



# Why Do Animals Do What They Do? Exploring Adaptations (3-5)

### At a glance

Students observe different types of animals and answer questions to determine why animals have different adaptations.

### Time requirement

One Zoo visit of at least 90 minutes

### Goal

To observe adaptations of animals at the Zoo and collect data to share with others

### Group size and grades

Any group size, divided into small groups of 10 or fewer students  
Grades 3-5

### Objective

Students will conduct investigations to determine how animals use their adaptations.

### Materials

Copies of Inquiry worksheets  
Stopwatch  
Pencils  
Clipboards or a Hard Writing Surface

### Theme

Animals have adaptations to help them survive.

### Academic standards

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|---|--|
| Ohio Science Academic Content Standards | Life Sciences<br><i>Heredity</i> (3:1)<br><i>Diversity and Interdependence of Life</i> (3:2,3) (5:4)<br>Science and Technology<br><i>Abilities To Do Technological Design</i> (3:4)<br>Scientific Inquiry<br><i>Doing Scientific Inquiry</i> (3:2,3,5) (3:6) (4:3,6) (5:1) (5:3)<br>Scientific Ways of Knowing (3:2) (4:2) (4:4) (5:4)                 |
| Kentucky Core Content—Science           | Biological Science<br><i>Unity and Diversity</i> SC-(EP-3.4.1,2,3) (04-3.4.1,2)<br><i>Biological Change</i> SC-05-3.5.2<br>Unifying Concepts<br><i>Interdependence</i> SC-(EP-4.7.1) (04-4.7.1)  |
| Indiana Science Standards               | The Nature of Science and Technology<br><i>Scientific Inquiry</i> (3.1.2,3,4)<br><i>The Scientific Enterprise</i> (3.1.5)<br>Scientific Thinking<br><i>Communication Skills</i> (4.2.5) (5.2.6)<br>The Living Environment<br><i>Diversity of Life</i> (3.4.1)<br><i>Interdependence of Life and Evolution</i> (4.4.4)<br><i>Human Identity</i> (3.4.6) |

## Background

Each animal and plant species is adapted to live in a specific habitat. A habitat is the place where an animal lives and finds what it needs to survive—food, water, shelter and space. Not all habitats are alike—some are cold and others hot, some are terrestrial and others are aquatic. Some have a diverse community of living things and others very few kinds of plants and animals. The physical and behavioral characteristics that enable an animal or plant to survive in its habitat are called **adaptations**.



For example, the elephant's most famous adaptation is certainly its trunk. A formidable body part, the trunk is comprised of more than 100,000 muscles and has one or two (depending on the species) fingerlike tips. It's how the elephant uses the trunk, its behavior, which truly makes it an indispensable adaptation. For example, this trunk has the ability to pick up a huge tree by its trunk or a twig the size of a pencil. The trunk acts as a snorkel to breathe through when under water and as a hose while bathing. The elephant also uses its trunk to bring food and water to its mouth, to trumpet to communicate, to dust its back for protection from the sun and to hold mother's tail for safety. Without its trunk and the ability to use it, the elephant would have a difficult time obtaining food, water, shelter and using space.

## Vocabulary

*Adaptation*—a body part or behavior that helps an animal survive in its habitat

*Ecological Niche*—where animals live and how they interact in that area

*Spiracles*—tracheal openings in the exoskeleton of an insect which allow it to obtain oxygen

*Hypothesis*—A proposed explanation that predicts an outcome of an investigation

## Activity

### *Getting ready*

Make enough copies of the investigation worksheets for each student or pair of students.

### *Doing the activity*

Before coming to the Zoo, let the students know that they will be taking part in important investigations to help them understand why animals do what they do. They will be observing animals that fit into certain categories and answering questions that help them understand many cool adaptations animals have that help them to survive in various locations around the world.

Introduce the concept of an adaptation. Have the students try to write their names or tie their shoes without using their thumbs. Explain how the thumb is one of our important adaptations. Without them it would be hard to do many things.

Other animals and plants have adaptations, too. An adaptation is a body part or behavior that helps an animal survive. Body Part + Behavior = Survival. Brainstorm a list of adaptations of different animals.

*At the Zoo*

Have a chaperone take around small groups of 10 or less students. Stop at each one of the 4 areas listed on the investigation worksheets and complete the investigation. If there is not enough time to make all 4 stops choose only the investigations that fit your needs. If there is time the students may answer the questions at the zoo or they may complete them in class.

*Wrap-up*

Back in class discuss the students' findings by going over their answers to the questions.

**Assessment**

Assess the student's overall participation and completion of the investigations.

*Unsatisfactory*—Student did not participate and did not do investigations.

*Satisfactory*—Student participated and conducted the investigations at a satisfactory level.

*Excellent*—Student fully participated in and conducted the investigations.

**Extension**

- Students choose one of the animals they observed at the Zoo to research further and draw a picture of or write a report on the animal's adaptations for survival.

## Mammals

Location: Cat/Carnivore House

Mammals are found on every continent in the world. Almost all mammals meet 4 requirements. They have fur, have milk for their babies, breathe air with lungs, and have live birth. Mammals come in many shapes and sizes. They can range from a small little mouse all the way to a great big elephant. In fact, you are a mammal.

Can you find the following mammals?

Put a check mark in the box after you have found the mammal.

Mammal with brown fur

Mammal with long ear tufts

Mammal that is sleeping

Mammal that is looking at  
you

Mammal with spots

Mammal with a short tail

Investigation: Is it Living?

The cats in the cat house spend much of their day sleeping because they are nocturnal, that means they are awake at night and sleep during the day. Sometimes it can be hard to tell if a sleeping cat is still alive. Pick one cat to observe for 2 minutes. You will be looking for any signs of life such as moving, breathing and eating.

How do you know the cat is alive? \_\_\_\_\_

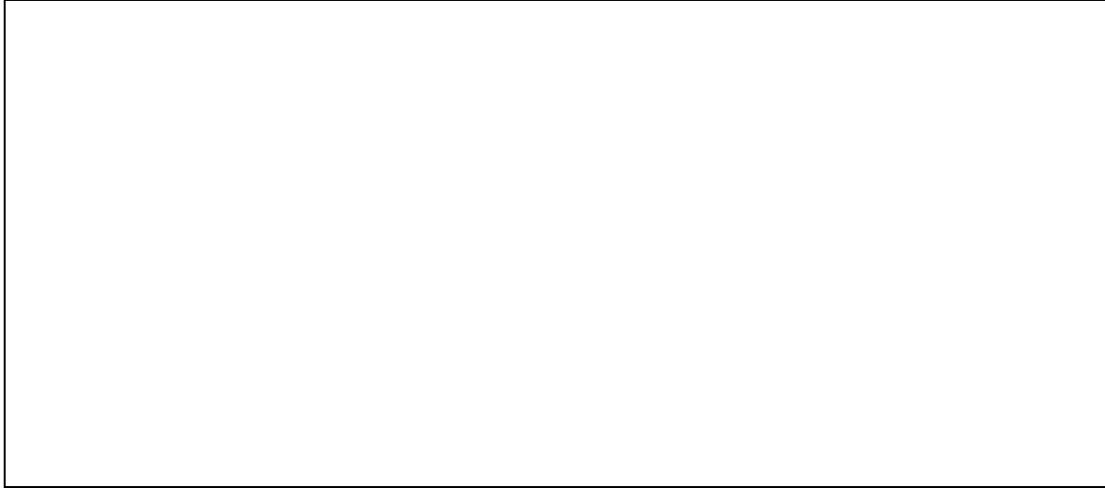
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If the cat you are observing is sleeping, how do you know it is still alive?

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Draw a picture of the cat you observed in the box below. Put the type of cat you observed on the line on top of the picture.



Plants and animals are living because they have these 6 common things:

1. They are made of cells. These are teeny tiny and help make living things grow.
2. They need energy. Plants get their energy from the sun, water, and air. How do you think cats gets energy?

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3. They can reproduce or make more of the same kind of living thing.

What is a baby cat called? \_\_\_\_\_

What is a baby plant called? \_\_\_\_\_

4. They can grow? Are you the same size you were when you were

born? \_\_\_\_\_

5. Living things respond to the environment.

When it rains outside what do you do?

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This is an example of how you respond to your environment when the weather changes.

6. Living things adapt to their environment if things change.

What does a cat do to get ready for winter? (Hint: Think about their fur and the food they eat).

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This is an example of adapting to the environment.

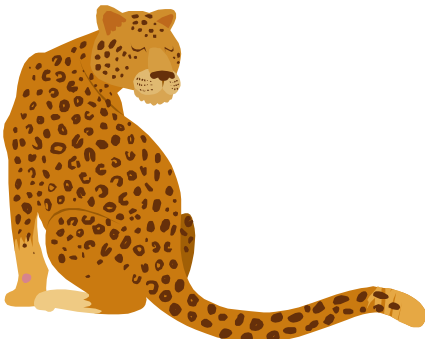
In Zoo Extension:

Go to the Discovery Forest and see the Sensitive Plant Discovery Zone. (Not available all of the time). Watch the plant respond to its environment when something touches it.

Living Thing Challenge:

Are the following things living? Put an X if "Yes" it is living; put an X in "No" if it is not living. (Remember to think about what living things have in common).

|            | Yes | No |
|------------|-----|----|
| Bird       |     |    |
| Tree       |     |    |
| Rock       |     |    |
| Television |     |    |
| Fish       |     |    |
| Lava       |     |    |
| Carrots    |     |    |



## Birds

Location: Wings of the World

Birds can be found on every continent in the world. Some birds live in the trees, some on the ground and even some in the water. No matter where birds are found they all have feathers, beaks and lay eggs. Birds have adaptations that help them to survive in these different areas. Bird's beaks, colors, and body shape are some of the adaptations that birds have to help them survive.

Go to the South American Aviary Located in Wings of the World  
Can you find the following birds?

Put a check mark in the box after you have found the bird.

Bird with yellow feathers

Bird in the water

Bird eating

Bird with a pointy beak

Bird on the ground

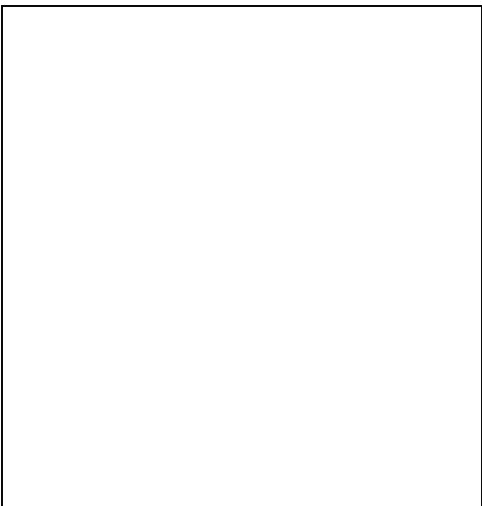
Bird with a beak longer than  
your hand

### Investigation: Where are the Birds?

Birds live in many different areas in the world. Some live on the ground, some in the middle parts of trees or in bushes and some live up high in the trees. Some birds fly in and out of these different locations but they prefer to spend most of their time in one particular area. Where animals live and how they interact in that area is called their ecological niche.

Pick 1 bird to observe for 2 minutes. Draw a picture of your bird in the box below. Identify your bird and write the species of bird on the side of your picture.

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Write a hypothesis (what you think might happen) of where you think your bird will spend most of its time.

My bird will spend most of its time on the \_\_\_\_\_ because

\_\_\_\_\_

Begin your 3 minute observation by putting a tally mark in the box where your bird is now. Then put a tally mark in the box every time you see your bird move to a different location.

|      | Ground | Middle of Tree | Top of Tree |
|------|--------|----------------|-------------|
| Bird |        |                |             |

Where did your bird spend most of its time?

\_\_\_\_\_

Was your hypothesis correct? \_\_\_\_\_

*Remember it is ok if your hypothesis was wrong. If scientists new all the answers, there would be no need to do research.*

Do you think it is a good idea that birds live in different parts of trees?

\_\_\_\_\_

What do you think would happen if all birds lived in only 1 area?

\_\_\_\_\_

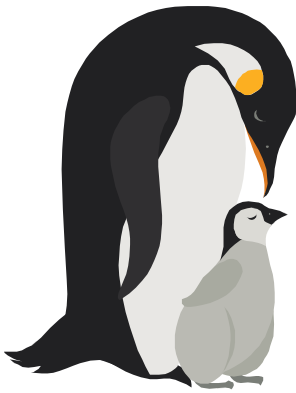
\_\_\_\_\_

\_\_\_\_\_

**Bird Challenge:**

Are the following things Birds? Put an X if "Yes" it is a bird; put an X in "No" if it is not a bird.

|                 | Yes | No |
|-----------------|-----|----|
| Flamingo        |     |    |
| Tree            |     |    |
| Hawk            |     |    |
| Bat             |     |    |
| Penguin         |     |    |
| Flying Squirrel |     |    |
| Blue Jay        |     |    |



# Insects

Location: World of Insects

Insects come in all shapes and sizes. Some are bigger than your hand and some are so small you can barely even see them. There are more insects in the world than any other animal. All insects have 6 legs, 2 antennae and 3 body parts. Most even have special eyes called compound eyes that are made up of tiny little parts and are really good at detecting movement.

Can you find the following animals?

Put a check mark in the box after you have found the animal.

Animal with 6 legs

Animal that is black and red

Animal with 8 legs

Animal with a stinger

Insect bigger than your hand

Insect with wings

## Investigation: Don't Burst My Bubble

Insects breathe in a way that is different from many other animals. Most animals breathe in and out from their mouths but insects breathe through tiny holes called spiracles (spear-a-culs) that are found on their bodies. They don't even have lungs. Many insects live in the water but they still need air and they have developed a really cool adaptation to help them get it.

Go to the sunburst beetle exhibit located in the World of Insect building. This exhibit is located in the third room right in the middle.

Write a hypothesis (what you think might happen) for how you think sunburst beetles breathe.

I think the sunburst beetle breathes by \_\_\_\_\_

\_\_\_\_\_

because \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Did you see the little air bubbles on the backs of the beetles? That is where they breathe. When they go underwater they take a little air bubble with them and store it by their backsides. When they need some more air they suck in some air from their butts. (Ewe Gross!!) (Or in scientific terms spiracles on their abdomens).

Why would this be a helpful adaptation for some insects to have?

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Why do you think insects have spiracles instead of mouths and lungs? Think about where insects might live, trees, leaf litter, underwater, and underground.

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Observe the beetles again but look closely at the ones that are resting and the ones that are swimming.

What do you notice that's different about their air bubbles?

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The Bubble Difference Answer:

Step 1: Say "At the Cincinnati Zoo, insects are cool too."

Step 2: Now run in place really fast for 30 seconds.

Step 3: Repeat the saying "At the Cincinnati Zoo, insects are cool too."

Were you out of breath making it harder to say the saying again? \_\_\_\_\_

Why do you think the air bubbles are different?

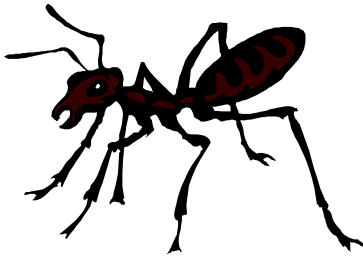
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**Insect Challenge:**

Are the following insects? Put an X if "Yes" it is an insect; put an X in "No" if it is not an insect.

|              | Yes | No |
|--------------|-----|----|
| Spider       |     |    |
| Beetle       |     |    |
| Millipede    |     |    |
| Bee          |     |    |
| Scorpion     |     |    |
| Cockroach    |     |    |
| Your Teacher |     |    |



# Reptiles

Location: Reptile House

Reptiles are found on almost all of the continents in the world. All reptiles have scales and are ectothermic. This means they need help from outside resources like sun and shade to help them keep a healthy body temperature. Some Reptiles live in the trees, some on the ground and even some in the water. Reptiles have adaptations that help them to survive in these different areas. Reptile's mouths, colors, scales and body shape are some of the adaptations that help them survive.

Can you find the following reptile adaptations?

Put a check mark in the box after you have found the reptile.

Reptile with claws

Reptile with a shell

Reptile with a rattle

Reptile with a tail

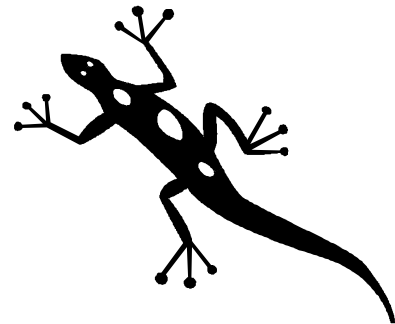
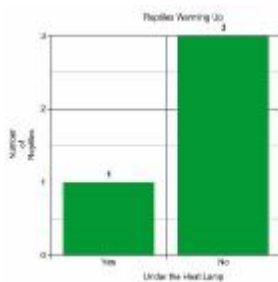
Reptile with green scales

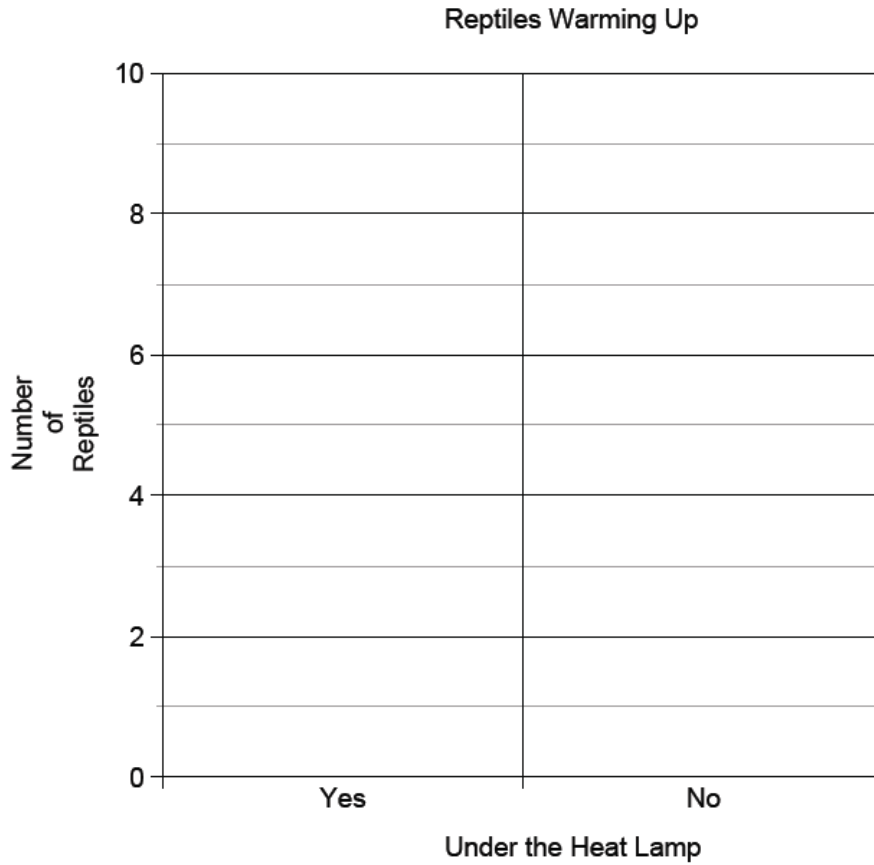
Reptile with a tongue

## Investigation:

All reptiles are ectothermic meaning they need help from outside resources to warm themselves up or cool themselves down. In the reptile house, zookeepers have provided reptiles with a heat lamp that will warm them up if they get cold. Find 10 reptiles to observe and make a bar graph to see if they are using a heat lamp to warm up. You will have to look up to see the round heat lamp when looking into the enclosure.

## Sample Bar Graph:





Were most of the reptiles under the heat lamp?

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Why do you think a reptile might not be under a heat lamp?

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What would a reptile use in the wild to warm up with? \_\_\_\_\_

What would a reptile in the wild use to cool down with? \_\_\_\_\_

Combine your data with everyone in the class in one big bar graph.

Did the class see more or less reptiles under the heat lamp? \_\_\_\_\_

Is the class outcome the same as your outcome? \_\_\_\_\_

Why might the outcome be different? \_\_\_\_\_

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**Reptile Challenge:**

Are the following Reptiles? Put an X if "Yes" it is a reptile; put an X in "No" if it is not reptile.

|              | Yes | No |
|--------------|-----|----|
| Snake        |     |    |
| Turtle       |     |    |
| Bird         |     |    |
| Bee          |     |    |
| Lizard       |     |    |
| Potato Chips |     |    |
| Alligator    |     |    |





Teacher Answer Page

**Living Thing Challenge:**

Are the following things living? Put an X if "Yes" it is living; put an X in "No" if it is not living.

|            | Yes | No |
|------------|-----|----|
| Bird       | X   |    |
| Tree       | X   |    |
| Rock       |     | X  |
| Television |     | X  |
| Fish       | X   |    |
| Lava       |     | X  |
| Carrots    | X   |    |

**Bird Challenge:**

Are the following things Birds? Put an X if "Yes" it is a bird; put an X in "No" if it is not a bird.

|                 | Yes | No |
|-----------------|-----|----|
| Flamingo        | X   |    |
| Tree            |     | X  |
| Hawk            | X   |    |
| Bat             |     | X  |
| Penguin         | X   |    |
| Flying Squirrel |     | X  |
| Blue Jay        | X   |    |

**Insect Challenge:**

Are the following insects? Put an X if "Yes" it is an insect; put an X in "No" if it is not an insect.

|              | Yes | No |
|--------------|-----|----|
| Spider       |     | X  |
| Beetle       | X   |    |
| Millipede    |     | X  |
| Bee          | X   |    |
| Scorpion     |     | X  |
| Cockroach    | X   |    |
| Your Teacher |     | X  |

**Reptile Challenge:**

Are the following Reptiles? Put an X if "Yes" it is a reptile; put an X in "No" if it is not reptile.

|              | Yes | No |
|--------------|-----|----|
| Snake        | X   |    |
| Turtle       | X   |    |
| Bird         |     | X  |
| Bee          |     | X  |
| Lizard       | X   |    |
| Potato Chips |     | X  |
| Alligator    | X   |    |