in the same species. That isn't the whole story, though. An organism's traits can be influenced by its **environment**. That means an organism will usually be more like other members of its species living in the same environment than like those in a different environment.

This book is about 20 different species of organisms and their traits. Here is what is in each entry:

Common name for the species

Information about what the species is like

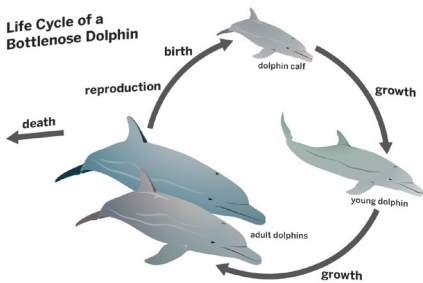
More about traits and variation in the species

Bottlenose Dolphin

Bottlenose dolphins live in the ocean all over the world. They have long bodies with two side fins and one top fin. They are gray in color. The biggest ones can be twice as long as a tall person. Even though they live in the water, dolphins breathe air. They have big brains and are very smart.



Life Cycle of a Bottlenose Dolphin



Variation in the Species

Bottlenose dolphins have **variation** in size and color. The dolphins in some groups are larger than the dolphins in other groups. Bottlenose dolphins also have different-sized beaks and fins. The **genes** that give instructions for these **traits** are passed from parents to **offspring**.

Another way that bottlenose dolphins vary is that each one has its own special whistle. Dolphins can tell each other apart by their whistles.



These dolphins show variation in color and beak size.

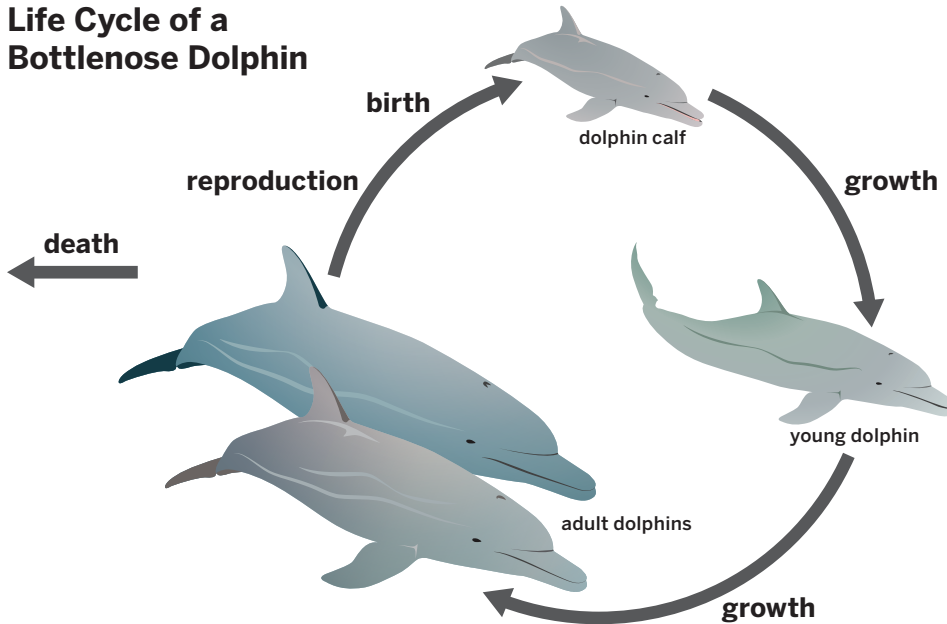
Diagram showing the life cycle of the species

Bottlenose Dolphin

Bottlenose dolphins live in the ocean all over the world. They have long bodies with two side fins and one top fin. They are gray in color. The biggest ones can be twice as long as a tall person. Even though they live in the water, dolphins breathe air. They have big brains and are very smart.



Life Cycle of a Bottlenose Dolphin



Variation in the Species

Bottlenose dolphins have **variation** in size and color. The dolphins in some groups are larger than the dolphins in other groups. Bottlenose dolphins also have different-sized beaks and fins. The **genes** that give instructions for these **traits** are passed from parents to **offspring**.

Another way that bottlenose dolphins vary is that each one has its own special whistle. Dolphins can tell each other apart by their whistles.



These dolphins show variation in color and beak size.

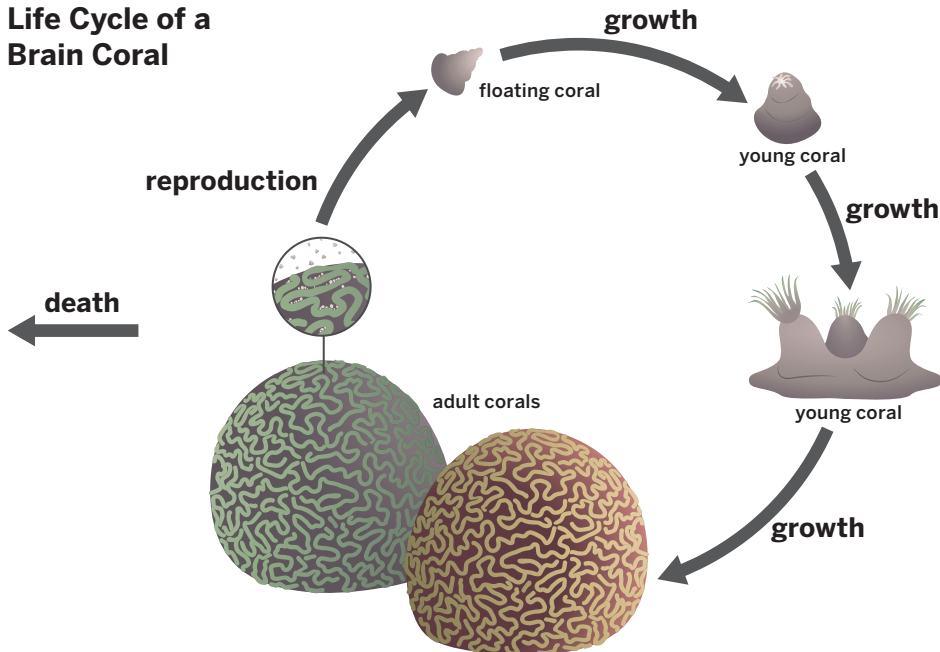
Brain Coral

Brain corals are animals that live in warm ocean water. They form “heads,” or rounded shapes that look like brains. Each head of brain coral is made of many tiny animals that build a big skeleton for themselves. Brain corals have small plant-like **organisms** called algae living inside them. The algae help the coral animals get what they need to live and grow. Some brain corals can live as long as 900 years.



These brain corals show variation in color and shape.

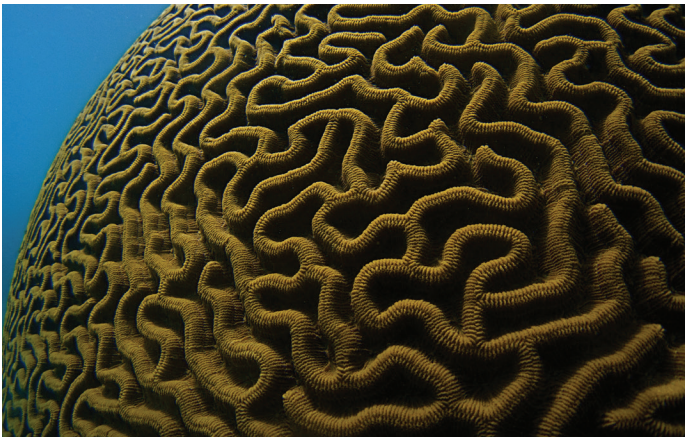
Life Cycle of a Brain Coral



Variation in the Species

Although they often make round heads, brain corals can form lots of different shapes. Sometimes they look more lumpy or flat. They vary in color from orange to green to purple.

Brain corals can turn white because of changes in their **environment**. This is called bleaching. If the ocean water gets too warm or polluted, it can make the algae leave the brain coral. Once the algae leave, the brain coral turns white. When a head of brain coral gets bleached, it is more likely to die.



This is a close-up of healthy brain coral.



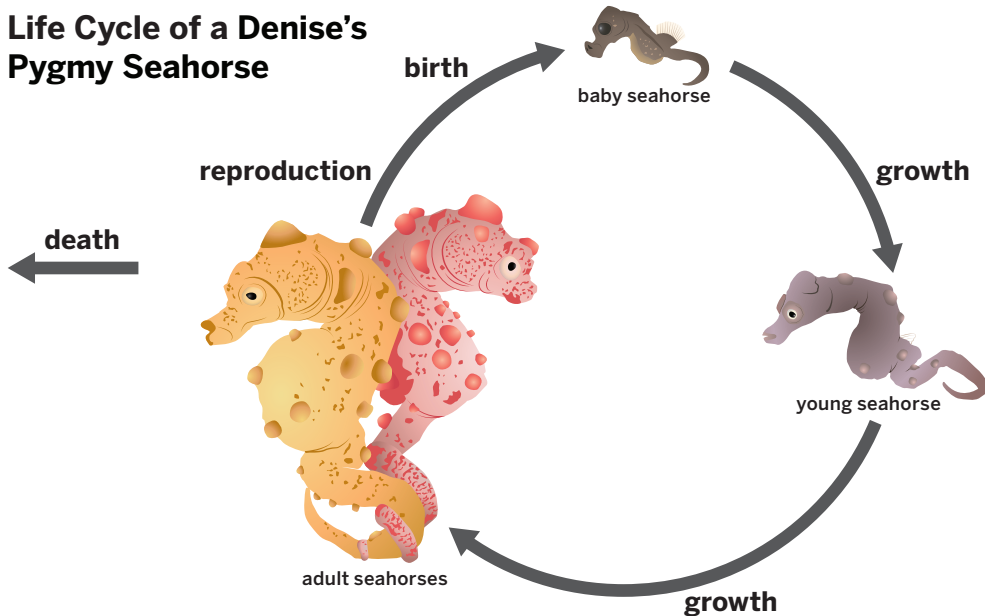
This is a close-up of brain coral that is getting bleached.

Denise's Pygmy Seahorse

Denise's pygmy seahorses are small fish that live on corals in the ocean. They are about the size of a person's fingernail. Their heads are shaped like horse heads, which is why they are called seahorses. They use their snouts to suck up tiny animals. Pygmy seahorses have thin bodies and tails that can wrap around things and hold on. Female pygmy seahorses lay eggs, and then the males carry the eggs in a special pouch. Once the eggs hatch, the baby seahorses come out of the pouch and swim on their own.

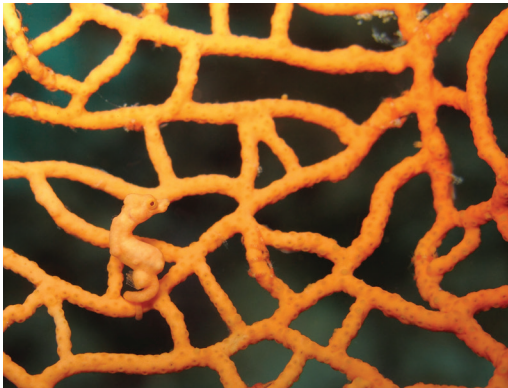
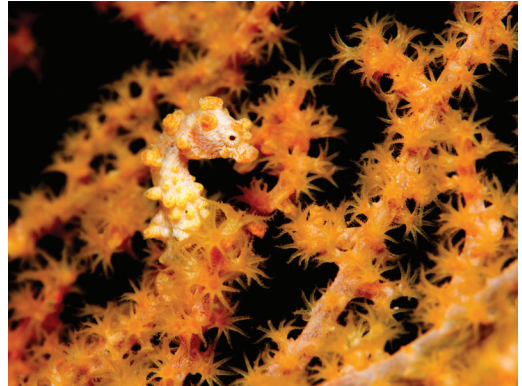
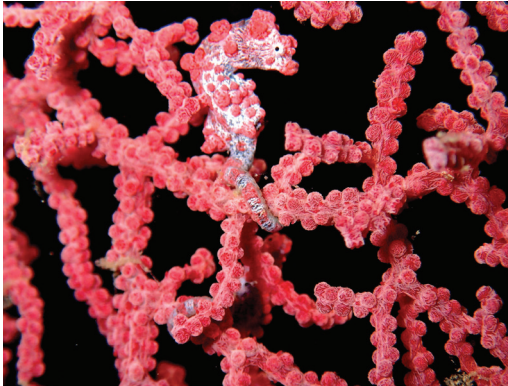


Life Cycle of a Denise's Pygmy Seahorse



Variation in the Species

Denise's pygmy seahorses can be pink, yellow, or orange. They can have smooth or bumpy skin. Their skin blends in with different kinds of coral. The ones that live on pink, bumpy coral have pink, bumpy skin. The snouts of Denise's pygmy seahorses can be different sizes, from short to medium. Some pygmy seahorses have bright red rings around their mouths.



These photos show variation in the color and skin texture of Denise's pygmy seahorses.

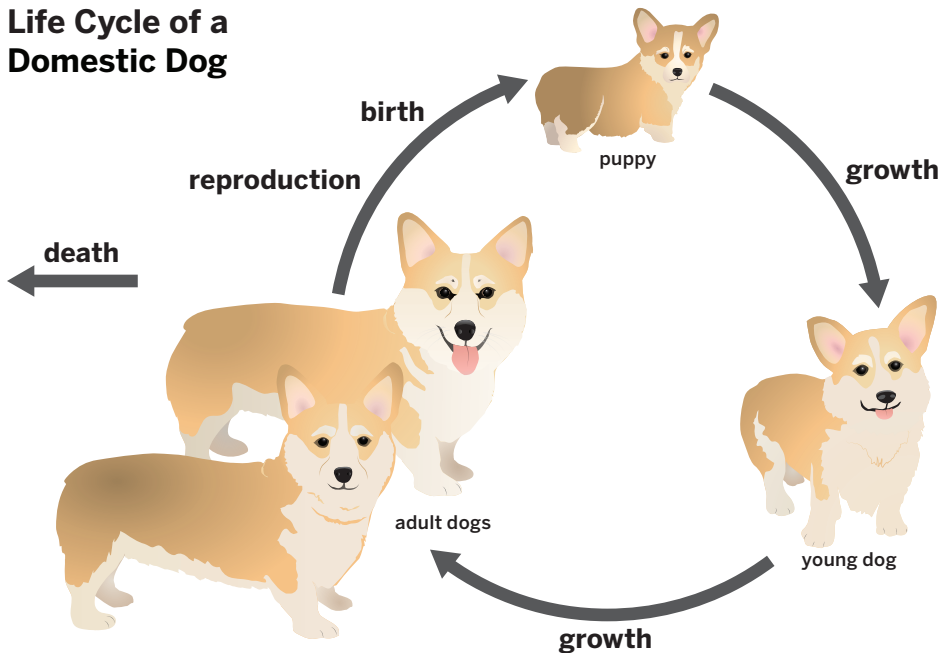
Domestic Dog

Dogs have been living with humans for thousands of years. People keep dogs as pets. Dogs also work on farms and help people who are blind. Dogs can eat many different things, including other animals and plants. They have a very good sense of smell.



These dogs look very different from each other, but they are all the same species.

Life Cycle of a Domestic Dog



Variation in the Species

Dogs have a lot of **variation** in **traits** like size, fur color, ear shape, and tail length. You may have seen a tiny tan-colored pug and a big gray Great Dane. These are both the same **species**, but they have very different traits. Puppies get **genes** for traits like color and fur length from their parents.



The dog at the bottom is the offspring of the two dogs at the top. One parent has lots of spots. The other parent has no spots. The offspring has some spots. Its number of spots is a trait that is a mix of its parents' traits.

Humans brush and cut poodles' hair to make special styles. Poodles inherit instructions for long, curly hair, but the hairstyles depend on the humans in the poodles' environment.

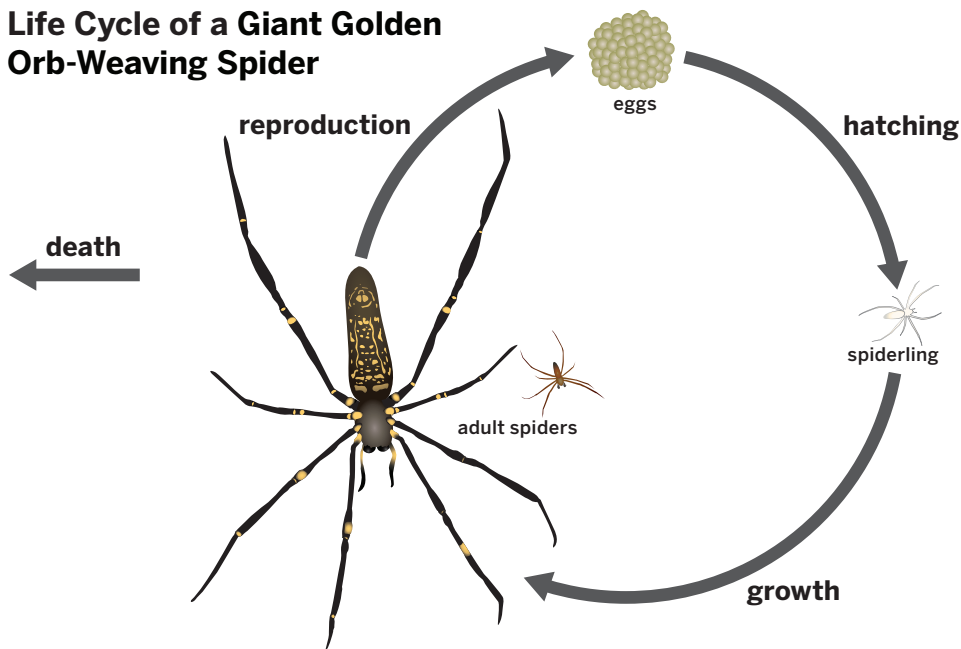
Giant Golden Orb-Weaving Spider

Giant golden orb weavers are some of the biggest spiders in the world. The females can be up to 20 centimeters (8 inches) long. The males are much smaller. Giant golden orb weavers make big webs that look golden in the sunlight. They eat all kinds of flying insects. Some even eat birds and snakes.



This photo shows a male sitting on a female's belly. The male is tiny compared to the female.

Life Cycle of a Giant Golden Orb-Weaving Spider



Variation in the Species

Most giant golden orb-weaving spiders have colorful markings on their bodies. They have white, yellow, orange, and red markings on a black background. Some spiders hatch with less colorful bodies. Body color is a **trait** that the spiders **inherit** from their parents.

Giant golden orb weavers make silk with their bodies to build webs. They can change the color of this silk to match the **environment**. They can make a web that blends in with dark trees or a web that sparkles in the sunlight to attract insects. Bees are attracted to the sparkly golden webs. They come up to the webs to check them out. Then they get caught and the spiders eat them!



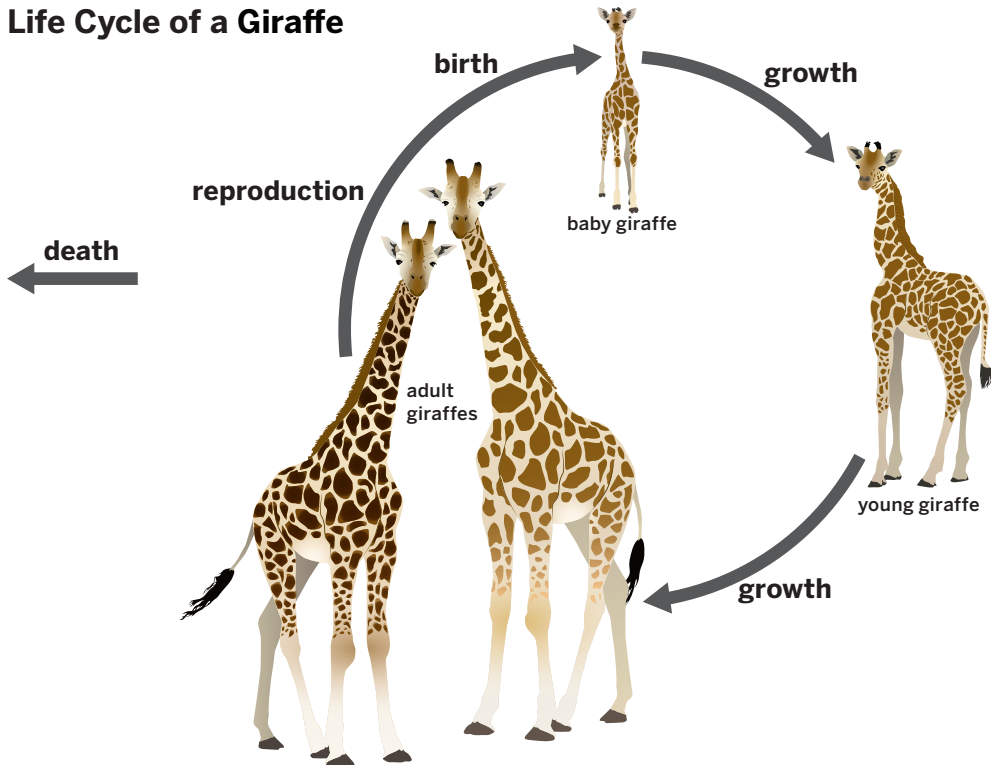
The spider on the right does not have colorful markings like the one on the left.

Giraffe

Giraffes are the tallest animals that live on land. They have very long necks and legs. They live in hot, dry places with lots of grass and a few trees. They use their long necks and huge tongues to eat leaves from the tops of trees and grass from the ground. They have white fur with dark orange or brown markings. They have short manes and small horns.



Life Cycle of a Giraffe



Variation in the Species

Giraffes have a lot of **variation** in size, fur color, and markings. Some giraffes have fur markings that are dark with straight edges. Other giraffes have fur markings that are lighter with blurry edges. Some people think that the groups of giraffes of different colors are different **species**. Some people think that all giraffes are one species. Scientists are still **investigating** to find out. Fur color and markings are **traits** that giraffes **inherit** from their parents. Even within a group of giraffes that are all related, each individual giraffe looks different.



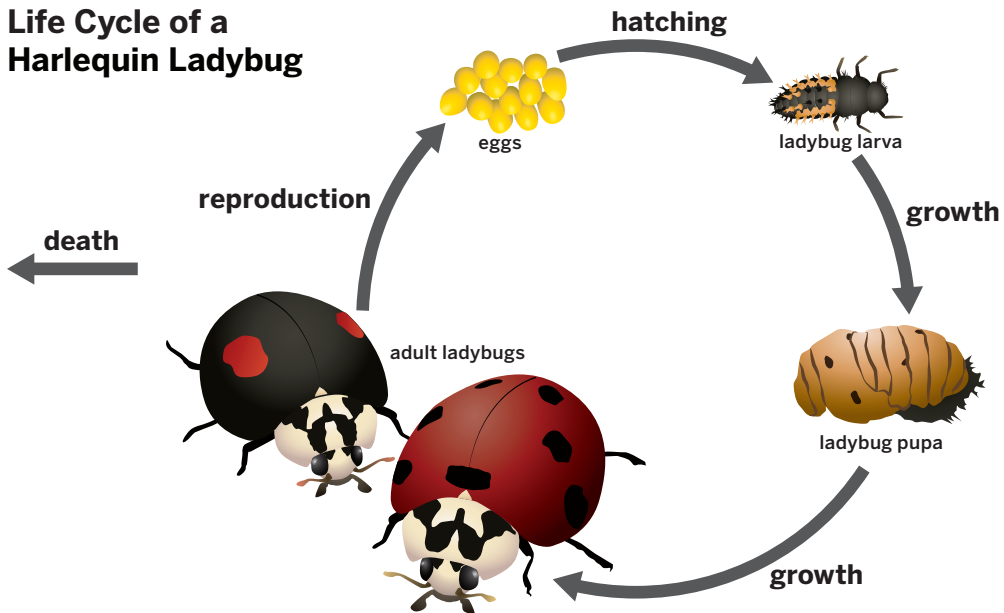
These giraffes show variation in the color and shape of their fur markings.

Harlequin Ladybug

Harlequin ladybugs are small beetles that are found all over the world. Their bodies are round, and they have two shiny covers that hide their wings when they are not flying. Ladybugs eat many types of smaller insects. Ladybugs lay their eggs near groups of small insects so that when the eggs hatch, the **offspring** will have lots to eat.



Life Cycle of a Harlequin Ladybug



Variation in the Species

Harlequin ladybugs can be yellow, orange, red, or black. Some have no spots, some have a few spots, and some have many spots. They are poisonous and taste bad to most animals that try to eat them. As they eat and grow, ladybugs get more poisonous.

Harlequin ladybugs rest together in large groups during the winter. That is how they stay warm. You might see a pile of thousands of ladybugs in a rock or a dead tree. Ladybugs make special smells with their bodies that they use to call each other to their winter meeting places. Being able to make these special smells is a **trait** that ladybugs **inherit** from their parents.



These pictures show variation in harlequin ladybugs.



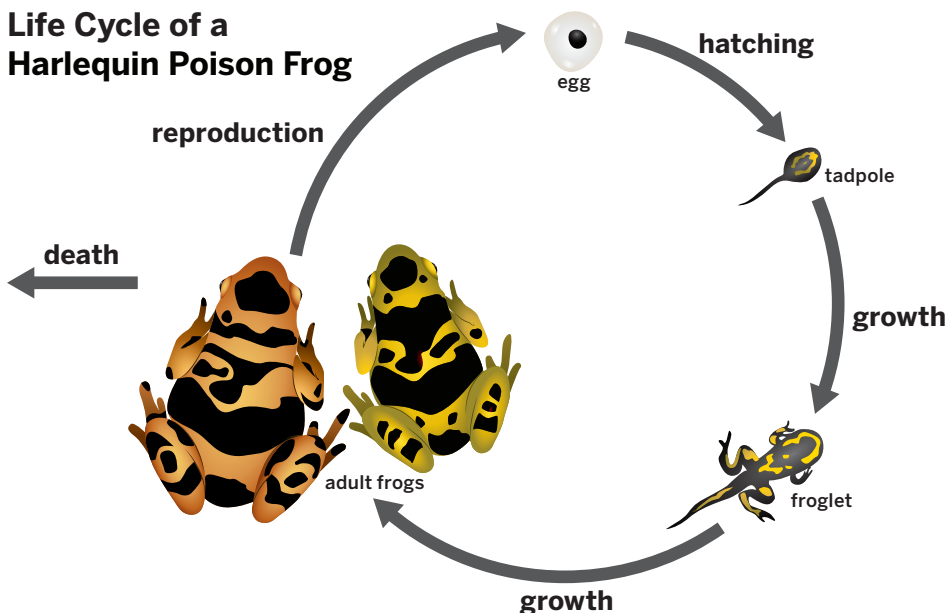
These harlequin ladybugs are resting and staying warm inside a crack in a rock.

Harlequin Poison Frog

Harlequin poison frogs are small, brightly colored frogs that live in the rain forest. They can be almost any color, and they often have stripes or spots on their bodies. They get their name because they have poison on their skin. Harlequin poison frogs eat a variety of small animals, such as ants and termites. Most animals cannot eat these poisonous frogs.



Harlequin poison frogs can be many different colors.



Variation in the Species

The easiest **variation** to see in harlequin poison frogs is their color. There is some variation in size and also in what they eat. Harlequin poison frogs also raise their **offspring** in different places depending on their **environment**. For example, if there are trees with leaves that catch water, the frogs will lay their eggs in those pools of water.

Some of the animals that harlequin poison frogs eat are also poisonous. They're not poisonous enough to hurt the frogs, though. In fact, the frogs get their poisonous **trait** from their food. Harlequin poison frogs are not poisonous until they eat poisonous animals. The frogs' skin becomes more poisonous when they eat more poisonous animals. The strength of a frog's poison is a trait that it gets from its environment.



This tadpole will grow into a harlequin poison frog.



This frog has traits that are similar to those of both its parents (top row). Its body color and spots are similar to those of its parents.

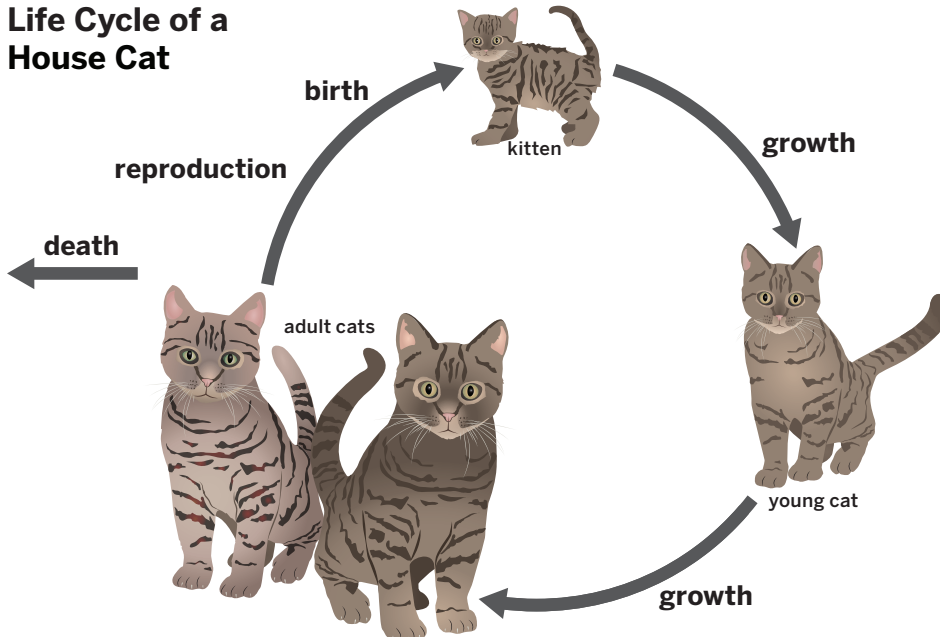
House Cat

House cats are the most common pets in the world. Cats hunt small animals, and they are often awake at night. They can see very well in the dark. Cats have fur to keep them warm and sharp claws and teeth to help them hunt.



These kittens (bottom row) look like their parents (top row).

Life Cycle of a House Cat



Variation in the Species

House cats have a lot of **variation** in their **traits**. Orange tabby cats have stripes like a tiger. Siamese cats have pale fur with dark markings that make it look like they are wearing a mask and socks. Sphynx cats don't have any fur at all. Cats have a lot of variation in size, ear shape, eye color, and behavior.

Sometimes a cat is born with extra toes. This is called polydactyly. Polydactyly is a trait that a cat can **inherit** from its parents. If two cats with polydactyly **reproduce**, their **offspring** are more likely to have polydactyly also.



This kitten got genes from both parents. It has polydactyly like one parent and long fur like the other parent.



These two cats have inherited very different traits, but they are both the same species.

Mexican Tetra

Mexican tetras are small fish that live in rivers and creeks. They are silver or pink in color, and they have thin fins that are almost clear. Mexican tetras eat insects, worms, and other small animals. They tend to live in groups called schools.

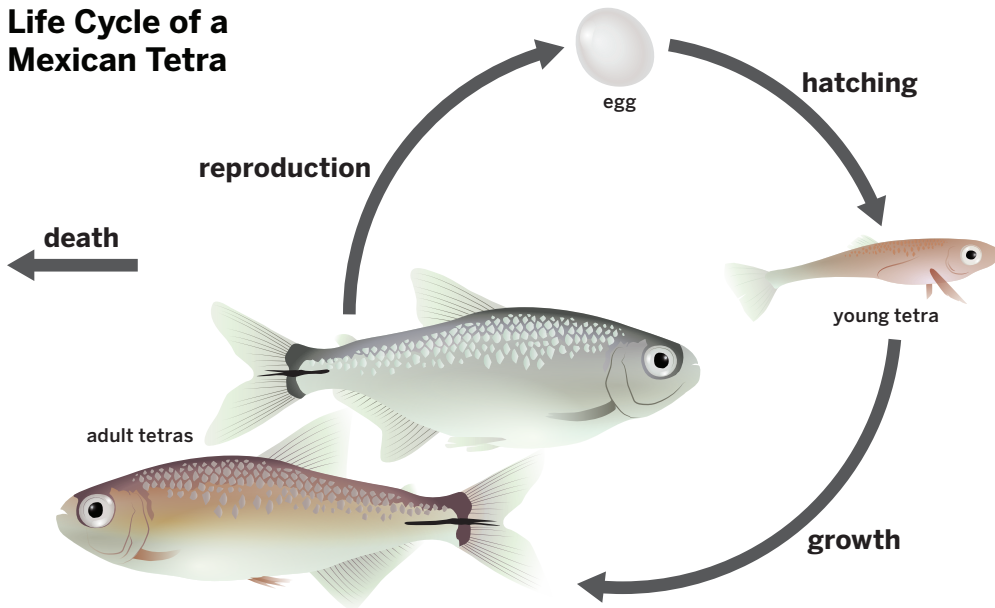


This is a school of silver Mexican tetras.



This is a close-up of a pink Mexican tetra.

Life Cycle of a Mexican Tetra



Variation in the Species

Mexican tetras can vary in size. They can also vary in color. Some of them have clear bodies, so you can see their insides, while others have silver skin that you can't see through.

Some Mexican tetras live in dark caves their whole lives. These fish are born blind. Some of them don't even have eyes. Blind Mexican tetras have taste buds all over their heads. Blindness is a **trait** that Mexican tetras **inherit** from their parents. Even if it moved to an **environment** with light, a blind Mexican tetra could not learn to see.



These Mexican tetras have eyes and can see.



This Mexican tetra has no eyes. Both its parents (in the picture at the left) also have no eyes. It inherited the trait of having no eyes from its parents.

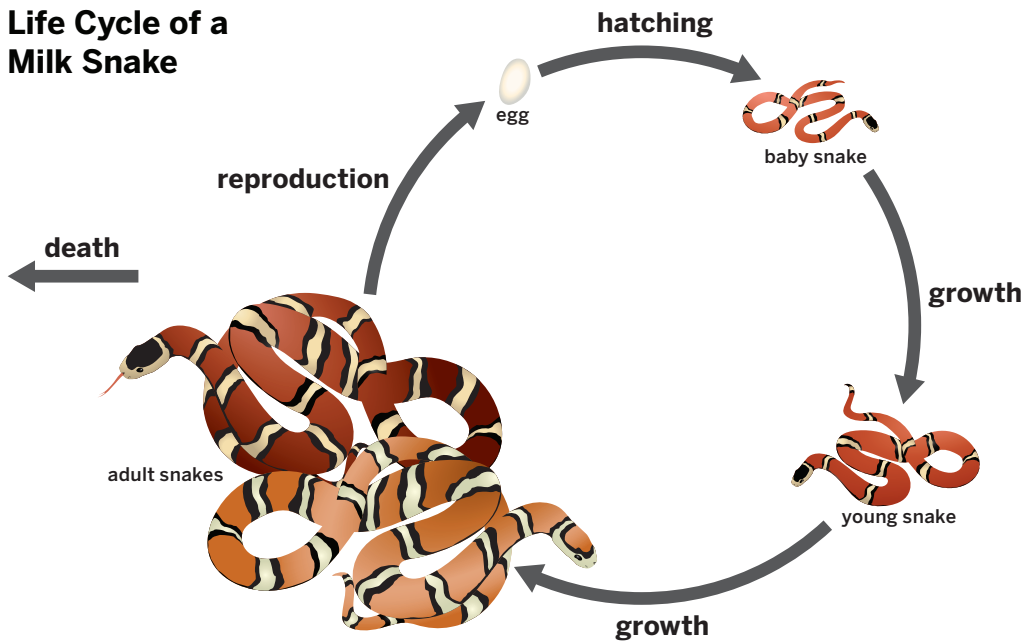
Milk Snake

Milk snakes are colorful striped snakes that are found in many places in North and South America. They can grow to be as long as 150 centimeters (5 feet). They have smooth, shiny scales. Young milk snakes eat slugs, worms, and insects. Full-grown milk snakes eat mice and frogs. Milk snakes are not dangerous to humans.



These milk snakes show variation in color and markings.

Life Cycle of a Milk Snake



Variation in the Species

There is a lot of **variation** in the color of milk snakes. Their stripes can be orange, red, brown, pink, white, black, or yellow. Milk snakes eat different kinds of food depending on their **environment**. Milk snakes that live near creeks eat frogs and fish. Milk snakes that live near fields eat mice.

Some milk snakes have coloring that makes them look a lot like other kinds of snakes. For example, some milk snakes have stripes that look the same as the stripes on a coral snake. Coral snakes are deadly. The **trait** of looking like a coral snake may help milk snakes scare away animals that might eat them. Those animals leave the harmless milk snake alone because it looks like a deadly coral snake. Milk snake colors come from **genes** they **inherit** from their parents.



This is a deadly coral snake.



This is a harmless milk snake. It inherited traits that make it look like the coral snake.

Peafowl

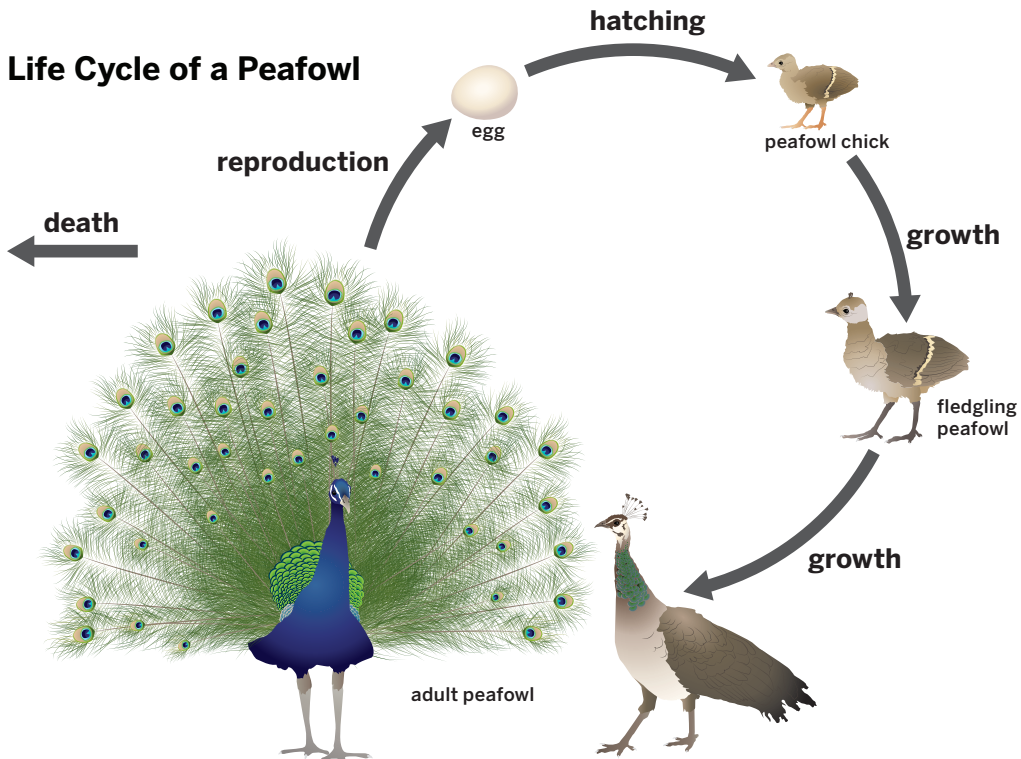
Peafowl are big, colorful birds. The males are called peacocks, and the females are called peahens. Peacocks are known for their huge, brightly colored tails. Peahens are smaller and mostly brown. When they are looking for mates, peacocks spread out their tail feathers into a big fan shape. Peafowl only fly when they need to get away from danger or sleep in a tree. They eat fruit, snakes, mice, and seeds.



peacock showing tail to peahen



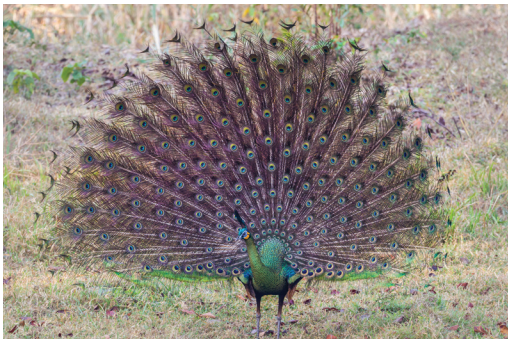
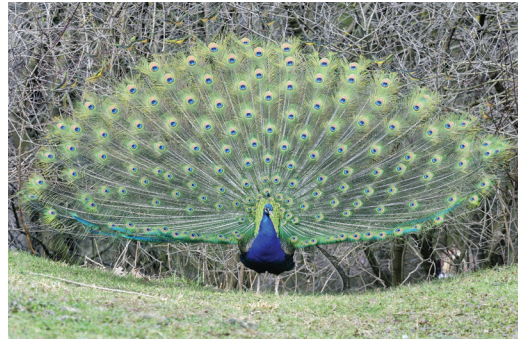
peahen and chick



Variation in the Species

Peacocks have some **variation** in how long their tail feathers are. There are many different color variations in peafowl. Some have black on their wings, and some have brown. Sometimes peafowl can be pure white.

Peacocks have about 200 tail feathers. About 150 of these feathers have a big spot in the middle. These are called eyespots. There is variation in how many eyespots peacocks have. Number of eyespots is a **trait** that peacocks **inherit** from their parents.



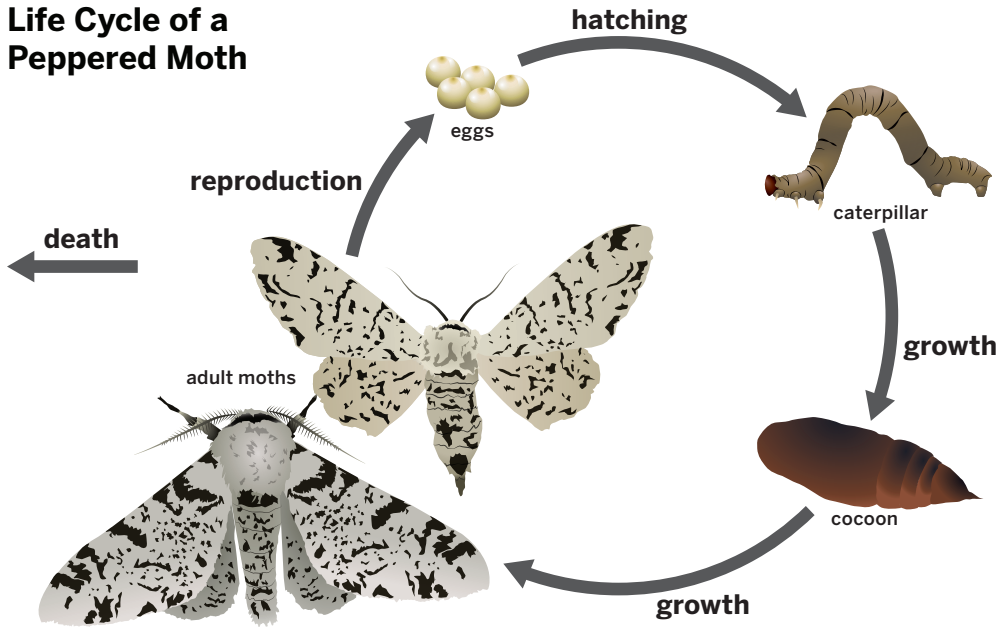
These photos show variation in peacock traits.

Peppered Moth

Peppered moths are named for the color of their wings: white with spots that look like black pepper. Like all moths, they start out as caterpillars. Peppered moth caterpillars look like twigs on a tree, which helps them hide. The moths fly around mostly at night.



Life Cycle of a Peppered Moth



Variation in the Species

Peppered moth caterpillars can be brown, gray, or green. The adult moths can be white with a few black spots or black with only a little bit of white. There is also **variation** in how long they spend as caterpillars before they turn into moths. All caterpillars **inherit** instructions to turn into moths within a certain amount of time. How long it takes depends on the **environment**. If there is a lot of food, the caterpillars will eat a lot and turn into moths quickly. If there is not much food, it will take longer for the caterpillars to turn into moths. The trait of how long it takes to turn into a moth results from both inheritance and interaction with the environment.

Peppered moth caterpillars can change color as they grow. While they are growing, the caterpillars molt several times. This means that they grow out of their skin and have to shed it like a shirt that is too small. If a caterpillar's environment changes, it can change the color of its skin when it molts. It can grow new skin that blends in with its new environment.



This photo shows some variation in peppered moth color. One of the moths in the photo is very hard to see.



These two peppered moth caterpillars are different colors. They blend in with the plants in their environment.

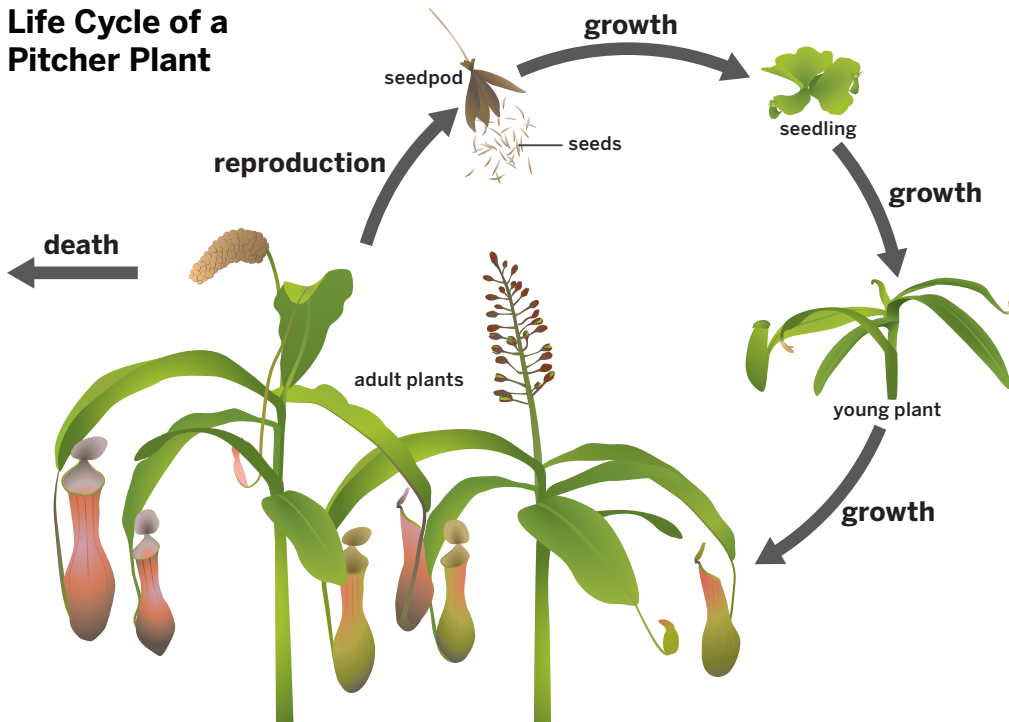
Pitcher Plant

Pitcher plants are not like most plants. They have special leaves that trap insects! The leaves are shaped like a pitcher that might be used to serve juice. That's how the plant gets its name. Pitcher plants get some of the things they need to live and grow from the insects they trap.



This pitcher plant has trapped an insect.

Life Cycle of a Pitcher Plant



Variation in the Species

Pitcher plants can grow to different sizes and have different numbers of pitchers depending on their **environment**. A pitcher plant can make many pitchers, or just one. The amount of sun that a pitcher plant gets can have a big effect on its leaves. Plants that get a lot of sun will grow strong and have many pitchers. Plants that get less sun will not have as many pitchers. Pitcher plants also have some **variation** in color. Some are more red and some are more green. Some even have stripes or spots.



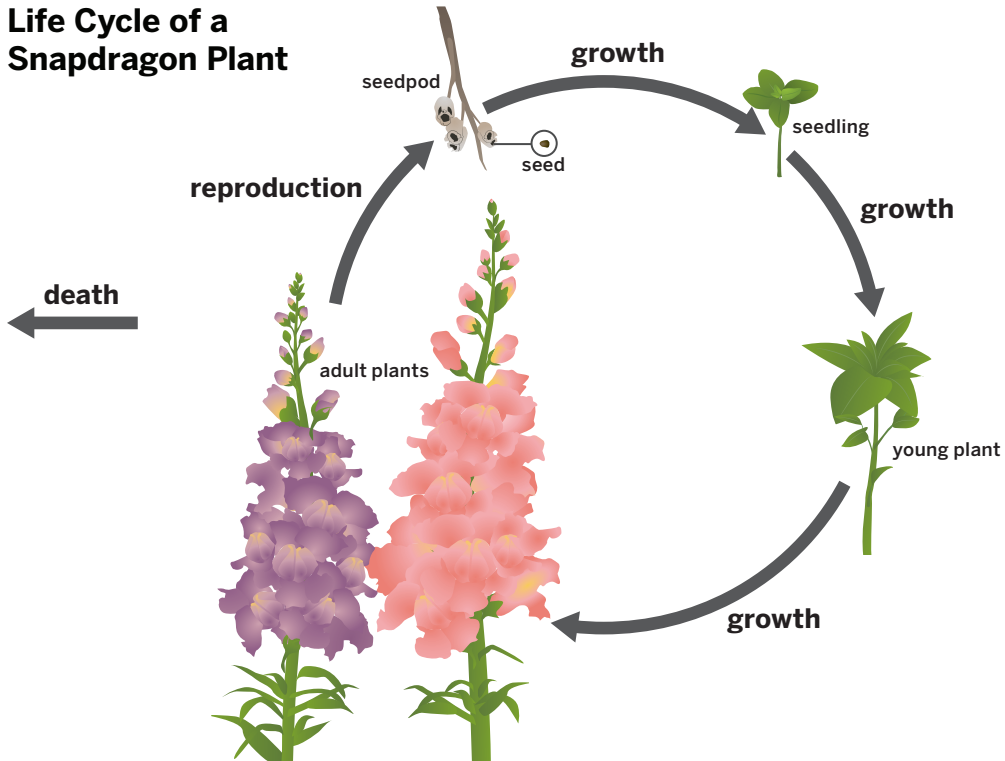
These photos show variation in pitcher plant leaves.

Snapdragon Plant

Snapdragon plants have colorful flowers and grow in gardens and in the wild around the world. They have tall stalks and their flowers have an interesting shape. Some people think they look like little dragon heads with mouths that can open.



Life Cycle of a Snapdragon Plant



Variation in the Species

Snapdragon flowers have a lot of **variation** in color and shape. They can be dark purple, orange, red, pink, white, or yellow. The plants also vary in height, from 10 centimeters (4 inches) to 1 meter (3 feet).

Different **species** of insects are attracted by different colors of snapdragon flowers. The color of a snapdragon's flowers is a **trait** that is **inherited** from its parents. A snapdragon's flower color can be a mix of its parents' flower colors. If a snapdragon plant with red flowers and a snapdragon plant with white flowers have **offspring**, the offspring will have pink flowers.



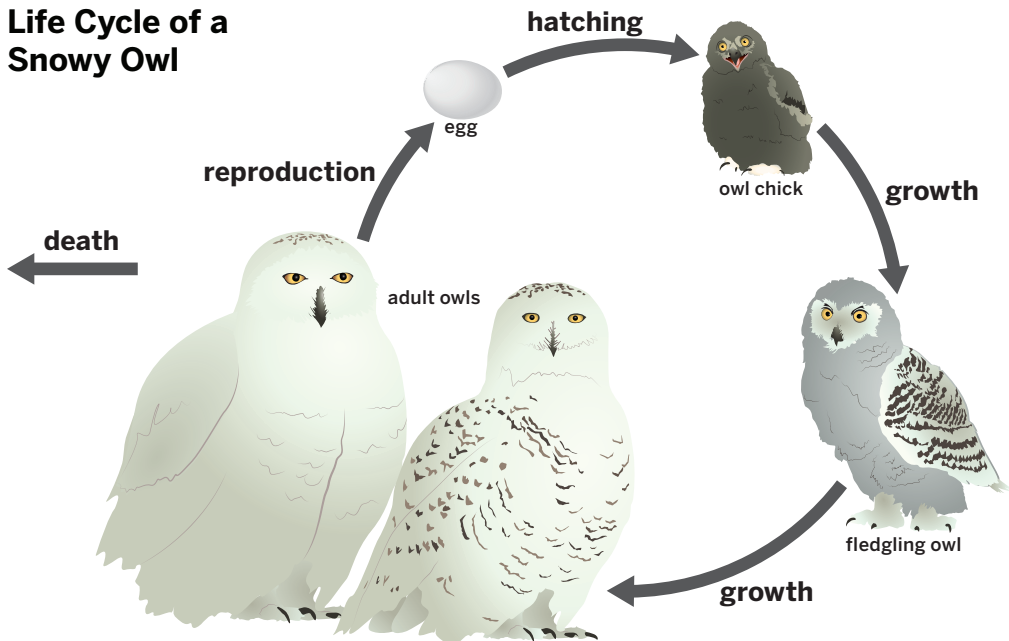
The snapdragon with pink flowers is the offspring of the snapdragon with white flowers and the snapdragon with red flowers. Its flower color is a mix of its parents' flower colors.

Snowy Owl

Snowy owls are white with black markings and yellow eyes. They hunt mice and other small animals. Unlike most owls, which only come out at night, snowy owls hunt in the daytime and the nighttime. They live in areas where it is usually cold. They can be up to 1.5 meters (5 feet) from the tip of one wing to the tip of the other wing.



Life Cycle of a Snowy Owl



Variation in the Species

Snowy owls can have different gray and black markings on their feathers. They have something called a bib, which is an area of white feathers under the face. The bib size can vary from owl to owl. Snowy owls hunt different kinds of animals depending on where they live and what they can find.

Snowy owls have 3–10 chicks at a time. Female owls **inherit** the **trait** of laying several eggs at a time. The exact number of eggs goes up or down depending on the **environment**. Some years, snowy owls are able to find more food in their environment. During these years, they have more chicks. How many eggs a snowy owl lays is a trait that results from both inheritance and interaction with the environment.



This group of snowy owls shows some variation in color.



This owl has three chicks.

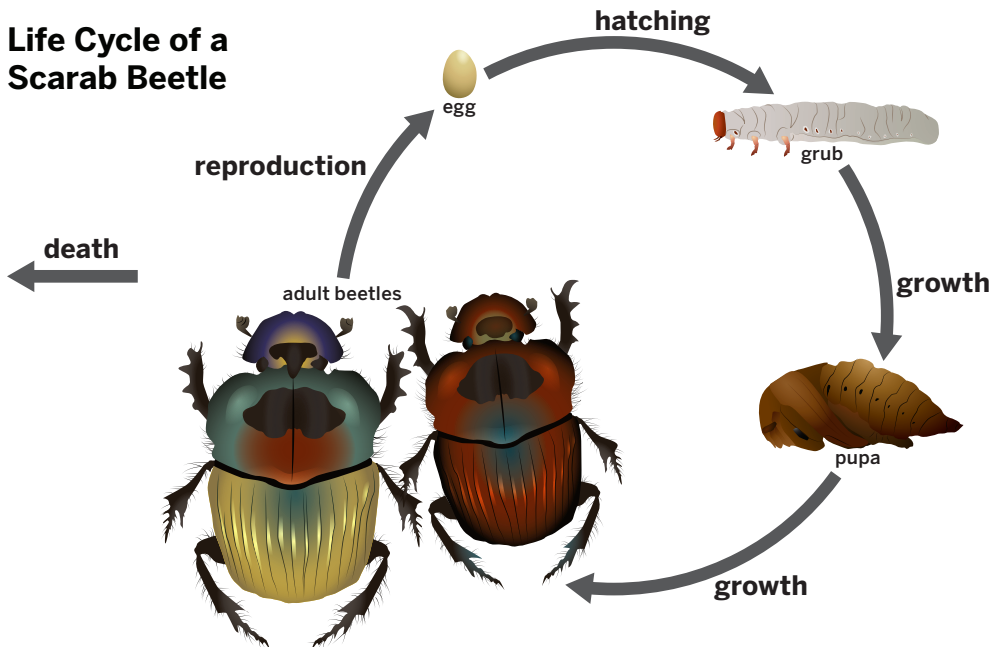
South American Scarab Beetle

Scarab beetles are big beetles with bright, shiny bodies. There is one **species** of scarab beetle that lives in forests and fields in South America. These scarab beetles eat the droppings of animals like sheep. They have claws on their legs that they use for digging.



male scarab beetle and female scarab beetle

Life Cycle of a Scarab Beetle



Variation in the Species

South American scarab beetles can be different colors, such as gold, red, green, brown, black, or blue. They eat different kinds of droppings depending on what is available in their **environment**. They can have different numbers of **offspring** depending on what they eat and where they lay their eggs.

The male of the species has a horn on its head like a rhinoceros. Male scarab beetles use their horns for fighting over mates and for digging holes. All the male beetles **inherit** instructions to grow horns of a certain size. The horns can grow to different sizes depending on how much food there is in the environment. If there is a lot of food in a scarab beetle's environment, its horn grows bigger. The trait of horn size results from both inheritance and interaction with the environment.



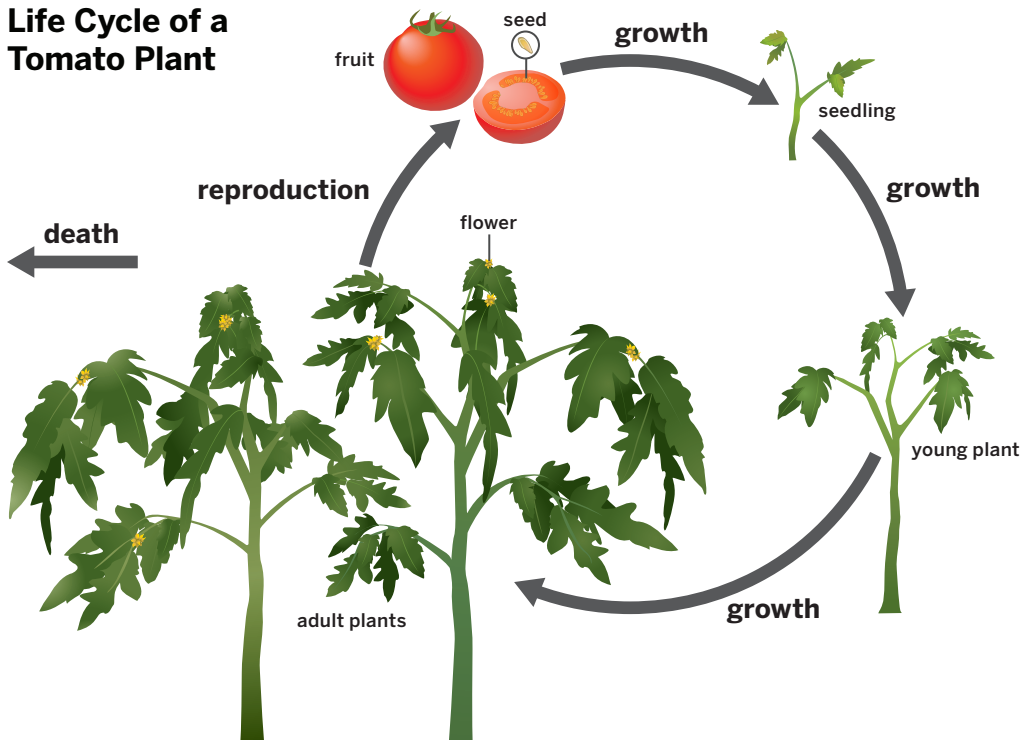
These photos show some scarab beetle variation. The male on the top left has a large horn.

Tomato Plant

You may have tasted tomatoes cut up in a salad or cooked in spaghetti sauce. Tomatoes are the fruit of the tomato plant, which has spiky, bright-green leaves and grows to about 1–3 meters (3–10 feet) tall. Tomato plants are covered in little hairs, and their leaves are poisonous.



Life Cycle of a Tomato Plant



Variation in the Species

Tomato plants all look similar, but they can make very different fruits. The fruits of some tomato plants look like tiny yellow peas. Other tomato plants have giant red fruits that wouldn't fit in your hand. There are black tomatoes, green tomatoes, pink tomatoes, and purple tomatoes. Some are shaped like bouncy balls, some look like torpedoes, and some are lumpy.

Humans have been growing tomatoes to eat for thousands of years. Over that time, farmers have chosen tomatoes that have **traits** they want, such as orange stripes, a sweet flavor, or a thin skin. When they **reproduce**, tomato plants pass down the **genes** for these traits to their **offspring**.



These photos show variation in the fruits of tomato plants.

White-Tailed Deer

White-tailed deer can be found in many parts of the world. They eat plants and live in forests and grasslands. Deer have white spots when they are born. The spots go away as they grow. Adult deer change from reddish to gray as they get older. Male deer grow antlers that they use to fight for mates. Every year, the antlers fall off and the deer grow new ones. White-tailed deer are very good at jumping and swimming. When they are scared, they lift their white tails to warn other deer of danger.

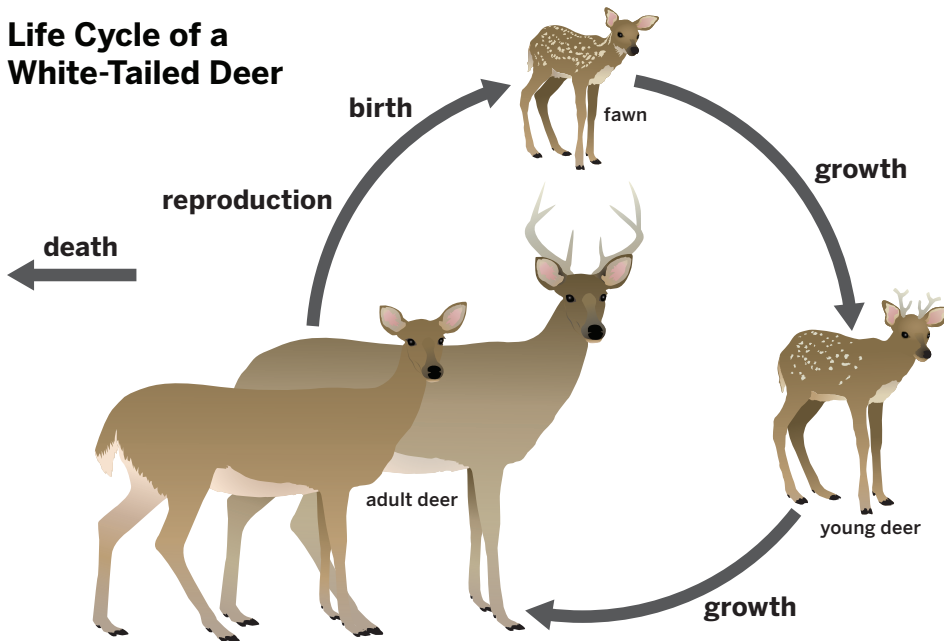


male white-tailed deer



female white-tailed deer and fawn

Life Cycle of a White-Tailed Deer



Variation in the Species

White-tailed deer can be bigger or smaller depending on how much food is available in their **environment**. Some deer have longer fur, while others have shorter fur. Every male deer has a different shape to its antlers. The **genes** that give instructions for antler shape are passed down from parent to **offspring**.

Every so often, a deer can be born with genes that give instructions for an unusual color **trait**. These deer are mostly white. The white color of these deer is an **inherited** trait.



These deer show some variation in color.



These deer are the offspring of two white deer.

White Willow Tree

White willow trees are big, tall plants that grow in many places around the world. They have long, thin leaves that are light green on top and white on the bottom. White willow trees can grow to be 25 meters (80 feet) tall. Their flowers are called catkins because they are long and fluffy like a cat's tail. Willow trees often grow in wet soil next to rivers and lakes.

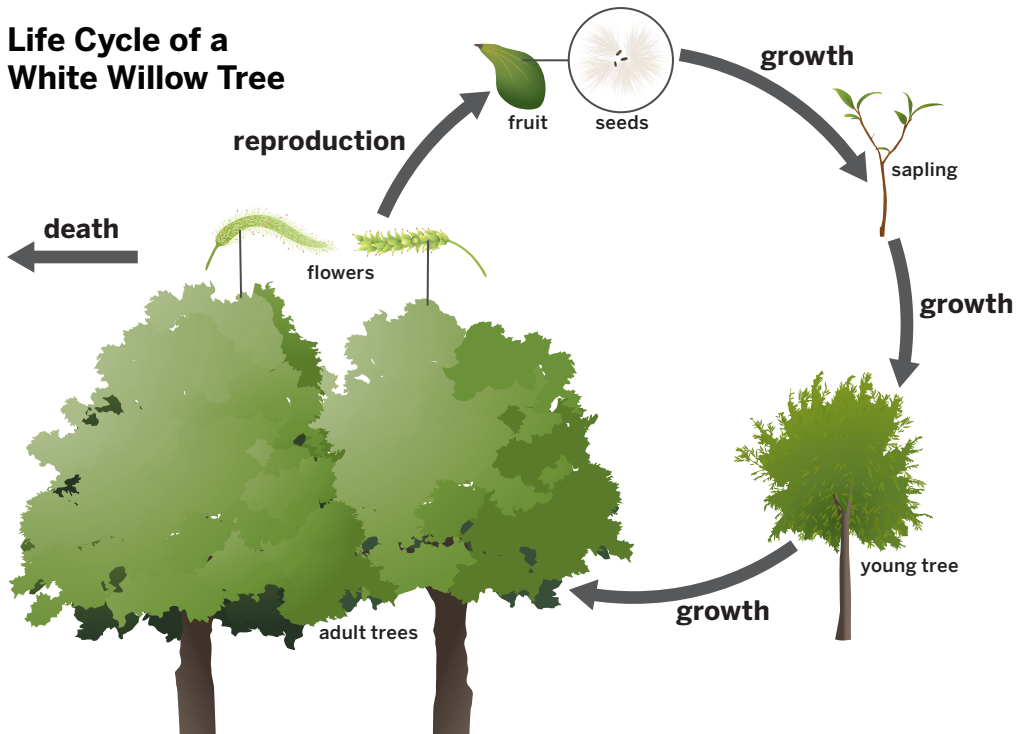


large white willow tree



small white willow tree

Life Cycle of a White Willow Tree



Variation in the Species

White willow trees have a lot of **variation** in size. They can grow very big if they have enough space, water, and sunlight. They can stay small if they do not have everything they need in their **environment**.

Willow trees have a chemical in their bark that helps the tree stay healthy. Humans have used this chemical as medicine for thousands of years. Now the chemical is used to make aspirin, which people take for pain. Willow trees **inherit** the **trait** of making a certain amount of this chemical. A tree can make more or less of the chemical depending on the weather in the tree's environment. The trait of how much of the chemical a tree makes results from both inheritance and interaction with the environment.



catkins



**aspirin made
from willow bark**

Glossary

cells: tiny parts that make up living things

compare: to notice how two or more things are alike or different

environment: all the living and nonliving things in an area

genes: instructions for making a living thing that are in cells and passed from parents to offspring

inherit: to get something that is passed down

investigate: to try to learn more about something

life cycle: the changes that happen in the life of an organism, such as birth, growth, and reproduction

observe: to use any of the five senses to gather information about something

offspring: living things that come from parents

organism: a living thing, such as a plant or an animal

reproduce: to make offspring

species: a group of organisms that are closely related to each other

trait: something that can be observed about an organism, such as color or size

variation: differences

Index

bottlenose dolphin 6–7

brain coral 8–9

Denise’s pygmy seahorse 10–11

domestic dog 12–13

environment 4, 9, 13, 15, 21, 25, 27, 31, 33, 37, 39, 43, 45

genes 7, 13, 23, 27, 41, 43

giant golden orb-weaving spider 14–15

giraffe 16–17

harlequin ladybug 18–19

harlequin poison frog 20–21

house cat 22–23

inheritance 4, 13, 15, 17, 19, 23, 25, 27, 29, 31, 35, 37, 39, 43, 45

life cycle 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44

Mexican tetra 24–25

milk snake 26–27

offspring 4, 7, 13, 18, 21, 23, 35, 39, 41, 43

peafowl 28–29

peppered moth 30–31

pitcher plant 32–33

reproduction 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, 24, 26, 28, 30, 32, 34, 36, 38, 40, 41, 42, 44

snapdragon plant 34–35

snowy owl 36–37

South American scarab beetle 38–39

tomato plant 40–41

white-tailed deer 42–43

white willow tree 44–45

Materials to be used solely for remote learning due to COVID-19



Books for *Inheritance and Traits*:

Blue Whales and Buttercups

The Code

Scorpion Scientist

How the Sparrow Learned Its Song

Handbook of Traits

Lawrence Hall of Science:

Program Directors: Jacqueline Barber and P. David Pearson

Curriculum Director, Grades K–1: Alison K. Billman

Curriculum Director, Grades 2–5: Jennifer Tilson

Lead Book Developers: Ashley Chase and Chloë Delafield

***Inheritance and Traits* Book Development Team:**

Leah B. Anderson Jennifer Garfield Phaela Peck

Ranem Atia Channon A. Jackson

Lauren Mayumi Brodsky Ari Krakowski

Amplify:

Irene Chan Charvi Magdaong Matt Reed

Samuel Crane Thomas Maher Eve Silberman

Shira Kronzon Rick Martin Steven Zavari

Design and Production: Fran Biderman-Gross, advantages.net

Credits:

Photographs: Cover, Pages 1, 5 (tl, tm), 6 (tl, tr), 8 (tl), 9 (t), 10 (t), 11, 12 (t), 13, 14 (tl), 15 (r), 16 (tl, tr), 17 (r), 19 (r), 22 (tl, tm, tr, ml, mr), 23 (tm, tr, ml, br), 25-29, 30 (t), 32 (tl, tr), 33 (l), 36 (tl, tr), 37, 38 (tl, tr), 39 (m), 40 (tl, tr), 41 (tl, bl, br), 42 (tl, tr), 43 (t), 44 (tr), 45 (br): Shutterstock; Pages 5 (r), 7: ANT Photo Library/Science Source; Page 8 (tr): Jerry McCormick-Ray/Science Source; Page 9 (b): Burt Jones & Maurine Shimlock/Science Source; Pages 14 (tr), 15 (l): Stuart Wilson/Science Source; Page 17 (l): mn reddy/Moment/Getty Images; Page 18 (t): Scott Linstead/Science Source; Page 19 (l): © entomart; Page 20: (tl) Mark Aartse-Tuyn; (tm) Mark Moffett/Minden Pictures/Getty Images; Page 20 (tr), 21 (mr), 34 (t): Chris Mattison/FLPA/Science Source; Page 20 (ml), 21 (br): Joel Sartore, National Geographic Photo Ark/National Geographic/Getty Images; Page 20: (mm, mr), 21 (ml): Thomas Marent/Minden Pictures/Getty Images; Page 21 (bl): Francesco Tomasinelli/Science Source; Page 23 (tl): Amy White & Al Petteway/National Geographic/Getty Images; Page 24 (tl): Luis Javier Sandoval Alvarado/Science Faction/Getty Images; (tr): Mark Smith/Science Source/Getty Images; Page 31 (l): Stephen Dalton/Minden Pictures/Getty Images; (mr, br): imageBROKER/Alamy; Page 33: (ml) Ch'ien Lee/Minden Pictures/Getty Images; (mr): Paul Starosta/Corbis Documentary/Getty Images; (r) Attenboroughii via CC BY 2.0; Page 35: (tl, bl, br) Udo Schmidt via CC BY-SA 2.0; (tr) Hectonichus via CC BY-SA 3.0; Page 39 (b): Winfried Wisniewski/Minden Pictures/Getty Images; Page 41 (tr): Francesca Yorke/Photolibrary/Getty Images; Page 44 (tl): Dea/N. Chasseriau/De Agostini Picture Library; Page 45 (bl): Adrian Bicker/Science Source; Page 48 (grid): Shutterstock; Jerry McCormick-Ray/Science Source; Scott Linstead/Science Source; Thomas Marent/Minden Pictures/Getty Images; Amy White & Al Petteway/National Geographic/Getty Images; Stephen Dalton/Minden Pictures/Getty Images; Chris Mattison/FLPA/Science Source; Dea/N. Chasseriau/De Agostini Picture Library

Inheritance and Traits

Meet a tiny pink seahorse and a giant striped spider.

This reference book is about 20 different organisms, their life cycles, and how their traits vary. Big or small, all organisms have interesting traits. There can be a lot of variation in those traits. Read about the traits of some very different organisms.



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

3

Amplify.

Published and Distributed by Amplify.
www.amplify.com

