

# The World of Reptiles

ZOOGUIDES volume 5

TEACHERS NOTES

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## **INTRODUCTION**

The ZooGuides™ series of software from REMedia provides a resource for K-12 teachers and librarians on life science topics. This Teacher's Guide offers suggestions, activities, and references for integrating the World of Reptiles ZooGuide into your curriculum. Other titles in the series include:

- Butterflies of the World
- Whales and Dolphins
- Mammals of Africa
- The Rainforest
- Life in the Desert
- Animals in Danger
- Natural History of Yellowstone

Use this program:

- as an encyclopedic reference;
- to teach major biological concepts such as Evolution, Life Cycles, Anatomy, Reproduction, and Ecology; and
- to understand and appreciate the intricate and fascinating lives of reptiles.

### **What is in this Guide**

The World of Reptiles Teacher's Guide offers suggestions for incorporating the accompanying CD-ROM into Life Science and Biology classes.

In addition, this guide provides information to complete activities by incorporating the different sections of the program and makes World of Reptiles a richer reference than an encyclopedia. Read from a chapter, look at and listen to movies, and use the index on groups of whales and dolphins to get a more complete picture of their world.

You can also use this Teacher's Guide as a quick reference for the data provided in the ZooGuide. A list of helpful reference materials is provided so that your students can do more in-depth research once the program has sparked their imagination and interest.

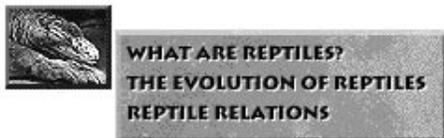
## **USING THE WORLD OF REPTILES ZOOGUIDE**

### **Navigating**

There are "chapter" buttons on the left and right hand sides of your screen. Click on a "chapter" button to access that chapter. When you move your mouse pointer over each "chapter" button, its name will appear. The chapter you are currently in has a darker shaded button than the other chapters.

1. Click on the chapter you wish to visit, and that chapter will appear on the screen.
2. To choose a different chapter; repeat 1 above.
3. The contents of the current (highlighted) chapter will appear as you move the mouse pointer over the chapter button. Examples of chapter contents are shown on the next page. Click on the section you wish to view from this contents list.

#### Examples of chapter contents



#### Playing Movies



Chapter topics have text and are accompanied by a movie, animation, and/or photographs. To access an animation or movie, click once on the movie picture and press the play button on the control bar. Use the other buttons located on the movie control bar to control the volume, to pause, or to jump forward or backward in the movie. You can also use the keyboard shortcuts shown below the movie to control the movie's progress.

## Viewing Photographs

Pictures and photographs of reptiles that appear on the page can be expanded by clicking on one of the thumbnail pictures on the screen. To return to the smaller view, click on the picture again. You can print the enlarged picture or photograph by clicking on the 'Print' button on the left hand side of the screen.

## Getting Help

There is on screen help available in the ZooGuide. To access it, click on the World of Reptiles title bar at the top center of the screen. The help information uses text and graphics to explain the functions of the different sections of the program. Click on the title bar again to return to the program.



## Other Buttons



Print the text or graphic on a page. If a photo or painting is enlarged it will be printed. If the photo or painting on a page is not enlarged, the text for that page will be printed. If you are on a quiz page, clicking the print button will print a copy of the quiz for that chapter.



Access the index for World of Reptiles



Take a quiz for the current chapter



Exit the program.

Click once on each of these button to activate the button.

## **INTEGRATING PARTS OF THE ZOOGUIDE**

The World of Reptiles ZooGuide has three zones of student-program interaction. They can be used singly or integrated to create more in-depth explorations of the program. For example, if students are learning about reptilian reproduction in the Life Cycle chapter and want to know more about the Tuatara mentioned, they can go to the Species Index buttons and click on the Tuatara entry where they can read and watch a movie about these strange reptiles. This provides more in-depth information than if you use only one part at a time of the ZooGuide. It also provides a context for launching into additional research using references listed in the program or at the end of this Teacher's Guide.

K-6 classes may want to use the parts of the program individually, especially with younger students, increasing the integration with more interested or older students. The pictures, movies, and animation are probably the most useful parts of the program at this level. They provide interesting facts and attention grabbing footage.

A number of useful internet links and update information on reptiles can be found on our special internet web page

**<http://www.remedia.com/repts.html>**

## **ACTIVITIES FOR K-6 TEACHERS**

This section of the Teacher's Guide offers 15 activities and ideas for integrating the World of Reptiles ZooGuide into your life science curriculum. The activities range from writing a play to making maps of reptile habitats.

Each activity lists the topic covered, the sources of information it will use, materials you will need, a step-by-step description of the activity, and discussion questions to help you conclude and find out what your students have learned in the process. Modify, delete, or edit these activities to tailor them to your specific needs. Also look at the 7-12 activities for other ideas and ways to use the ZooGuide with your students.

### **K-6 Activity 1:**

TOPIC: ZooGuide Hunt

SOURCE: World of Reptiles ZooGuide

MATERIALS: Paper  
Pen or pencil

ACTIVITY: In this activity students will familiarize themselves with the World of Reptiles ZooGuide by hunting for answers to questions listed below.

Students will have to search to find the answers to some of the following questions while others will be obvious. The questions below are written on the page following this activity description. Please feel free to print and copy this page for students to use during the hunt.

Questions:

1. Find three places where chameleons are shown.
2. Where can you find a picture of a Ball python with her clutch of eggs?
3. Where can you find review questions about each chapter in the ZooGuide?
4. Find the list of reptiles, click on flying dragons and find the picture of a dragon.
5. Find the name for the turtle order.
6. Find a picture of a leopard tortoise and write down its genus and species name. Print the picture.
7. How many species of worm-lizards are there?
8. Gharials belong to which group of reptiles:  
a. Lizards and Snakes b. Turtles c. Crocodilians  
d. Tuatara
9. What is the name of the outer layer of reptile skin?
10. What can some lizards do to escape from enemies?

Answers:

1. Introduction — What are Reptiles chapter movie, Species Index Lizard button, Life Cycle — Sex Differences and Reproduction sections.
2. Life Cycle — Looking after the young
3. Quiz button feature
4. Index button
5. Chelonia (from Groups — Orders section)
6. Geochelone pardalis
7. 140
8. c
9. Keratin
10. Detach their tail

Students should now be familiar with the various features of the World of Reptiles ZooGuide. They have used the chapters, species index buttons, index, print, and quiz buttons, and viewed movies or enlarged pictures to find the information for the ZooGuide Hunt.

**DISCUSSION:** As a group review the answers to the following questions as a way to conclude this activity.

1. How many students used the Index button consistently when looking up information about specific reptiles?
2. How many students used the Species Index buttons instead?
3. Which question was the hardest to find the answer to? Why?
4. Do you feel comfortable with the parts of the ZooGuide now? (If many students answer no, you could write more questions for them to look up, or you could take them on a guided tour of the program.)

## Reptile ZooGuide Hunt

Name:

Date:

Use the World of Reptiles ZooGuide to find the following information.

1. Find three (3) places where chameleons are shown.
2. Where can you find a picture of a Ball python with her clutch of eggs?
3. Where can you find review questions about each chapter in the ZooGuide?
4. Find the list of reptiles, click on flying dragons and find the picture of a dragon and print it.
5. Find the name for the turtle order.
6. Find a picture of a Leopard tortoise and write down its genus and species name. Print the picture.
7. How many species of worm-lizards are there?
8. Gharials belong to which group of reptiles?  
a. Lizards and Snakes   b. Turtles   c. Crocodylians   d. Tuatara
9. What is the name of the outer layer of reptile skin?
10. What can some lizards do to escape from an enemy?

## **K-6 Activity 2:**

**TOPIC:** Identifying Reptiles

**SOURCES:** Introduction Chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed at the end of this Guide

**MATERIALS:** Paper  
Pen or pencil

**ACTIVITY:** In this activity students will identify the various reptiles pictured in the Introduction chapter of the ZooGuide. This will help to familiarize them with the different parts of the program by requiring them to use the Species Index to look up different reptiles.

Begin this activity by viewing the movie in the What are Reptiles? section of the Introduction chapter. Students can work in small groups, individually, or as a whole class. Movies can be paused at any point allowing closer inspection of a picture. You can also slide the bar forward or backward by clicking and dragging it.

Continue viewing the movies in the other two sections of the Introduction chapter. Then make a list, in order of all the reptiles you see. Some of them are too vague to allow further classification than a designation in one of the four orders (lizards and snakes, turtles and tortoises, crocodylians, and tuatara).

Use the Species Index and reference books to determine the species of reptile shown in each picture. Below is a list of the reptiles as they appear in the program.

1. Cobras, chameleon, turtle, lizard, snake, lizard, chameleon, snake, skink, snake, Galapagos Giant tortoise, crocodile, iguana, chameleon, turtle.
2. Komodo Dragon, frog, frog, green iguana, dinosaur, triceratops, Tyrannosaurus rex, archaeopteryx, bird.
3. Frog, frog, tadpole—frog, tuatara, chameleon, tuatara baby.

**DISCUSSION:** Answer the following questions as a way to discuss this activity.

1. How many of the reptiles could you identify by name?
2. What types of frogs were shown?
3. Dinosaurs are extinct reptiles. How many more reptile groups have become extinct? (There were 16 originally, now there are only 4.)
4. Which of the reptiles shown in the Introduction chapter is the largest, smallest?

### **K-6 Activity 3:**

**TOPIC:** Introduction to Reptiles

**SOURCES:** 'What are reptiles?' subtopic in Introduction chapter in World of Reptiles ZooGuide  
Science textbook  
References listed in this Guide

**MATERIALS:** Paper  
Pen or pencil

**ACTIVITY:** In this activity as in the previous two, students are introduced to reptiles.

Begin by asking students if they can name some reptiles. Make a list on the blackboard or overhead projector. Describe some common features of reptiles (e.g. scaly skin, egg layers, cold blooded, etc.)

Next, compare reptiles with mammals such as cats, dogs, horses, etc. How are they similar? How are they different?

Watch the movie in the What are reptiles? section of the Introduction chapter in the ZooGuide. As students are watching and listening they should answer the following questions.

1. What does reptile mean? Why is this a good name for them?
2. What are the four types of reptiles living today?
3. What is the goal of this ZooGuide?
4. What is a person who studies reptiles called? Why?
5. What do people use reptiles for?

**DISCUSSION:** Discuss the following questions to wrap up this activity.

1. What did you find out about reptiles that you didn't know before?
2. Have you ever seen a real reptile? What kind was it? Did you touch it? What did it feel like?
3. Where else can you go to find information about reptiles?

#### **K-6 Activity 4:**

**TOPIC:** Comparing Males and Females

**SOURCES:** 'Sex Differences' subtopic in Life Cycle chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Paper  
Pen or pencil  
Scissors  
Magazines with animal pictures

**ACTIVITY:** In this activity students will compare males and females of various species and discuss reasons for their differences.

Begin by asking students if boys and girls are the same or different. List the similarities and differences on the blackboard. They should come up with items like size, clothes, haircuts, sexual organs, etc.

Next show them pictures of several common animals which contain both males and females. Some good ones to use are lions, cardinals, mallard ducks, etc. Have students list similarities and differences on the chart on the next page.

Ask students to look at the pictures of the chameleons shown in the Sex Differences section of the Life Cycle chapter in the ZooGuide. Guess which lizard is the male. Describe the differences between the male and female shown.

Enlarge the pictures by clicking on them to find out if your guess about who was male is correct. Add them to your chart. Look up other species of reptiles in reference books and compare the males and females. Add what you find to the chart. Use magazines to find pictures of different animals. Find males and females, cut them out, and paste them onto your chart.

**DISCUSSION:** Answer the following questions to summarize this activity.

1. Why do males of nesting species tend to be brightly colored while the females are plain looking?
2. Why do males tend to be larger than females?
3. Are there any animals where the male and female look the same? Which ones?
4. Name a kind of animal that has larger females than males. (Hint: think about insects and some reptiles.)



### **K-6 Activity 5:**

**TOPIC:** Baby Reptiles

**SOURCES:** 'Looking After the Young' subtopic in Life Cycle chapter in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Large lined paper  
Pen or pencil  
Markers, crayons, or colored pencils  
Poster paper

**ACTIVITY:** In this activity students will compare baby reptiles to baby mammals, birds, amphibians, and insects.

Begin by asking students what they know about baby reptiles:

1. How are they born? (most hatch from eggs, some are born live)
2. Do their parents take care of them? (in most cases there is no parental care before or after hatching)
3. What do they eat? (small animals and insects or plants)

Now that students have some idea of what baby reptiles lives are like read the Looking After the Young section in the Life Cycle chapter.

Discuss differences in the way that baby mammals, birds, amphibians, and insects are treated. For example, mammals grow inside the mother and are taken care of for some time after birth. Birds incubate their eggs and feed the young until they can fly and feed themselves. Amphibians lay their eggs and that generally ends their parental involvement except in a few species. Insects, like reptiles, lay their eggs and sometimes provide a food source (e.g. flies lay their eggs on dead animals) before leaving the young to fend for themselves.

Look up some specific reptiles such as sea turtles, chameleons, and tuataras to see how each takes care of its young. Draw a picture of the kind of place where the eggs are laid, how the baby's hatch, and what they look like when they are born.

DISCUSSION: Discuss answers for the following questions as a way to review this activity.

1. Why don't reptile parents need to take care of their babies?
2. People tend to have only one baby at a time, why do you think reptiles can lay many eggs at one time?
3. Describe what you think life as a baby reptile would be like. Imagine you are a baby crocodile or alligator and you are alone in a large pond. What do you do? How do you take care of yourself? How do you avoid being eaten?

### **K-6 Activity 6:**

**TOPIC:** Reptile Skin

**SOURCES:** 'Skin' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Plaster  
Clay  
Tools for working with clay  
Paper mache  
Small sea shells  
Marbles

**ACTIVITY:** In this activity students will make representations of several types of reptile skin. They will learn that reptile skin isn't slimy, but dry and smooth or rough depending on the species.

Begin this activity by asking students to describe snake, lizard, and turtle skin. Make and save a list of the adjectives they use in their descriptions. Then look at the movie in the Skin section of the Body Plan chapter in the ZooGuide. Were the descriptions accurate? What misconceptions do your students have?

Visit a zoo or children's museum that has reptiles. Have students draw what the skin looks like. If there is a petting zoo that allows them to touch the reptiles, encourage them to do so. Borrow turtle shells and molted snake skin from a zoo or Biology department at a local college. Let the students feel the texture of the skin.

Get the original list of adjectives and next to it ask students to make a new list describing the reptiles they have touched. How do they compare?

Present students with a variety of materials (some possibilities are listed above) from which to make models of a reptile of their choice. Have each group work on one of the four orders of reptiles, choosing a representative from each (e.g. a box turtle, a diamond back snake, an alligator, and a tuatara).

Use the pictures of the reptiles from the Species Index to get close-up views of the skin. Display the models with a card telling the name of the reptile whose skin is represented as well as a description of it.

DISCUSSION: Answer the following questions to wrap-up this activity.

1. Why do reptiles have such hard scaly skin?
2. What did you learn from this activity that surprised you?
3. Your skin has hair follicles and sweat glands. Do reptiles have these features? Why not?
4. Why is skin so important to animals?

### **K-6 Activity 7:**

**TOPIC:** Name That Reptile

**SOURCES:** World of Reptiles ZooGuide, including chapters and Species Index  
References listed in this Guide

**MATERIALS:** Construction paper  
Markers, colored pencils, crayons  
Felt

**ACTIVITY:** In this activity students will make costumes, observe reptile behaviors and act like a reptile of their choice while the rest of the class tries to guess which one they are. This activity will teach students what is essential in identifying a type of reptile and give them experience with creatively interpreting a reptile's behavior. Begin by writing names of reptiles shown in the ZooGuide on pieces of paper. Let students choose a name from a hat and then look it up in the ZooGuide.

Print a picture of each reptile from the Reptile Pictures folder on the CD.

Each student can now use construction paper or felt to make the parts of their reptile that they will need as a costume. They should also study any moving pictures of their reptile so that they know how to imitate it. (You will probably want to choose reptiles that are familiar to the students such as rattle snakes, turtles, chameleons, etc. so that they can recognize the actors movements.)

When everyone has tried on their costumes and practiced behaving like their reptile, they can take turns performing for the class.

The audience should watch their behavior, look at their shape, skin type, etc. and make a guess as to which kind of reptile they are seeing.

**DISCUSSION:** Once all the students have performed their reptile for the class, get together as a group and discuss the following questions.

1. Which reptile was the easiest to figure out? Why?
2. Which reptile was the hardest to guess? Why?
3. What did you learn about your reptile from becoming a reptile for a few minutes?
4. Get feedback on your performance from the teacher and your fellow students. What could you have added or done differently to make identification easier?

### **K-6 Activity 8:**

**TOPIC:** Reptile Senses

**SOURCES:** 'Sensory System' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Paper  
Pen or pencil  
Markers, colored pencils, crayons

**ACTIVITY:** In this activity students will label the sensory organs of a snake and turtle. They will be able to answer the question "Why do snakes stick out their tongues all the time?".

Begin by asking students to list their five senses and the organs that help them see, taste, touch, smell, and hear. Ask them if reptiles have similar kinds of senses. Do reptiles have any additional senses or sense organs?

Read the information and watch the animation in the Sensory System section of the Body Plan chapter in the ZooGuide. Students should be able to answer the following questions:

1. What is the name of the structure inside snakes' mouths that helps them smell? (Jacobson's Organ)
2. What other kinds of animals have this structure? (some cats and lizards)
3. What do the "pits" on pit vipers' lips allow them to do? (detect infrared)

Ask students to draw a picture of a person and label the sensory organs and name the senses associated with each. On the same piece of paper they can also draw a picture of a snake or lizard. Label the pits and Jacobson's Organ as well as the eyes, nose and skin. Now draw a turtle and label its sense organs. (You may need to use a reference book to find information such as whether they have ears or not.) Post the pictures around the room and use the ZooGuide as a reference for labeling the parts and for making accurate drawings.

As a bit of trivia and an extension ask students to find the reptile that has a third eye on its head. What is its main function?

DISCUSSION: Answer the following questions as a group.

1. Where do pit vipers live?
2. Does where pit vipers live have anything to do with why they have infrared sensors? What?
3. Compare your sensory organs with those of snakes. Which group do you think has a better set of senses? Why?
4. Do turtles have as many senses as people? Why do you think this is the case?

### **K-6 Activity 9:**

**TOPIC:** Warning Coloration

**SOURCES:** 'Venom ' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
'Reptile Deceptions' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Markers-bright colors  
Paper  
Pictures of warning signs

**ACTIVITY:** In this activity students will recognize the colors humans use as warnings of danger and compare this to the use of bright colors in the animal kingdom to warn predators to stay away.

Begin by showing students pictures of signs like the skull and crossbones, a stop sign, the color red, blue police lights, orange cones at construction sites, etc. Ask them what each of these signs means and why they think colors like red, orange, and blue are used so often.

Next, introduce the idea that animals also use bright colors to warn each other about dangers such as poison, venom, bad smells (skunks), etc. Ask students if they can think of any examples of how reptiles warn other animals to stay away. (They may mention rattle snakes rattle which warns people and other animals to keep away or they will be bitten.)

Look at the Venom section of the Body Plan chapter in the ZooGuide. Watch the animation and look up the reptiles mentioned as using venom. Are any of them brightly colored? Which ones?

Look at the Reptile deceptions movie in the Ecology chapter of the ZooGuide. Why do you think the lizards have brightly colored tails? Do they use bright colors to warn predators? What do they use it for?

Pass out drawing paper and ask students to create a reptile that is poisonous if eaten. It wants to let other animals know this. Use bright colors and patterns to make it clear that you want other animals to stay away. Students should name their creature and write a brief explanation of the reptile's poisonous nature (eg, fangs, poisonous skin, poison darts, poisonous spit, etc.).

DISCUSSION: After displaying your students creations, discuss the following questions as a group.

1. Color isn't the only way that animals warn each other to stay away. Name 2 other kinds of warning.
2. Why do you think that bright colors are used for warnings instead of colors like gray, brown, etc.?

### **K-6 Activity 10:**

**TOPIC:** Body Temperature

**SOURCES:** 'Temperature Control' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
'Searching for Food' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Paper  
Pen or Pencil

**ACTIVITY:** In this activity students will define cold-blooded and learn how being cold-blooded affects a reptile's behaviors.

Begin by explaining to students that birds and mammals are called warm-blooded animals because we maintain a constant body temperature. Ask them if they know what normal human body temperature is? Is it the same on a cold day? Is it the same on a hot summer day? To maintain a constant body temperature mammals and birds have to eat lots of food to make energy. We also have mechanisms to maintain a constant temperature such as shivering when cold and sweating when hot.

Reptiles, amphibians, insects, and fish are cold-blooded animals whose body temperature varies with that of their environment. Ask students if they have ever touched a snake or other reptile. How did it feel in terms of temperature? Have they ever held a bird or mammal (cat, dog, etc.) How did it feel in terms of temperature?

Read the information in the Temperature Control section of the Body Plan chapter and answer the following questions:

1. When are reptiles most active? Why?
2. According to the animation on the Temperature Control page, how long does it take a reptile to warm up in the morning?
3. Once a reptile warms up what does it do? (check the Searching for food section in the Ecology chapter for ideas)
4. Where reptiles can live is controlled by environmental temperature. How? (Use the Index to look up several species of reptiles and read about where they live.)

DISCUSSION: When you have answered the questions given above, you can discuss the following concepts as a group.

1. Reptiles, amphibians, and fish don't really have cold blood so why do you think people call them cold-blooded?
2. Which would you prefer, given the choice, to be cold blooded and live in a warm climate, or be warm blooded and live anywhere, but have to eat lots of food?
3. Do some research and try to find out if scientists think that dinosaurs were warm or cold blooded.
4. Why do you think that reptiles move so slowly?

### **K-6 Activity 11:**

**TOPIC:** Camouflage Experiment

**SOURCES:** 'Searching for Food' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Colored paper (green and brown)  
Scissors  
Paper  
Pen or pencil

**ACTIVITY:** In this activity students will do an experiment to find out why reptiles that live in rainforests tend to be green and reptiles that live in deserts tend to be brown.

Begin by looking at the information provided in the Searching for Food section of the Ecology chapter in the ZooGuide. Continue gathering information on the coloration and food gathering connection among reptiles by looking up pythons, Agamid lizards, chameleons, and Monitor lizards. Look at the pictures of the reptiles and their surroundings. What do you notice?

To do the experiment you will need to cut out 10-2 inch squares each of green and brown paper for each group. These will represent reptiles of different colors. You also need a large piece of brown and green paper for each group. Use the chart on the next page to record results of the experiment as you go.

1. Divide each group into two teams (Placers and Selectors), each of which will have a different job in the experiment. One team will place "reptiles" in the green (rainforest) environment or brown (desert) environment while the other team isn't looking. Once the reptiles are placed at random in their environment (place 5 brown and 5 green ones in the green or brown environment) the selectors can look and pick up the first 5 squares they see. This represents reptiles being eaten by predators. Record the colors of the 5 remaining squares on the chart.
2. The 5 remaining reptiles reproduce by adding 5 new squares that are the same as the 5 left after the predators are finished (e.g., if 4 green and 1 brown are left, add 4 green and 1 brown to the pile of reptiles). Then repeat the above steps of placing the 10 new reptiles in the SAME environment and letting the Selectors pick 5 again.

3. Repeat this process until only one color of squares is left. Then try the experiment again with the other color environment, switch the Placers and Selectors, and repeat the experiment.

DISCUSSION: Answer the following questions about the experiment.

1. What was the result of the experiment using the desert environment? using the rainforest environment?
2. How do your results support what you saw in the ZooGuide's Species Index?
3. This process of killing animals that don't match the environment very well is called Natural Selection. Is color the only thing that can be selected? What else can be selected?

## Camouflage Experiment Chart

Trial-Green (Rainforest)	Number of Green	Number of Brown
1		
2		
3		
4		
5		
Trial-Green (Desert)	Number of Green	Number of Brown
1		
2		
3		
4		
5		

### **K-6 Activity 12:**

**TOPIC:** Reptile Food Chain

**SOURCES:** 'Searching for Food' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Poster paper  
Markers, crayons, colored pencils  
Scissors  
Glue

**ACTIVITY:** In this activity students will define food chain and discover the connection between organisms in a reptile's food chain.

You can also do a food web with older or more interested students where you explore how multiple food chains interconnect.

Begin by asking students what they think a food chain is. List their ideas on the blackboard or overhead projector. As an example of a food chain, ask students to list some of their favorite foods. Choose one (e.g. hamburger, pizza, etc.) and make a chart showing the connection from the student to the food to what it eats for food and so on until you reach a primary producer (a plant or one celled organism that makes its own food from the sun). This is a food chain. Draw the person, the cow, and the grass, then connect them with arrows starting with the grass and moving up the chain. This will visually represent the food chain.

Now that you have introduced the concept of a food chain to your students, they can make a similar one for a reptile of their choice. Make a list of the kinds of things your students think reptiles eat. Then read and watch the information presented in the Search for Food section of the Ecology chapter in the ZooGuide. How many of the foods that you listed were mentioned?

Have each student or group of students select a reptile from the Species Index or Index to discover what that particular one eats. Some of the foods eaten by certain reptiles are not mentioned in the ZooGuide. If that is the case for any of the species chosen, use other reference materials to research what they eat.

Use poster paper to make a drawing of the food chain, again beginning at the top with the reptile and moving down the page to list the organism it eats and so on until you reach the primary producer (a plant). Students can find pictures of these organisms and cut and paste them on the paper, or they can draw and color them.

DISCUSSION: Review this activity by answering the following questions:

1. Name 3 kinds of food that reptiles commonly eat.
2. Why is "Food Chain" a good name for the drawings you made?
3. Which of the reptiles you studied eat primary producers (plants)?
4. Which reptile's way of getting food surprised you the most? Why?

### **K-6 Activity 13:**

**TOPIC:** Reptile Homes

**SOURCES:** 'Where do Reptiles Live?' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Enlarged map(s) of the world  
Markers, colored pencils, crayons  
Scissors  
Glue

**ACTIVITY:** In this activity students will map where the 4 orders of reptiles live on Earth. They will also create a map legend to make the map easier to read.

Begin this activity by asking students where they think reptiles live. Make a list of the places on the blackboard. Now read and watch the information presented in the Where do Reptiles Live? section of the Ecology chapter in the ZooGuide. Make a list of the places mentioned. How well did the students do in making their initial list?

To get more accurate geographical information about specific groups of reptiles look in the Species Index as well as the reference books listed in this Guide.

To make your maps, first decide whether this will be a whole class, small group, or individual student project. You could assign each of four groups one of the four orders of reptiles to map. Students should choose colors to represent different groups (either an order if all four are included on one map or each species if only one order is on a map). Create a map legend showing the color code and begin coloring the regions of the world inhabited by reptiles. You can include drawings or printed pictures of reptiles by gluing them to the proper places on the map.

In addition to discussing the geographical locations of reptile homes, you can also discuss where reptiles live physically (e.g., in holes, nests, underwater, in trees, etc.). Ask students to make a list of physical places mentioned in the Where do Reptiles Live? section as well as the Species Index. Explain that this is called the reptiles habitat and ask them what their habitat looks like.

DISCUSSION: Answer the following questions after completing the activity.

1. Where do most reptiles of the world live? Why?
2. Do any reptiles live in the Arctic? Why not?
3. The Tuatara lives inside the nest of a type of bird. What is the advantage of this situation to the tuataras?
4. Why do reptiles need homes?

### **K-6 Activity 14:**

**TOPIC:** Reptile Research Paper

**SOURCES:** Groups chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** Writing paper  
Pen or pencil  
Pictures of reptiles

**ACTIVITY:** In this activity students will write a research paper on one of the reptiles species living or extinct that is mentioned in the ZooGuide.

Students can begin their research by choosing a type of reptile. Use the ZooGuide as a first resource to find basic information. Continue with reference books listed in this Guide or materials found in your school or local library. The research paper should include the following information plus anything that you wish to add (or delete).

1. Where does this species live? (include geographic location and physical home, if any)
2. What does it eat?
3. How does it reproduce?
  - a. live young vs. eggs
  - b. parental care before and after hatching, if any
  - c. gestation time
  - d. number of offspring per mating
4. What kind of skin does it have?
5. Include a drawing of the reptile.
6. Do people use it, how?
7. Is it an endangered species? Why not?
8. How long does it live?
9. How often does it eat?
10. Why is this species a member of the reptile class? (List the characteristic of a reptile.)

**DISCUSSION:** Once students have finished their research papers they can give a brief presentation to the class. Discuss their findings as a group by creating a trivia game or "20 questions" game to review the information they have learned.

### **K-6 Activity 15:**

**TOPIC:** Review of World of Reptiles

**SOURCES:** World of Reptiles ZooGuide  
References listed in this Guide

**MATERIALS:** 40-5x8 cards  
Magazines with reptile pictures  
Markers, colored pencils, crayons  
Scissors  
Glue

**ACTIVITY:** In this activity students will review what they have learned in the World of Reptiles ZooGuide by identifying various species of reptiles.

You will need to find between 30-50 pictures of various kinds of reptiles from nature magazines or printed from the ZooGuide's Reptile Pictures folder located on the CD. You may want to include some "red herrings" such as frogs and eels or other organisms that resemble reptiles.

Give a packet of pictures along with 5 x 8 cards to each group of students. They should sort the pictures into the 4 orders of reptiles (turtles and tortoises, snakes and lizards, tuatara, and crocodilians). Next they should glue each picture onto a card and on the back write the name of the species (Use the Species Index to look up more difficult species pictures.), where it lives, what it eats, and which order it belongs to. Use the World of Reptiles ZooGuide as a reference as well as the references listed in this Guide.

Once the cards are made you can use them as flash cards or cards for a board or team game.

**DISCUSSION:** Answer the following questions to review this activity.

1. How many reptiles do you recognize from using the ZooGuide?
2. Which reptile is the most interesting? Why?
3. What more would you like to know about reptiles?
4. Where can you find more information about reptiles?

## ACTIVITIES FOR 7-12 TEACHERS

This section of the Teacher's Guide offers 15 activities and ideas for integrating the World of Reptiles ZooGuide into your Biology curriculum. The activities range from mimicry to studies of reptile circulatory systems.

Each activity lists the topic covered, the sources of information used, a step-by-step description of the activity, and a conclusion section with questions to help you find out what your students have learned in the process. Modify, delete, or edit these activities to tailor them to your specific needs. Also look at the K-6 activities for other ideas and ways to use the ZooGuide with your students.

### 7-12 Activity 1:

TOPIC: Introduction to World of Reptiles ZooGuide

SOURCE: World of Reptiles ZooGuide

ACTIVITY: In this activity students will familiarize themselves with the ZooGuide by gathering information for a trivia game.

Allow students to peruse the World of Reptiles ZooGuide to answer the following questions. In the process, they will become familiar with the various parts of the program and will be able to access information for other activities with more confidence.

Here is a list of questions you can use. Feel free to add to or delete items from the list depending on your focus for the ZooGuide.

1. Where do Tuataras live? (on islands off New Zealand, in Petrel nests)
2. What are the four orders of reptiles? (Tuataras, turtles and tortoises, snakes and lizards, and crocodylians)
3. How many orders of reptiles used to be alive? (16 or more)
4. Find the quiz question "Which of these reptiles does not live in tropical oceans?" (found in the Ecology Quiz section) What is the correct answer?( Lizards)
5. What is the name of the turtle order? (Chelonia)

6. Find the list of reptiles, choose the banded gecko, and answer the following questions:
  - a. How long are geckos? (1/2 inch to 11 inches)
  - b. What is the genus name of the banded gecko? (Coleonyx)
  - c. Is there a picture of the banded gecko shown on this page? (yes)
7. Which reptiles use venom? (snakes and 2 types of Heloderma [Gila Monsters]) What do they use it for? (capture small prey, defense against predators)
8. How many Superfamilies of turtles are there? (3)
9. What did reptiles evolve from? (amphibians)  
When? (315 million years ago)
10. What is the advantage to reptiles of rainforest living versus desert living? (less temperature differences) Why? (thermoregulation is easier in a temperature constant environment)

**CONCLUSIONS:**

Discuss the answers to the above questions as a group.  
What surprised the class the most about reptiles?

## 7-12 Activity 2:

TOPIC: Reptile Evolution

SOURCES: 'Reptile Evolution' subtopic in Introduction chapter in World of Reptiles ZooGuide  
References listed in this Guide  
Species Index in World of Reptiles ZooGuide

ACTIVITY: In this activity students will apply their knowledge of evolution to the emergence of reptiles on earth some 315 million years ago. Use this activity when studying Evolution or Comparative Anatomy. Begin this activity by asking students to read and watch the information presented in the Reptile Evolution section of the Introduction chapter of the ZooGuide. They should be able to answer the following questions when they have done so:

1. Describe an early kind of reptile.
2. How many of the ~ 16 species of reptiles identified were dinosaurs?
3. Name the four orders of reptiles alive today.
4. What is the closest living relative of dinosaurs today?
5. Did mammals evolve from reptiles? From what did they evolve?

Now that you have these basic facts about times and ancestors you can do some comparisons between reptiles and their predecessors.

1. How do scientists know that reptiles evolved from amphibians?
2. What became of the amphibian-like ancestors?
3. Explain how scientists can use genetics to compare reptiles, amphibians, and mammals to show that mammals arose from amphibians and not reptiles.
4. What were two major advances in body structure that reptiles made over amphibians? What advantages did these advances have on the rise of the age of dinosaurs?

CONCLUSIONS: Answer the question below to conclude this activity.

How does what you have learned about reptilian evolution support the general theory of evolution?

### 7-12 Activity 3:

TOPIC: Classifying Reptiles

SOURCES: 'Reptile Relatives' subtopic in Introduction chapter in World of Reptiles ZooGuide  
Group chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

ACTIVITY: In this activity students will create a classification "tree" showing the four orders of reptiles, their families, genus, and species alive today as well as the extinct branches and when they became extinct.

Use this activity when studying Classification, Evolution, or Reptiles.

Begin by accessing the information in the Reptile Relatives section of the Introduction chapter and the Groups chapter of the ZooGuide. They contain information on the names of orders, families, genus, and species of many of the reptiles listed.

Draw a large tree with a trunk labeled "Reptiles" and 16 main branches representing the 16 orders of reptiles that have lived on earth. Show major sub-branches of the 12 that have become extinct and then focus on the 4 that are left. Use the Species Index to get Latin names of the various species of reptiles in these 4 orders. Because of the great number of species of reptiles this exercise should be limited in some way (e.g., list only 4 genus per family, etc.)

Once the tree is finished have students compare trees.

1. Did everyone get the same basic structure?
2. Which branch (order) has the fewest species? Why?
3. What order was the most recent to become extinct? Why did it go extinct?
4. What are the parts, in order, of the classification system?

CONCLUSIONS: Answer the following questions to wrap-up this activity.

1. Why did scientists invent the classification system you used in this activity?
2. How do you use classification in your everyday life?
3. Why are lizards and snakes grouped together into one order?
4. Lizards, snakes, crocodiles, turtles, and tuataras are very different kinds of organisms. Why are they all classified as reptiles?

#### 7-12 Activity 4:

TOPIC: Reptile Reproduction

SOURCES: 'Reproduction' subtopic in Life Cycle chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will compare reptile reproduction with reproduction in fishes, amphibians, birds, and mammals. They will also discover that not all reptiles lay eggs and not all mammals bear live young.  
Use this activity when studying Reproduction or Life Cycles.

Begin this activity by having your students fill out the chart on the next page. They should know the basics like where development occurs, but may need to use reference books to find out gestation times and parental involvement.

Once they have completed the chart for general groups of organisms introduce some oddities such as the tuatara which bears live young and the duck billed platypus which lays eggs. Ask the following questions:

1. What is the evolutionary reason for a mammal laying eggs and a reptile bearing live young?
2. What other reptiles gestate internally? Why?
3. Do some research into fish and amphibians and find the fish species that carries the eggs in its mouth until they hatch, and the frog that has special pouches on its back that carry the eggs and erupt when they hatch. Can you come up with any advantages to this method of reproduction?
4. What are the general strategies for reproduction used by living organisms on earth? (There are at least 4.)

CONCLUSIONS: Discuss the answers to the above questions and then discuss the following.

1. How does reproduction in reptiles, insects, mammals, and birds demonstrate the evolutionary leap to independence from a water environment?
2. Why do humans have to invest 15-20 years into the development of their offspring while most reptiles don't take care of their young at all?
3. State the importance of reproduction to living organisms.

# REPRODUCTION CHART

Name:

Date:

Group	Gestation Location	Pre-natal Care	Post-natal Care
REPTILES			
Tuatara			
Gecko			
Alligator			
BIRDS			
Cardinal			
Blue Heron			
Robin			
MAMMALS			
Duck-billed			
Platypus			
Human			
Field Mouse			
FISHES			
Shark			
Clown Fish			
Trout			

### 7-12 Activity 5:

TOPIC: Males and Females

SOURCES: 'Sex Differences' subtopic in Life Cycle chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will use the Scientific Method to develop a hypothesis explaining the physical (coloration, size, etc.) differences observed between males and females of various reptile species.

Use this activity with a unit on Reproduction, Anatomy, or Life Cycles.

Begin by reading the information provided in the Sex Differences section of the Life Cycle chapter in the ZooGuide. Enlarge the two pictures of the male and female chameleon to get a closer look at them. Based on the information provided about crocodiles and lizards, snakes and turtles; develop a hypothesis that you think explains the physical differences between males and females of a species.

Use the steps of the Scientific Method to gather data, support or refute your hypotheses, and so on. Remember that the six steps are as follows:

- 1) pose a question
- 2) form a hypothesis
- 3) gather data using your senses
- 4) conduct an experiment with control and variable
- 5) compare results with your hypothesis, and
- 6) revise your hypothesis if necessary.

Use other reference materials to gather more specific information on size, color, and internal differences between males and females. Then answer the following questions:

1. What reasons are offered by scientists to explain differences between males and females?
2. Does your independent research and experimentation bear out these theories? How?
3. Are there any exceptions to the general theories? Give 1 example.

CONCLUSIONS: Now that you have completed this activity and discussed the answers to the above questions, conclude by answering these questions.

1. How does the Scientific Method help scientists form theories about the natural world?
2. Give some examples of animal species that exhibit no internal or external differences between the sexes. How do they fit the sex difference theory?
3. What sexual organ have reptiles developed that animals evolved before them didn't possess? How does this organ aid them in successful mating?

### 7-12 Activity 6:

TOPIC: Poisonous Reptiles

SOURCES: 'Venom' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will identify reasons why some reptiles are poisonous and others are not.

Use this activity when studying Animal Behavior, Food Webs, or Defense Strategies.

Begin this activity by asking students to name poisonous reptiles. Make a list on the blackboard or overhead projector. Ask them what kinds of poisons these reptiles use and why they use them. Next, students should read and view the information provided in the Venom section of the Body Plan chapter in the ZooGuide. Look up several species mentioned to be poisonous (Gila monsters, Beaded lizards, Rattle snakes, Cobras, Vipers, etc). Use the Index button or Species Index buttons on the right of the page to access this information. Then answer the following questions.

1. Give 3 reasons why snakes and lizards use venom.
2. What are the two types of venom and which reptiles use each?
3. What are some other forms of protection/defense that non-poisonous reptiles use?
4. Describe 3 different fang types and how they deliver the venom.
5. Which reptile is responsible for the most human poisoning deaths? Why?

Review the answers to these questions and move on to the conclusion section.

CONCLUSIONS: Discuss the following questions as a group to conclude this activity.

1. Why did only a few reptiles evolve poisonous venom?
2. How do we cure people of venomous bites?
3. What other kinds of living organisms also use venom/poison as a defense or to capture prey?
4. Where can you get more information about venomous reptiles?

### 7-12 Activity 7:

TOPIC: Comparing Circulatory Systems

SOURCES: 'Circulation and Blood' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will compare circulatory systems in reptiles with those of fish and mammals. The clear "progress" from one kind of heart to another will be demonstrated.  
Use this activity when studying Comparative Anatomy, Circulatory Systems, or Evolution. Begin this activity by reviewing the structure of fish, mammal, and reptile circulatory systems. Give students a photocopy of each kind of system and discuss the physical differences in each.  
Next, students should read and view the information provided in the Circulation and Blood section of the Body Plan chapter in the ZooGuide. They are now ready to discuss the answers to the following questions.

1. Which reptile order has a circulatory system that is most like those of mammals?
2. Why is it less important for fish and reptiles to keep oxygenated and deoxygenated blood separate as it is pumped to and from the heart than it is for mammals and birds?
3. You would expect a lot of mixing of oxygenated and deoxygenated blood in the ventricle of reptile hearts. Is this the case? Why not?
4. There are two types of blood circulation in reptiles and mammals, pulmonary and systemic. Explain each and compare these with fish which don't have a separate pulmonary system.

CONCLUSIONS: After discussing the answers to the above questions your class can begin to draw some conclusions about the evolution of circulatory systems. Discuss the following to bring out these conclusions.

1. How do the differences and similarities in fish, reptile, and mammal circulatory systems help support the theory of evolution?

2. Is it likely that crocodiles evolved more recently than other reptiles based on the differences in its heart structure compared with those of other reptiles?
3. Look up the circulatory systems of other animal classes and list them in order of less complex to more complex. (Use mollusks, crustaceans, insects, arachnids, echinoderms, amphibians and birds for this question.)

### 7-12 Activity 8:

TOPIC: Comparing Nervous Systems

SOURCES: 'Nervous System' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will compare nervous systems in reptiles with those of arthropods and mammals. The clear "progress" from one kind of brain to another will be demonstrated.

Use this activity when studying Comparative Anatomy, Nervous Systems, or Evolution.

Begin this activity by reviewing the structure of arthropod, mammal, and reptile nervous systems. Give students a photocopy of each kind of system and discuss the physical differences in each. Focus on the changes from invertebrate to vertebrate systems.

Next, students should read and view the information provided in the Nervous System section in the Body Plan chapter in the ZooGuide. They are now ready to discuss the answers to the following questions.

1. How are mammal brains similar to reptile brains?
2. Why is it less important for arthropods and other invertebrates to have a strong control center in the brain than it is for mammals and reptiles?
3. Based on the relative size of each section of the reptile brain, what is the most important sense? How do they use it?
4. Use your textbook to compare spinal cords in vertebrates with arthropod cords. How are they similar, how are they different?

CONCLUSIONS: After discussing the answers to the above questions your class can begin to draw some conclusions about the evolution of nervous systems. Discuss the following:

1. How do the differences and similarities in reptile and mammal brains help support the theory of evolution?
2. Why do vertebrates have more sophisticated nervous systems than invertebrates?
3. Look up the nervous systems of other animal classes and list them in order of less complex to more complex. (Use mollusks, insects, arachnids, echinoderms, amphibians and birds for this question.)

### 7-12 Activity 9:

TOPIC: Reptile Food Web

SOURCES: 'Searching for Food' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will define a food web and discover the connection between organisms in a reptile's food web.

Use this activity when studying Ecology or Food Webs.

Begin by asking students what they think a food web is. List their ideas on the blackboard or overhead projector. As an example of a food web, ask students to list some of their favorite foods. Choose one (e.g., hamburger, pizza, etc.) and make a chart showing the connection from the student to the food to what it eats for food and so on until you reach a primary producer. This is a food chain. To make it a food web, add branch chains for the organisms listed and chart them back to a primary producer as well. Make a drawing using cutouts from a magazine or have students draw them to show the organisms involved in the food web.

Now that you have introduced the concept of a food web to your students, they can make a similar one for a reptile of their choice. Make a list of the kinds of things your students think reptiles eat. Then read and watch the information presented in the Search for Food section of the Ecology chapter in the ZooGuide. How many of the foods that you listed were mentioned?

Have each student or group of students select a reptile from the Species Index or Index and research what it eats. Some of the foods eaten by certain reptiles are not mentioned in the ZooGuide. If that is the case for any of the species chosen, use other reference materials. Use poster paper to make a drawing of the food web, beginning in the center with the reptile and moving out to list the organism it eats and so on until you reach the primary producers. Label the participants in the food web and designate them as producers, consumers, or decomposers. Students can find pictures of these organisms and cut and paste them on the paper, or they can draw and color them.

CONCLUSIONS: Review this activity by answering the following questions:

1. Name 3 kinds of food that reptiles commonly eat.
2. Why is "Food Web" a good name for the drawings you made?
3. Which of the reptiles you studied eat primary producers (plants)?
4. Which reptile's way of getting food surprised you the most? Why?

### 7-12 Activity 10:

TOPIC: Warning Coloration and Mimicry

SOURCES: 'Venom' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
'Reptile Deceptions' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will recognize the colors humans use as warnings of danger and compare this to the use of bright colors in the animal kingdom to warn predators to stay away. They will also discover that some reptiles mimic the colors of poisonous reptiles to protect themselves.

Begin by showing students pictures of signs like the skull and crossbones, a stop sign, the color red, blue police lights, orange cones at construction sites, etc. Ask them what each of these signs means and why they think colors like red, orange, and blue are used so often as warnings.

Next, introduce the idea that animals also use bright colors to warn each other about dangers such as poison, venom, bad smells (skunks), etc. Ask students if they can think of any examples of how reptiles warn other animals to stay away. (They may mention a rattle snake's rattle which warns people and other animals to keep away or they will be bitten.)

Look at the Venom section of the Body Plan chapter in the ZooGuide. Watch the animation and look up the reptiles mentioned as using venom. Are any of them brightly colored? Which ones?

Look at the Reptile Deceptions movie in the Ecology chapter of the ZooGuide. Why do you think the lizards have brightly colored tails? Do they use bright colors to warn predators? What do they use it for?

Use the Species Index to find the names of several reptiles that use mimicry to fool predators into thinking they are poisonous.

CONCLUSIONS: Discuss the following questions as a wrap-up of this activity.

1. Color isn't used solely as a warning by reptiles. Name 3 other ways that they use color.
2. Why do you think that bright colors are used for warnings instead of colors like gray, brown, etc.?
3. How do you think that mimicry in animals arose evolutionarily?
4. What other organisms use mimicry to escape predation?

### 7-12 Activity 11:

TOPIC: The Physics of Movement

SOURCES: 'Movement' subtopic in Body Plan chapter in World of Reptiles  
ZooGuide  
Your Biology textbook  
References in this Guide

ACTIVITY: In this activity students will compare movement in several classes of animals to establish the physics and evolution of locomotion.

Use this activity with Evolution or Anatomy studies.

Begin by viewing the Movement section of the Body Plan chapter in the ZooGuide. Then answer the following questions.

1. Why can't frogs run?
2. Which group of animals was the first to lift themselves off the ground?
3. What advance made this possible?
4. What evolutionary change in leg structure allowed mammals, birds, and dinosaurs to run?
5. How did the first land animals move?
6. Why was this form of locomotion inefficient?

Use your Biology textbook and other references to study the physics of locomotion and the biological aspects (e.g., muscle control, bone placement, etc.) Then explain why having a straightened elbow joint allows for fast locomotion while two right angle joints allow only a slower gait.

CONCLUSIONS: Discuss the following questions to conclude this activity.

1. Why did animals evolve "better" (e.g., more efficient) forms of locomotion?
2. Name 3 types of reptiles that don't take advantage of the double right angle joint orientation. Why don't they?
3. Which reptile species is the fastest? How does it compare to a cheetah?

### 7-12 Activity 12:

TOPIC: Body Temperature

SOURCES: 'Temperature Control' subtopic in Body Plan chapter in World of Reptiles ZooGuide  
'Searching for Food' subtopic in Ecology chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will define cold-blooded and learn how being cold-blooded effects a reptiles behaviors.

Use this activity when studying Comparative Anatomy or Reptiles. Begin by reviewing the concepts of warm bloodedness and cold bloodedness in animals. Ask students what defines these two states and which organisms are categorized as cold or warm blooded.

How does body temperature effect behavior?

Read the information in the Temperature Control section of the Body Plan chapter and answer the following questions:

1. When are reptiles most active? Why?
2. According to the animation on the Temperature Control page, how long does it take a reptile to warm up in the morning?
3. Once a reptile warms up what does it do? (check the Searching for Food section in the Ecology chapter for ideas)
4. How does body temperature being related to environmental temperature control where reptiles can live? (Use the Species Index to look up several species of reptiles and read about where they live.)

CONCLUSIONS: When you have answered the questions given above, you can discuss the following concepts as a group.

1. Reptiles, amphibians, and fish don't really have cold blood so why are they referred to as cold-blooded?
2. What are the advantages to maintaining a constant body temperature? What are the disadvantages?
3. According to the best research on the subject to date, were dinosaurs warm or cold blooded? How have scientists come to this conclusion?
4. Hypothesize what would happen if reptiles evolved into warm blooded animals and mammals became cold blooded.

### 7-12 Activity 13:

TOPIC: Camouflage Experiment

SOURCES: 'Searching for Food' subtopic in Ecology Chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
References listed in this Guide

MATERIALS: Colored paper (green and brown)  
Scissors  
Paper  
Pen or pencil

ACTIVITY: In this activity students will do an experiment to find out why reptiles that live in rainforests tend to be green and reptiles that live in deserts tend to be brown.

Use this activity when studying Evolution, Adaptation, or Predator-Prey relationships.

Begin by looking at the information provided in the Searching for Food section of the Ecology chapter in the ZooGuide. Continue gathering information on the coloration and food gathering connection among reptiles by looking up pythons, Agamid lizards, chameleons, and Monitor lizards. Look at the pictures of the reptiles and their surroundings. What do you notice?

To do the experiment you will need to cut out 10-2 inch squares each of green and brown paper for each group. These will represent reptiles of different colors. You also need a large piece of brown and green paper for each group.

Use the chart on the next page to record results of the experiment as you go.

1. Divide each group into two teams (Placers and Selectors), each of which will have a different job in the experiment. One team will place "reptiles" in the green (rainforest) environment or brown (desert) environment while the other team isn't looking. Once the reptiles are placed at random in their environment (place 5 brown and 5 green ones in the green **or** brown environment) the selectors can look and pick up the first 5 squares they see. This represents reptiles being eaten by predators. Record the colors of the 5 remaining squares on the chart.

2. The 5 remaining reptiles reproduce by adding 5 new squares that are the same as the 5 left after the predators are finished (e.g., if 4 green and 1 brown are left, add 4 green and 1 brown to the pile of reptiles). Then repeat the above steps of placing the 10 new reptiles in the SAME environment and letting the selectors pick 5 again.
3. Repeat this process until only one color of squares is left. Then try the experiment again with the other color environment, switch the placers and selectors, and repeat the experiment.

CONCLUSIONS: Answer the following questions about the experiment.

1. What was the result of the experiment using the desert environment? using the rainforest environment?
2. How do your results support what you saw in the ZooGuide's Species Index?
3. This process of killing animals that don't match the environment very well is called Natural Selection. Is color the only thing that can be selected? What else can be selected?

## Camouflage Experiment Chart

Trial-Green (Rainforest)	Number of Green	Number of Brown
1		
2		
3		
4		
5		
Trial-Green (Desert)	Number of Green	Number of Brown
1		
2		
3		
4		
5		

### 7-12 Activity 14:

TOPIC: Reptile Research Paper

SOURCES: Groups chapter in World of Reptiles ZooGuide  
Species Index in World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will research an order of reptiles and write a research paper on them.

Use this activity when studying Reptiles.

Begin by asking students to read and watch the information presented in the Groups chapter of the ZooGuide. There they will get a good overview of the 4 orders of reptiles. Then they can choose the one that fascinates them most. Alternatively, they could choose one of the 12 extinct orders of reptiles to conduct research on.

Assign a paper the length of your choice to each student or group of students and make sure that there is a good mix of orders being researched. Papers should address the following items as well as those you wish to add. Use the ZooGuide, your Biology textbook and the references listed in this Guide or those contained in your school or local library to gather information.

1. Name of order including number of species in that order (include families and genus where appropriate)
2. Where do the species in this order live?
3. How do they reproduce?
  - a. live young versus eggs,
  - b. parental care before and after hatching or none,
  - c. gestation time, and
  - d. number of offspring in a single cycle.
4. What kind of skin do they have? How often do they molt?
5. Do people use them? How? (eg, food, skins, medicines, and so on)
6. Are any of their species endangered? Why?
7. What is their life span?
8. How often do they eat, on average?
9. What characteristics do they have that place them in the class Reptile?

CONCLUSIONS: Students can present a summary of their papers to the class as a way to conclude this activity.

### 7-12 Activity 15:

TOPIC: Review of World of Reptiles ZooGuide

SOURCES: World of Reptiles ZooGuide  
Your Biology textbook  
References listed in this Guide

ACTIVITY: In this activity students will assimilate all the information they have learned in completing the activities for this ZooGuide into a multimedia presentation to the class.

This is a very open-ended activity. You can let your students brainstorm ideas to come up with exciting topics to develop a multi-media presentation around. Suggestions include:

1. A videotape showing the birth of a reptile with explanations and facts.
2. The recreation of the Age of Dinosaurs with its various species of reptiles, showing habitats and niches as well as predator/prey relationships.
3. A taped interview with a reptile researcher studying an interesting aspect of reptile anatomy (e.g., sight, smell, nesting habits, etc.)
4. A videotape of a trip to the zoo highlighting reptiles in their captive state.
5. An exposé on the illegal killing and selling of alligator and snake skin to make purses, belts, and boots.

Add ideas or ask students to come up with new ones. When they have completed the video, interview, etc., they can write a brief summary and present it to the class.

CONCLUSIONS: Discuss these questions following presentation of projects.

1. Why are reptiles important to study?
2. What did you learn from this experience that surprised you?
3. Which reptile species is most fascinating to you? Why?

**References:**

The references listed in this section are divided into three parts: references from the ZooGuide located in the credits section, K-6 activity references, and 7-12 activity references. The references listed were found in a local public library and represent a small portion of the books that are available on this topic. If you cannot find a specific reference listed here, try to find a book with similar content in your school or local library.

**References from the World of Reptiles ZooGuide:**

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**K-6 References for the Teacher's Guide Activities:**

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**7-12 References for the Teacher's Guide Activities:**

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