Learning Set 1
Habitat and Animal Classification

Overview

The objectives of Learning Set 1 are to introduce the students to their schoolyard habitats and begin to learn about life in their schoolyard. The first lesson has students collect and record habitat information about their schoolyard on a map. While outside, students also collect invertebrates for investigation in the following lesson. Finally, the students are introduced to the nine major groups used by scientists to classify animals.

Lessons

Lesson 1: What Types of Habitats are Found in My Schoolyard?

The schoolyard discovery lesson includes both initial investigation of the schoolyard and a class discussion of the findings. Students use a schoolyard map to record the habitats of their assigned schoolyard zone. The class assembles afterwards to create a class schoolyard habitat map. While outside, students also collect invertebrates for closer investigation in Lesson 2.

Lesson 2: How do You Examine and Classify Invertebrates?

This lesson includes the observation of invertebrates collected in Lesson 1. Using metric rulers, magnifying glasses, microscopes, and the identification guides, students will investigate the invertebrates they collected and identify them.

Lesson 3: How do Scientists Group Animals?

Students will learn about the physical features that allow scientists to classify animals into different groups. First, as a class, students will examine animal drawings to determine what features each animal group has in common. This knowledge will be reinforced by an animal version of "Go Fish." Finally, there are two follow-up activities. The Mystery Animal Data Sheet can be used as bell work or homework, and an Animal Group Comparisons Data Sheet can be done in class or as homework.

Learning Set 1
Habitat and Animal Classification

Before You Begin Learning Set 1

Lesson 1

- ☐ If necessary, arrange with your school for students to go outside and for additional adult support.
- ☐ Read the *To The Teacher* section for Lesson 1 and reference sections 2 and 3 entitled *Tips for Outdoor Activities* and *Habitats*.
- ☐ Make a copy of the schoolyard map for each team of four students. A map is provided by BioKIDS and can be found in your teacher packet.
- ☐ Prepare a supply tote bag for each team. You will need collection containers, forceps, a magnifying lens, a shovel, and identification guides. Also bring the teacher tote bag outside with the binoculars and nets.
- ☐ Before the lesson begins carefully check the study area for potentially dangerous trash (such as broken glass and needles), poisonous plants (such as poison ivy, oak or sumac), and bee and hornet nests.
- ☐ For safety, inform students to wear closed toed shoes, long pants and long sleeved shirts on the day you will be going outside.
- ☐ If students will not be examining their invertebrates the next day, pour alcohol into the vials for preservation. This is something the teacher may want to do after school.

Lesson 2

- ☐ Read the *To The Teacher* section for Lesson 2
- ☐ Prepare the materials for each team, including collection jars containing invertebrates from Lesson 1, metric rulers and microscopes.
- ☐ Have the student tote bags that contain forceps, magnifiers, and Invertebrate Identification Guides available.

Lesson 3

- ☐ Read the *To The Teacher* section for Lesson 3 and reference section 4 entitled *Animal Organization*.
- ☐ Make an overhead of the Animal Classification Data Sheet. Prepare one deck of "Go Fish" cards per team, found in the teacher tote bag.

Lesson 1:
What Types of Habitats are Found in My Schoolyard?

To the teacher:

Lesson 1 Overview:
A sunny, wind-free day is best for this lesson. Lesson 3 may be done before Lesson 1 if weather is a factor. In addition to reviewing this lesson, see reference sections 2 and 3 entitled *Tips for Outdoor Activities and Habitats*. You may wish to review the sample answers provided for the teacher version of the student worksheets. These are not included in the student binders.

This lesson has three main parts. First, there are several organizational steps to take before going outside. Second, the students go outside, map habitats, and collect invertebrates. Finally, the students come back inside to create a Schoolyard Habitat Map.

1. Before Going Outside
Before the class goes outside, there are several in-class organizational steps. You may want to make some of these preparations a day in advance so that the students have a full class period outside.

a. Each team of four students needs to choose a tracker name as their team name. It is VERY IMPORTANT that each team has a DIFFERENT name.
b. Students will be using maps of their schoolyard in this and several future activities. Make a copy of the schoolyard map provided by BioKIDS for each student, divide the map into zones, and assign a team to each zone. Explain to the students that each team will be responsible for collecting data from one zone within the schoolyard.
c. Review with the students the different kinds of habitats they will look for to mark on their maps when they are outside. Definitions can be found in the reference section 3 entitled *Habitats*.
d. Review the definition of an invertebrate, collection techniques, and safety issues. Details can be found in reference sections 2 and 4.

Driving Question
What types of habitats are found in my schoolyard?

Learning Goals
Content
Students identify various habitats in the schoolyard.
Inquiry
Students use appropriate tools and techniques to gather data.

Time
3 class periods

Materials
- Schoolyard map for each student with zones shown.
- One supply tote bag per team:
  – 1 pair of forceps
  – 1 magnifying lens
  – 1 shovel
  – Collection containers
  – Invertebrate Identification Guide
  – Vertebrate Identification Guide
  – Track & Sign Guide
- Teacher supply tote bag:
  – 2 pair binoculars
  – 2 insect nets

2. Outside

When you and the class first arrive outside, sit down as a group. Orient the students to their assigned zones on the schoolyard map and discuss how they will be labeling the map with the habitat information. A sample map is shown on the student worksheets. Let the students know that when they complete their maps they may return to you to obtain invertebrate collection supplies. Encourage each team to collect at least three invertebrate samples.

3. Back In The Classroom

a. As a class, prepare a Schoolyard Habitat Map from the data that the students provided. This could be one map at the front of the room or on an overhead projector, where each team adds the habitat information from their zone. Each team will need a copy of this Schoolyard Habitat Map for future data collection and analysis.

b. Lead a discussion about what worked, what didn't work, and especially "where did each team find animals?" Encourage the teams to share tips with each other about where to look and what to look for.

c. If you will not be examining the invertebrates for several days, it is important to put alcohol in the collection jars to preserve the invertebrates. This is most important for animals such as worms and slugs that will dry out quickly. The teacher may want to do this after school.

Lesson 1: What Types of Habitats Are Found In My Schoolyard?

Your team of biologists will be going into the schoolyard to collect information about the animals seen there and where they live. As a team, look at the map below and the tracker descriptions on the following page. Choose one of the trackers for your team name.

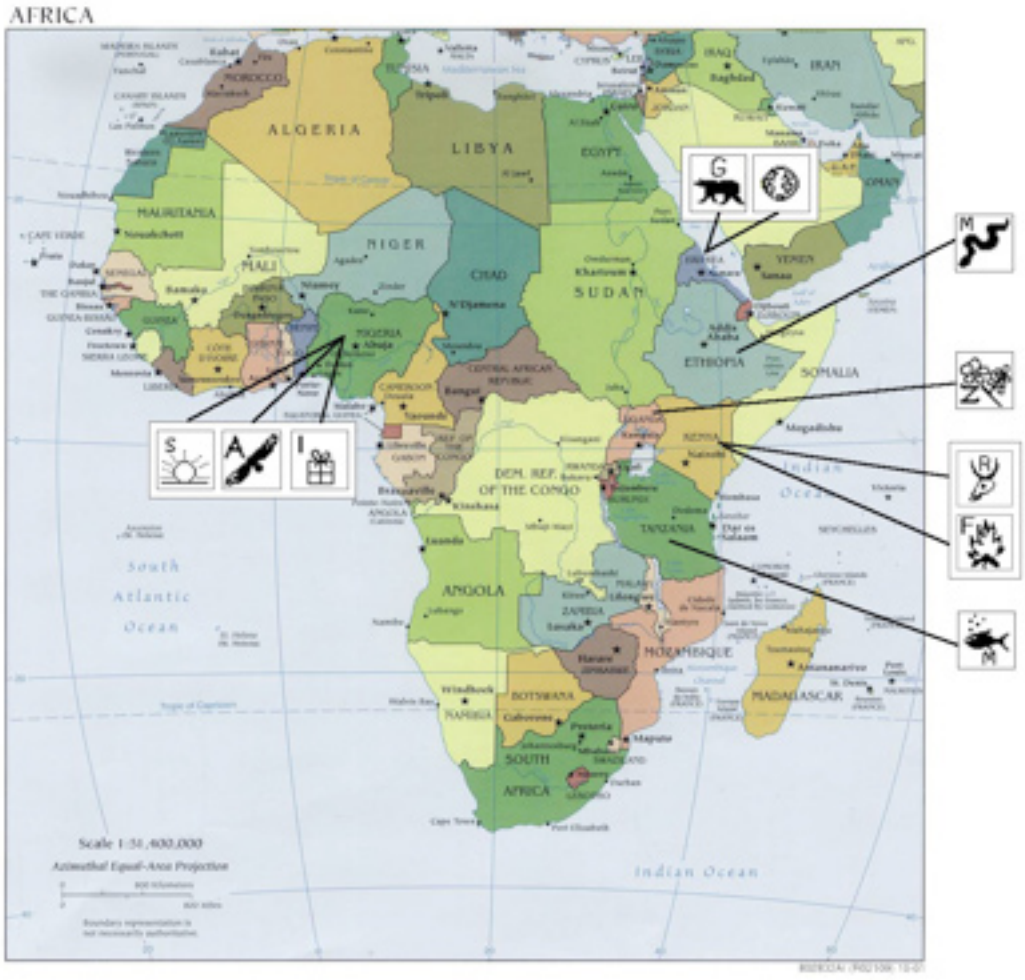
The members of my team are:

_____ _____

_____ _____

_____ _____

Our team name is: _____



Credits:
Map produced by the U.S. Central Intelligence Agency, used courtesy of The General Libraries, The University of Texas at Austin. http://www.lib.utexas.edu/maps/africa/africa_pol01.jpg

Tracker Names

Isoke [pronunciation: ih-so-key] is a tracker from Nigeria. Her name means "a beautiful gift," so her icon is a wrapped present.

Faraji [fuh-rah-jee] is from Kenya. His name in Swahili means "consolation." His icon is a fire because his father says he has such a fiery spirit.

Rakanja [ruh-kahn-juh] is also from Kenya. Her icon is an antelope skull because she found one of these once and keeps it as a special treasure.

Sanjo [sahn-joe] lives in Nigeria. Among the Yoruba people her name means "one who appreciates her past." Her icon is a sunrise.

Aren [air-en] is also from Nigeria. His name means eagle so that is his icon.

Zahra [zah-rah] is from Uganda. Her name means "flower" in Swahili, therefore she chose a flower for her icon.

Miniya [min-ee-yuh] is from Ethiopia. Her icon is a snake because as a child she was bitten by a snake. She survived and became an expert tracker.

Alem [ah-lem] is a tracker from Eritrea, neighbor to Ethiopia. His name means "world," so his icon is the earth.

Ghe'le [jeh-lay] is Alem's younger brother. The very strong bear is his icon because his name means "strength."

Mkali [muh-kah-lee] is from Tanzania. She chose a fish to be her icon because she loves to go fishing and she loves to eat fish.

Name information came from the following web sites:
http://www.heptune.com/names/afriname.html
http://www.swagga.com/name.htm
http://www.parenthoodweb.com/parent_cfmfiles/babynames.cfm

Habitat Mapping

While outside today your team will be doing two things. 1) Use the following list of habitats to label the habitats in your zone of the schoolyard map. Some habitats may not exist in your schoolyard and others, such as "in the air", exist throughout so do not need to be included. 2) After you have completed your map, collect some invertebrates for closer observation in the classroom.


bare ground


in the soil


short grass


tall grass


leaf litter or mulch


bushes


under something


in the air

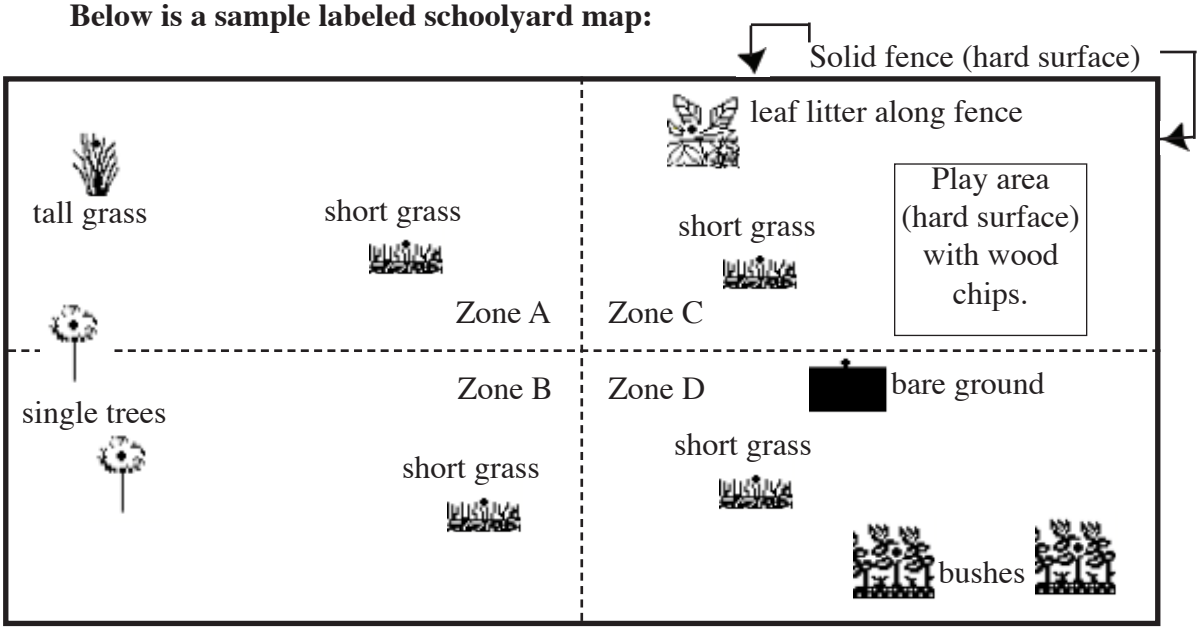

single tree


trees together


in water


near water

Below is a sample labeled schoolyard map:



Invertebrate Collection Data Sheet

Name: _____ Team Name: _____

Invertebrate means the animal is "not a vertebrate." In other words, it does not have an internal skeleton. There are no characteristics that unite all invertebrates, just the absence of a backbone. Most species of animals are invertebrates.

Each biologist may decide to focus his/her research on just one type of animal. There are so many kinds of invertebrates in the world. Even within Michigan there are many that have never been seen, identified or named! Over 90% of all invertebrates are less than two centimeters long.

In the table below, take notes on any invertebrates that you collect from your zone.

Describe the animal. Give details! Remember a name is not a complete description!	In what type of habitat did you find the animal?
Example: A lot of small brown ants. They have thin bodies, six legs, and black eyes.	*Example: At the base of the school building. On bare ground.*

Lesson 2:
How do You Examine and Classify Invertebrates?

To the teacher:

Lesson 2 Overview:
In this lesson, students examine invertebrates up close and in depth using the invertebrates that were collected in Lesson 1.

Invertebrate Observation
Students will bring their invertebrates inside for examination, guided by the Invertebrate Observation Data Sheets. If you have enough microscopes have the students work in pairs instead of a team of four. Pass out the microscopes, magnifying glasses or boxes, forceps, and metric rulers to each team. First have the students measure the invertebrate. If the invertebrate is longer than ten millimeters, encourage them to use the magnifying box or lens to answer the rest of the questions. This is because the depth of field and field of view of many microscopes only allows the student to see a portion of the large invertebrate well, where the magnifying glass allows the student to see the whole body. It may be necessary to use the microscope to answer some questions. If the invertebrate is shorter than ten millimeters have the students use the microscope to answer all of the questions. If students are unfamiliar with the microscopes a demonstration of how to use the microscopes will be useful at the beginning of this section. In addition, students may need a reminder on how to read a metric ruler.

Diagrams of an insect and an arachnid with the body parts labeled are located at the beginning of this lesson. It might be useful to discuss these briefly with the students. The Invertebrate Identification Guide is also an important tool for this lesson.

Driving Question
How do you examine and classify invertebrates?

Learning Goals
Content
- Students examine distinguishing characteristics of animals.
- Students compare and classify organisms into major groups and species classifications on the basis of observable physical characteristics and their structure.

Inquiry
- Students use appropriate tools and techniques to gather data.
- Students formulate explanations from evidence.

Technology
- Students use technological tools for viewing and identifying animals.

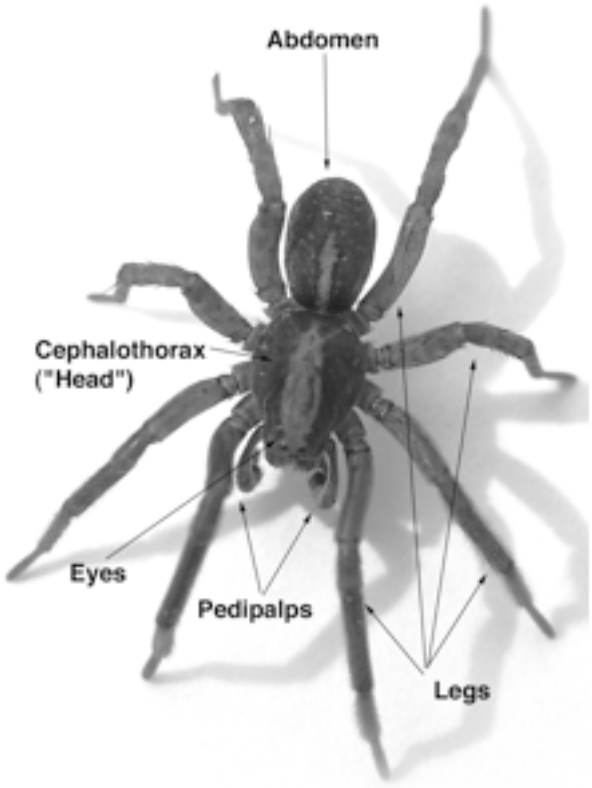
Time
2 class periods

Materials
For each team:
- At least one metric ruler
- At least one microscope
- From the student tote bags:
  - forceps
  - Invertebrate Identification Guide
  - Magnifying box or lens

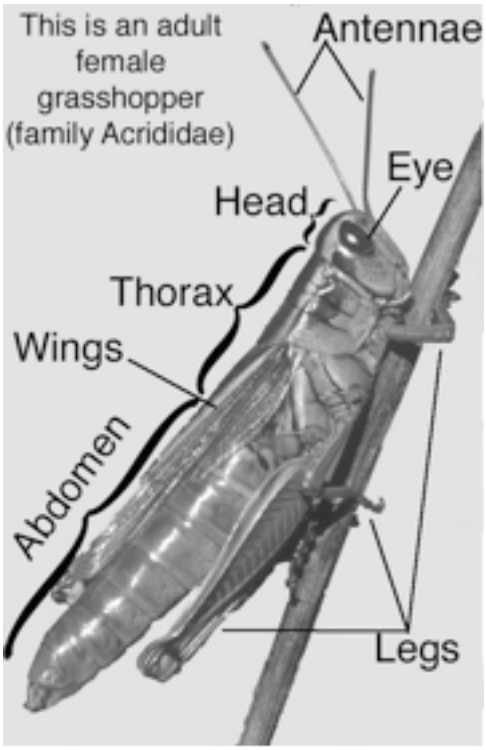
Lesson 2:
How do You Examine and Classify Invertebrates?

Working with your team, choose one invertebrate to observe carefully. Use a magnifying box or glass and microscope to answer the questions on the Invertebrate Observation Data Sheets. If you cannot tell, mark that answer with "*we cannot tell*." Use the Invertebrate Identification Guide to help identify your animal at the end of the lesson.

Below are diagrams of an insect and an arachnid with the body parts labeled. Use these diagrams to help identify the body parts on your invertebrate.



Arachnid



Insect

Invertebrate Observation Data Sheet 1

Name: _____ Team Name: _____

Using a metric ruler, measure your invertebrate.

1. Measure the entire invertebrate
- How long is it? _____ mm
- How wide is it? _____ mm
- How high (tall) is it? _____ mm

If your invertebrate is longer than ten millimeters, use the magnifying box or glass to answer the rest of the questions. It may be necessary to use the microscope to answer some questions. If your invertebrate is shorter than ten millimeters, use the microscope.

2. Look more closely
- How many sections does it have? _____ sections
- How many legs? _____ legs
- How many antennae? _____ antennae
- How many wings? _____ wings
- How many eyes? _____ eyes
- What do the eyes look like? _____

What color? How big? What pattern?

3. Examine the body
- What color is the body? _____
- What is the body like? _____

Smooth? Fuzzy? Wrinkly? Does it have hairs? Plates?

- Does it have stripes or spots? No ☐ Yes ☐

If Yes, describe their color and shape:

4. Examine the legs (If there are no legs, continue to #5)
- How long are the legs? _____ mm
- What do they look like? _____

Fuzzy? Prickly? Smooth? Pinchers at the end? Claws?

Invertebrate Observation Data Sheet 2

5. Examine the antennae (If there are no antennae, continue to #6)

- How long are the antennae? _____ mm
- What do they look like? _____

Are they long and skinny? Short or thick?

6. Examine the wings (If there are no wings, continue to #7)

- How long are the wings? _____ mm
- What do they look like? _____

Are they clear? Do they have colors or patterns?

7. *Draw* your invertebrate here and *label* as many parts as you can.

Invertebrate Observation Data Sheet 3

Invertebrate Identification: There are many, many species of invertebrates. In Michigan alone there are at least 15,000 species, and around the world there are millions! No one knows for sure how many exist because most invertebrate species are not described or known by scientists. Since there are so many different kinds, it might be difficult for you to identify the exact species of each invertebrate you find. For example, you might find a little black and gray spider that jumps a lot and has two big eyes and six little ones. You can use the Invertebrate Identification Guide and figure out that it is a jumping spider. But which species? There are over 50 species of jumping spiders in southeastern Michigan, and the only way to identify them exactly is by detailed microscopic study! In this case, the best you can do is to say that your spider belongs to the group that contains all jumping spiders, the family Salticidae (pronounce it "sal-TISS-i-dee"). Your spider is a "salticid" (pronounced "sal-TISS-id").

8. Using your observations and the Invertebrate Identification Guide, identify the type of invertebrate that you have found. Look on your *Invertebrate Collection Data Sheet*, to see the habitat where your invertebrate was found. Think about how the physical features that you have examined allow your invertebrate to live in this habitat.

My invertebrate is a(n) _____ and was found in _____.

Lesson 3:
How Do Scientists Group Animals?

To the teacher:

Lesson 3 Overview:
This lesson introduces animal classification. First, students will be introduced to animals from nine scientific groups, and they will learn to identify the physical characteristics common/unique to each group. Students will then play a modified version of "Go Fish" to practice identifying the characteristics of each of the nine groups. Some worksheets to reinforce these concepts are included and can be used in class, as bellwork or as homework.

1. Identifying Characteristics of the Animal Groups
As a class read the *Animal Classification Information Sheet* to introduce your students to the difference between vertebrates and invertebrates, the nine animal groups used by BioKIDS, and the term "species." Next, using the three pages of animal drawings, have the students identify characteristics shared by each group and record the information on the *Animal Classification Data Sheet*. It may be helpful to have this data sheet on an overhead projector and work as a class. Evaluate each suggestion before students record it on their data sheet. If students misidentify a characteristic, it is usually possible to find an animal that will illustrate their error. For example, some students identify flight as an identifying characteristic of birds. However, some birds such as penguins and ostriches do not fly.

2. BioKIDS "Go Fish"
To practice using the characteristics of the groups to identify animals, have students play several rounds of the BioKIDS "Go Fish" game in teams of three or four. The rules of BioKIDS "Go Fish" are as follows:

- Shuffle the deck
- Deal out a hand of five cards to each player.
- Place the remainder of the cards in a face-down stack.
- The player to the left of the dealer starts.
- In each turn, the player asks any other player for a specific animal group. E.g. "Shanti, do you have any amphibians?"

Driving Question
How do scientists group animals?

Learning Goals
Content
- Students classify animals into nine major groups on the basis of observable physical characteristics.

Inquiry
- Students use appropriate tools and techniques to analyze and interpret data.
- Students formulate explanations from evidence.

Time
3 class periods

Materials
- Overhead of Animal Classification Data Sheet.
- 1 deck of BioKIDS "Go Fish" playing cards per team found in the teacher tote bag.

- The player who asks must already have at least one card of the type being requested.
- If the player being asked (e.g., Shanti) has any of the requested cards (e.g., amphibians), they must hand over **all** cards of that type to the player who requested them.
- The player who made the original request then gets another turn to request an animal group from any player, providing they already hold one animal from the requested group.
- If the person asked does not have any cards of the named animal group, they say 'Go fish!'
- The asker must then draw the top card of the un-dealt stack and the turn passes to the next player to the left.
- As soon as a player collects a complete set from an animal group (4 cards), this must be shown to the other players and placed face down in front of the player.
- The game continues until either someone has no cards left in their hand or the face down stack in the middle runs out.
- The winner is the player who has collected the most complete animal groups.

3. Mystery Animal Identification

Once students are familiar with how scientists group animals, they are asked to identify a "mystery" animal on the *Mystery Animal Data Sheet*. Students read a brief description of an animal, decide what group it belongs to (based on the physical characteristics they've learned), and then justify their answer. This can be done as bell work or homework.

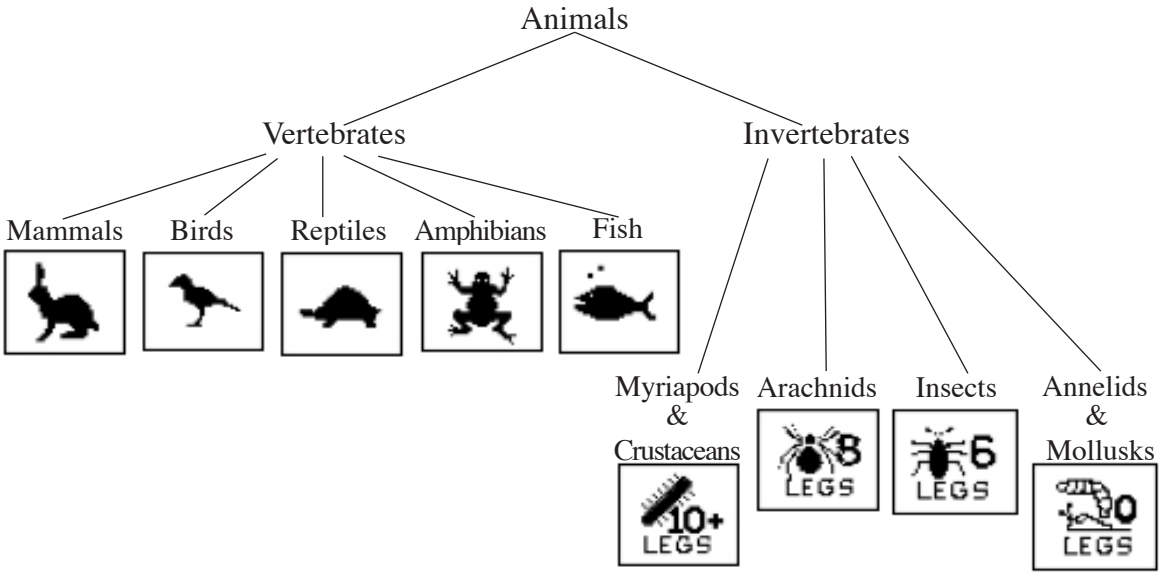
4. Animal Group Comparisons

To further reinforce the differences between animal groups, we have provided an additional worksheet (*Animal Group Comparisons Data Sheet*) that asks students to write down what is similar in two groups and what is unique. This can be done in class or as homework.

Lesson 3: How Do You Group and Classify Animals?

Animal Classification Information

Scientists use systems to group and classify animals. They do this so they can communicate about the animals. Over time, scientists have used many different kinds of systems. Some systems are based on genetic history, some on appearance, and some systems are even based on size! The BioKIDS system is based on **physical features.**



All animals can be classified as either a vertebrate or invertebrate. **Vertebrates** all have a backbone, while **invertebrates** lack one.

BioKIDS uses nine **animal groups**. The five vertebrate animal groups include mammals, birds, reptiles, amphibians, and fish. In the Critter Catalog, invertebrates have been divided into the four groups: myriapods & crustaceans, arachnids, insects, and annelids & mollusks. This isn't exactly the same as how scientists classify animals. All species have characteristics that scientists can use to place them in one of the nine animal groups. This means that all species in an animal group share certain characteristics.

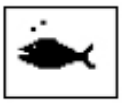
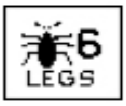
There are many, many species in each animal group.

A **species** is a kind of animal. All members of a species look very much alike and have the same way of life because they all had the same ancestors – they are related to each other. There may be small differences in how members of a species look or behave depending on where they live, but in most cases they are enough alike that they can **breed** with each other (make babies). For the most part, animals in one species cannot breed with animals of another species.

Animal Classification Data Sheet

Name: _____ Team Name: _____

Today we are going to identify the features that separate our nine groups.
1. Look at the animal drawings on the next three pages. For each animal group, identify at least two **physical features** that all three animals share.
2. Discuss these as a class and write them in the table below. This will be an important reference for future lessons.

Animal Group	Common Physical Features
 Mammals	*Have fur (even whales and dolphins have a few whiskers when born)* *Give birth to live young* *Nurse their young with milk*
 Birds	*Have feathers* *Have hard shelled eggs*
 Fish	*Have scales* *Have fins* *Live in water*
 Amphibians	*Moist skin with no scales* *Lay soft eggs with no shell in water* *Live part of their lives in water and part on land* *Cold-blooded*
 Reptiles	*Have scaly skin* *Cold-blooded* *Lay eggs with tough leathery shells on land*
 Annelids & Mollusks	*No legs* *Soft bodies, though some mollusks make a shell*
 Insects	*Six legs* *Antenna* *Three body segments*
 Arachnids	*Eight legs* *No antenna* *Two body segments*
 Myriapods & Crustaceans	*Ten or more legs* *Hard exoskeleton*

Animal Groups

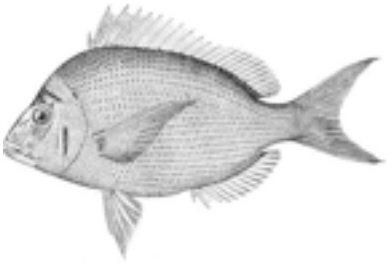
Mammals



Birds

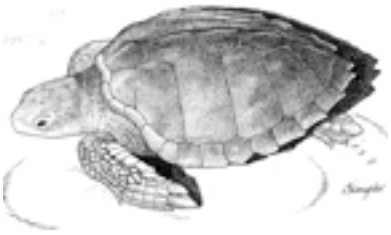


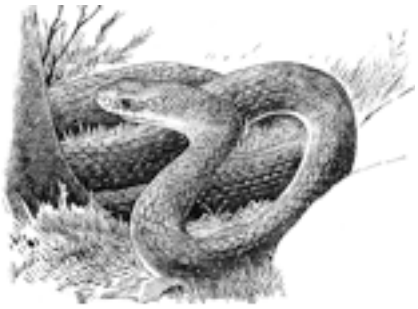
Fish

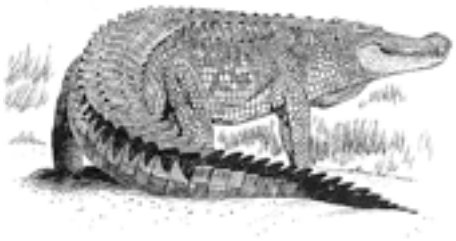




Animal Groups

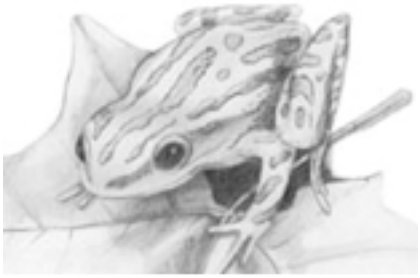
Reptiles







Amphibians

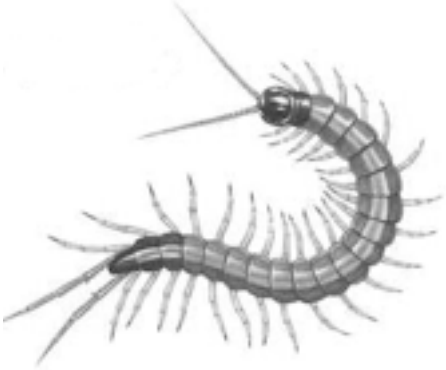


Insects

Animal Groups

Annelids & Mollusks

Myriapods & Crustaceans



Arachnids

BioKIDS "Go Fish" Instruction Sheet

Name: _____ Team Name: _____

BioKIDS "Go Fish" Game

Practice using the characteristics of the groups to identify animals, by playing several rounds of the BioKIDS "Go Fish" game in groups of three or four. The rules of BioKIDS "Go Fish" are as follows:

- Shuffle the deck
- Deal out a hand of five cards to each player.
- Place the remainder of the cards in a face-down stack.
- The player to the left of the dealer starts.
- In each turn, the player asks any other player for a specific animal group. E.g. "Shanti, do you have any amphibians?"
- The player who asks must already have at least one card of the type being requested.
- If the player being asked (e.g., Shanti) has any of the requested cards (e.g., amphbians), they must hand over all cards of that type to the player who requested them.
- The player who made the original request then gets another turn to request an animal group from any player, providing they already hold one animal from the requested group.
- If the person asked does not have any cards of the named animal group, they say 'Go fish!'
- The asker must then draw the top card of the un-dealt stack and the turn passes to the next player to the left.
- As soon as a player collects a complete set from an animal group (4 cards), this must be shown to the other players and placed face down in front of the player.
- The game continues until either someone has no cards left in their hand or the face down stack in the middle runs out.
- The winner is the player who has collected the most complete animal groups.

1. a. When playing "Go Fish", which two animal groups were the most difficult to tell apart?

Amphibians and reptiles

b. Why do you think you confused these two animal groups?

Both types of animals live in a pond and breathe air.

Animal Group Comparisons Data Sheet 1

Name: _____ Team Name: _____

All species in an animal group have certain features in common. That is why those species are grouped together. On an earlier worksheet, you wrote down some of those features. But sometimes animals in different groups also have things in common – frogs and dogs both have 4 legs, while snakes and worms don't have any legs. How can biologists tell groups apart?

Compare the animal groups below and find at least **two** differences that help you tell one animal group from the other. If you need more information, go to the computer and take a look at each Critter Catalog animal group page. The Critter Catalog website is: http://www.biokids.umich.edu/critters/

Insects vs. Arachnids

Unique to Insects	Similar to both	Unique to Arachnids

Insects vs. Myriapods & Crustaceans

Unique to Insects	Similar to both	Unique to Myriapods & Crustaceans

Insects vs. Annelids & Mollusks

Unique to Insects	Similar to both	Unique to Annelids & Mollusks

Animal Group Comparisons Data Sheet 2

Fish vs. Amphibians

Unique to Fish	Similar to both	Unique to Amphibians

Mammals vs. Birds

Unique to Mammals	Similar to both	Unique to Birds

Reptiles vs. Amphibians

Unique to Reptiles	Similar to both	Unique to Amphibians

Mammals vs. Arachnids

Unique to Mammals	Similar to both	Unique to Arachnids

Birds vs. Reptiles

Unique to Birds	Similar to both	Unique to Reptiles

Scientific Explanations Explained!

An important inquiry skill we hope to foster in the BioKIDS curriculum is learning to make scientific explanations supported by evidence. We emphasize explanations for several reasons.

- Constructing explanations is a key part of actual scientific practice.
- They foster complex skill such as weighing evidence, interpreting data, and evaluating claims.
- They give students practice in effective communication
- They enhance a deeper understanding of scientific concept

A scientific explanation consists of a claim, supporting evidence, and reasoning that links the evidence to the claim. The scaffolding seen here is provided for all worksheets where students are asked to make a scientific explanation. Below are descriptions and characteristics of each component of a scientific explanation that you may wish to go over with your students before you begin.

Example scientific question:
Are pill bugs a kind of insect?

What is the main science concept covered in this question? ***Example: Insect – Insects are animals with six legs and three body parts.***

Scientific Explanation:

Claim: The claim should be a single complete sentence that answers the scientific question that is posed. The rest of the explanation will either support or refute the claim. This sentence should NOT contain any evidence.
Example: Pill bugs are not insects.

Hint:
A claim is a complete sentence that answers the question.

Evidence: For evidence, students should be using data or facts that specifically support their claim. Relevant facts are usually associated with the key scientific concept.
Example:
#1 – Pill bugs have fourteen legs.
#2 – Pill bugs have 8 body parts.

Hint:
*Evidence is observations, data, or information that support the claim. Explanations need **two** or more pieces of evidence.*

Reasoning: Reasoning is the justification that links the claim and evidence. It should show WHY the data or facts count as evidence to support the claim, usually with reference to the main scientific concept.
Example: Pill bugs have more legs than insects, and more body parts than insects.

Hint:
Reasoning tells why your particular evidence supports your claim.

Concluding Sentence: Therefore,
In the last sentence, students should reassert their claim. Many students find this redundant, but it serves as the conclusion, drawing their argument full circle.
Example: Therefore, pill bugs are not insects.

Hint:
Restate your claim in the Concluding Sentence.

Mystery Animal Data Sheet

Name: _____ Team Name: _____

Sometimes biologists get phone calls or emails from people asking them to identify an animal. How would you respond if you got the following description?

Harry found a small animal in his yard. As shown below, it has a hard shell, many body parts, and lots of legs – he counted 14 of them. Harry wondered if it was an insect.

Example scientific question:
Is this animal an insect?

What is the main science concept covered in this question? ***Sample: Insect – insects are invertebrates with six legs and three body parts.***

Scientific Explanation:

Claim: There is only **one** correct claim to this question. Remind students to write a complete sentence that answers the question, but does NOT contain any evidence.
Sample: This animal is not an insect.

Hint:
A claim is a complete sentence that answers the question.

Evidence: For evidence, students should identify characteristics of the animal that would show whether or not it could be an insect. In this case, body parts and legs are defining characteristics of insects.
Sample:
#1 – This animal has 14 legs.
#2 – This animal has many body parts.

Hint:
*Evidence is observations, data, or information that support the claim. Explanations need **two** or more pieces of evidence.*

Reasoning: Here students should explicitly describe how this animal is different from an insect.
Sample:
This animal has more body parts and more legs than insects.

Hint:
Reasoning tells why your particular evidence supports your claim.

Concluding Sentence:Therefore,
Here, students should reassert their claim.
Sample:
Therefore, this animal is not an insect.

Hint:
Restate your claim in the Concluding Sentence.

Put it all together in a paragraph!

This animal is not an insect. Insects are invertebrates with three body parts and six legs. This animal has 14 legs. This animal has many body parts. This animal has more body part and legs than insects. Therefore, this animal is not an insect.