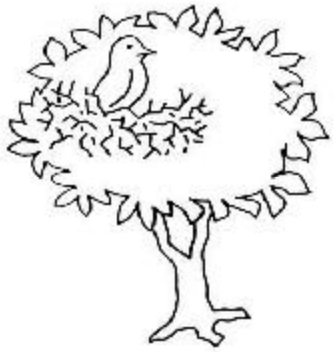


A Habitat For All

Unit Overview

This unit focuses on the dimension of habitat to teach key concepts about sustainable development appropriate for Grades K – 4. It is the goal of the unit to have students increase their understanding of habitat problems related to sustainable development, to examine new ideas and develop creative solutions.

Using the Unit

This unit contains three lessons with specific objectives and learning outcomes. It is the goal of this unit for students to define and provide simple examples of the basic concepts of sustainable development as they relate to habitat and carrying capacity. Although the activities can be taught as separate exercises, the content builds on previous activities and contains more mature concepts in the later activities.

The culminating activity of this unit is a case-problem intended to give older students a deeper understanding of some sustainable development concepts. Students are encouraged to think creatively. Students will be asked to evaluate the consequences of the decisions made. The economic, ecological, and social/ecumenical concerns of each solution will be examined.

The case begins with a presentation of the problem and includes key facts and background information related to the case. A list of resources (websites, articles, and other publications) are provided to allow students to do additional research to enhance their knowledge and create more informed solutions. Working in teams, the students propose a solution that they feel best reflects a sustainable development perspective. Students analyze the likely consequences of their solution using the sustainable development choices and consequences questionnaire provided. They will examine the economic, ecological, and social/ecumenical aspects of their choices. Students present their proposed solution to the class as a debate, skit, poster, or traditional paper.

Unit Content

In the context of our Soft vs Hard Green Framework (see Chapter 2), the teacher can introduce the philosophical concepts of anthropocentrism (human-centered), biocentrism (nature-centered), and eco-centrism (human/nature balance). Emphasizing anthropocentrism, Hard Green enthusiasts place humans at the top of the hierarchical ladder, whereas Soft Green thinkers tend to embrace more biocentric and/or ecocentric values.

Field Trip

Included in this unit is a field trip on the school grounds. Each lesson in the unit utilizes information gathered during the field trip. In preparing for the field trip, look for any conditions that would be hazardous and caution students about potentially dangerous areas. Identify the areas where students are likely to find animals or evidence of them. Arrange for aides or parents to help.

School grounds have many different areas with a variety of habitats. They may be sunny, shady, the grass, fence or trees. Don't forget to look under the bark and leaves of trees and shrubbery, and rocks and on the walls and fences. Also look in the cracks of sidewalks. Parking lots are a good illustration of how humans have changed the environment from one form to another with completely different properties. If it is safe to go into the parking lot, you might have students compare it with the other habitats and the animals that live there.

LESSON 1

Habitat HUNT

All organisms have basic survival needs of food, water, shelter and space. There are many types and sizes of habitats and each one has its own characteristics that support animals, plants and human beings. Students will examine the habitats on their school grounds to learn about habitat requirements and the animals living there.

Objectives:
In this lesson students will:

- **Define habitat**
- **Identify their own basic needs for food, water, shelter, and space**
- **Match different animals to their habitats.**

Standards of Learning:

Math K.16, 1.18; Science K.1, K.6, 1.4, 1.5; English K.3, 1.11

Skills:

Observing
Concluding
Interpreting
Discussing
Comparing
Contrasting

Key Terms / Concepts:

Habitat
Survival Needs
Shelter
Differences
Similarities

You Will Need

- Clipboards or writing surfaces
- Drawing materials
- Hand lenses (if available)

Background:

A habitat is the place where animals and/or humans live. It provides the basic survival needs of food, water, shelter, and space. A schoolyard, even a sterile-looking urban one, contains many habitats that provide the basic needs of many living organisms.

Different organisms need different kinds of food and have different needs for shelter and amounts of space. There are many types and sizes of habitats and many habitats overlap. All habitats combine to form the biggest habitat of all—the earth.

Getting Ready:

Check the school grounds before taking students outside. Identify areas where students are likely to find animals or evidence of them. Make a list of the different animals and habitats.

Make copies of the animal worksheet (H 1) with the simple line drawings of the creatures the students are likely to find. Make enough copies for each team of two students. Make an aerial map of the schoolyard on a bulletin board.

Obtain a copy of the book, *A House Is A House for Me*, by Mary Ann Hoberman, to read to the students. If this book is unavailable, substitute a similar book from the list of books at the end of this lesson.

Activities:

1. Ask the students to describe their homes and where in their home are the things they need to live. Where do you get your water? Where is the food? Where do you sleep? Describe your neighborhood. Tell students that a habitat is the place where animals and humans live. It provides the basic survival needs of food, water, shelter, and space. Following the discussion, read to the class *A House is a House for Me* by Mary Ann Hoberman. This picture and word book illustrates many kinds of houses and habitats for many different creatures. If this book is unavailable, substitute a similar book from the list at the end of this lesson. Another approach is to collect pictures of various habitats from such nature magazines as *National Geographic, Ranger Rick, Big Backyard,* or *Nature Conservancy*. Also cut out pictures of several animals the students will recognize that live in those habitats.

2. Tell the students that there are many different kinds of habitats. Ask them to describe some of the habitats from the book or the pictures you have collected. What are some of the differences and similarities?

3. Explain to the students that their own schoolyard is one big habitat with many smaller habitats within it. Many different creatures live in these habitats. What type of creatures might we find on the school grounds? They might suggest birds, worms, spiders, and squirrels. Be sure they include humans on their list. Where will those creatures live? Ask for ideas of places they might look for creatures on their schoolyard. Their suggestions might include trees, bushes, in the cracks of sidewalks, under leaves, on a fence or near the playground equipment.

4. Pair students into teams of two or three. Provide each team with a clipboard with the animal worksheet (H 1) and have them take their drawing materials. Tell students they will need to search carefully to find the animals. Once they have found an animal, they should check it off their list. If they find more than one animal, they should make a mark for each one. If they find an animal that is not on the worksheet, they can make a drawing of it. Explain that scientists often make sketches when they are doing field work.

5. Take students outside and give each team about 10 minutes to find as many animals as they can. If hand lenses are available give them to the students to use in looking for very small creatures.

6. Bring the students together to discuss their findings. Possible questions to ask:
   What animals did you find?
   How many were there?
   What type of food is there for them to eat?
   Did you find where they get their water?
   Did you find their shelter? Where is it?

7. Return to the classroom. Have the students color the animals they found on the worksheet, cut them out and place on the correct habitat on the bulletin board.

Enrichment:

1. Extend the field trip experience by having the students make line drawings of each of the animals and their habitat. Make copies of their drawings and collect them into a booklet for each student to color.

2. Ask students to list any signs they found of animals they did not see. Their answers might include tracks, seed cases, webs without spiders, partially eaten nuts, candy wrappers, feathers, fur, and droppings. Have them imagine what the creature looks like that left the sign.

3. Read *A House for Hermit* and discuss the crab's needs to survive. Draw or construct a house for Hermit. Bring in a hermit crab. Discuss what it would need to survive.

4. Paste pictures of animals on cards and have the students pick a card. Designate four areas in the classroom: forest, tree, house, and water. Have students choose which area their creature would live in and have the student stand in that area.

Assessment:

1. Match the animals and the habitats.

2. Determine if students can identify more than one habitat.

3. Evaluate student abilities to communicate the basic needs of food, water, shelter, and space.

References:

Carle, E. *A House for Hermit Crab.* (New York: Scholastic Inc.), 1987.

Hoberman, Mary Ann. *A House is a House for Me.* (New York: Scholastic, Inc.), 1988.

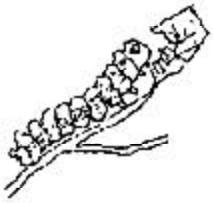
Resources:

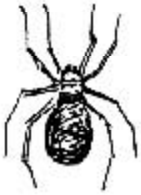
Burningham, J. *Hey! Get Off Our Train.* (New York: The Trumpet Club), 1989.

Cole, Joanne. *This is the Place for Me.* (New York: Scholastic, Inc.), 1986.

Cutts, David. *The House that Jack Built.* (New Jersey: Troll Communications),1979.

Animal Worksheet **Name:**





Grade Level: 2-3

LESSON 2

A Space for You & Me

There are many types and sizes of habitats and each one has its own characteristics that support animals, plants and human beings. Students will examine the habitats on their school grounds and describe the significance of carrying capacity.

Objectives:
In this lesson students will:

- **Define habitat**
- **Identify the habitats on their school grounds**
- **Generalize the consequences of carrying capacity.**

Standards of Learning:

Math 2.21, 3.21; Science 2.5, 2.8, 3.6, 3.10

Skills:

Observing
Concluding
Interpreting
Describing
Comparing
Contrasting

Key Terms / Concepts:

Habitat
Survival Needs
Carrying Capacity
Population

You Will Need

- Clipboards or writing surfaces
- Drawing materials
- Hand lenses (if available)
- Scissors
- Tape

Background:

A habitat is the place where animals and/or humans live. It provides the basic survival needs of food, water, shelter, and space. There are many types and sizes of habitats on the school grounds and some of the habitats overlap.

All habitats combine to form the biggest habitat of all—the earth. Because the earth is a finite system that supports a diversity of life, humans and animals depend on the continued functioning of the earth's systems for their own survival. Each habitat can only sustain so much development. Even the most natural looking of schoolyards can provide for the basic needs of only so many living organisms.

This is because the habitat has a limited amount of food that it can provide, a limited amount of waste it can absorb and a limited amount of space. The limiting factor of a habitat to sustain living things is called "carrying capacity" and is defined as the maximum number of living things that can be sustained in an area over time. Different organisms can have different carrying capacities even in the same area. For example, more insects can live in a tree than birds can.

The biological carrying capacity of an area can change from one season to the next and from year to year. Changes in the environment such as rainfall, temperatures, natural disasters and disease affect the number of living things a habitat can sustain.

The social carrying capacity is affected by human intervention and such activities as hunting, planting specific vegetation, and winter feeding. Some management practices intentionally reduce or increase the carrying capacity of a habitat. Pollution and over development of an area can reduce the carrying capacity of a habitat. The earth has a carrying capacity and can only support a limited number of humans and other forms of life without reducing its ability to support those populations in the future.

Getting Ready:

Prepare for the field trip on the school grounds.

Prepare an aerial map of the school yard on a bulletin board. Copy the student page with the birds on it (H 2), and cut into squares for each student. Draw and color a large tree on poster board (but smaller than will accommodate the number of birds) and laminate it. Attach it to another portion of the bulletin board.

Bring a tape player and music to class for the musical habitat activity.

Activities:

Activity 1 / Part 1

1. Review the definition of habitat and have students suggest what types of creatures might be found on the schoolyard and where would they be found.

2. Prepare students to go on to the schoolyard. Provide each team with a clipboard and drawing materials. Tell students they will need to search carefully to find the animals. Once they have found an animal they should add it to their list and take notes on its habitat. Have the students make a simple line drawing of the creature. Explain that scientists often take notes and make sketches when they are doing field work. Give each team about 10 minutes to find as many animals as they can.

3. Bring the students together to discuss their findings. Possible questions to ask:
   - What animals did you observe and how many were there?
   - Compare and contrast the needs of the different animals.
   - Describe and compare the habitats of the animals they observed.

4. Have students construct a picture or bar graph to illustrate their data. Older students can construct a bar graph on grid paper using a key. Give the graph a title.

Activity 1 / Part 2

1. Have the students color and cut out the animals they observed. Ask each student to place their animals in the schoolyard habitats on the bulletin board. Does more than one animal live in the same area? Do any of the animals use more than one area of the schoolyard to meet their basic needs? What would happen if there were too many animals in a given area? Do any of the habitats overlap? How many different areas on the schoolyard do the animals use to meet their basic needs for survival?

2. Have the students identify what food from nature the animals are eating and discuss where this food is on the school grounds (berries on the bushes,

acorns from the trees, worms in the ground). Describe a bush that might grow on the school grounds that bears fruits/berries. Ask the students what they think would happen if some birds came and ate all of the berries off the bush. What other animals might rely on those berries for food? What will happen to those animals? Discuss with students how many birds the bushes might support with food?

Activity 2

1. Ask the students to think about their house as one type of habitat. Imagine that your parents have decided to have a big family celebration and have invited 20 of your relatives to stay at your house. Imagine the problems that might cause. How would you feed this many people? Where would they eat, sleep, and sit? How would they all use the bathroom? How many relatives could stay at your house? What is the carrying capacity of your house?

2. Ask the students to estimate how many birds they think can live in one tree. Have them color the bird you have given each student. Have field guides and pictures from nature magazines to guide them in their color choices. Have each student tape their bird to the large tree on the bulletin board. Tell them they should try to get as many birds in the tree as they can, but the birds cannot touch each other and they cannot be stacked on top of another bird. When the tree is full, ask the students how many birds can live in the tree. What will happen to the other birds that cannot fit in the tree? Can the tree provide enough food and shelter with this many birds in it? Explain to the students that even though there is a tree for shelter for the birds, that it can only support so many birds and their other needs such as water and food that have to be met too. The tree has a carrying capacity of a certain number of birds - only that number can survive there.

Activity 3

1. Arrange ten chairs in the middle of the classroom to represent a habitat. Have half of the class represent humans and half represent animals, insects and plants. Students can make masks to represent their animal, plant or insect. Playing musical chairs, start the game with 5 humans and 6 animals, bugs, and plants spaced around the chairs. The remaining students in the class represent additional humans and animals who are waiting to be brought into the game. Explain that when the music stops, everyone is to sit down on a chair.

2. If the student left standing represents an animal, they must leave the circle and be replaced by another student representing either human or animal. If the student left standing is a human, he or she stays in the circle and keep playing. Explain that this is similar to the way it is in the real world where there is competition between plants, animals and humans for the habitat.

3. Play several rounds. Count the number of people and the number of plants. Students should notice that the number of humans is getting larger and the number of creatures is getting smaller.

4. Ask students how this activity is similar to real life. What are some of the reasons humans are taking more of the habitat on earth? What are some of the consequences of this behavior? What would humans have to give up to save more of the earth habitat for animals? What are some possible solutions to meet all the earth's creatures needs for habitat?

5. Conclude the activity by reading *Busy Beavers.* Discuss how the beavers alter the habitat of many animals so they can have food and shelter. How are the beaver activities similar to human ones?

Enrichment:

1. Ask students to list any signs they found of animals they did not see. Their answers might include tracks, seed cases, webs without spiders, partially eaten nuts, candy wrappers, feathers and fur. Have them imagine what the creature looks like that left the sign. Read *Animal Tracks* and have students make tracks of the animals they have found on pieces of paper. Tape the tracks on the schoolyard bulletin board near the animal's shelter. Have students describe the animal habits from the tracks. Where did it go to get food and water?

2. Have students write a paragraph on a way they can preserve a specific habitat.

Assessment:

1. Assess student contributions to the class discussions and observations.

2. Evaluate student abilities to identify the schoolyard animals' basic needs of food, water, shelter and space.

3. Evaluate student abilities to define carrying capacity and the limiting factors.

4. Examine the graphs for accuracy in depicting the data.

References:

Dabcovich, L. *Busy Beavers.* (New York: Scholastic Inc.), 1988.

Dorros, A. *Animal Tracks.* (New York: Scholastic Inc.), 1991.

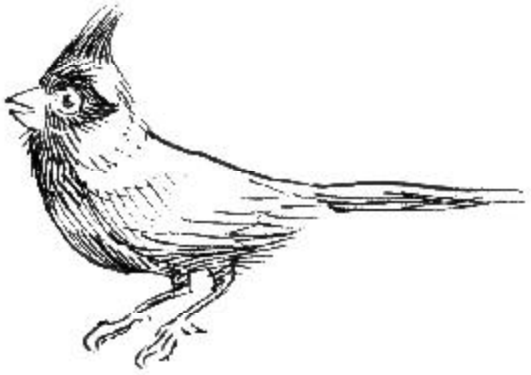
Resources:

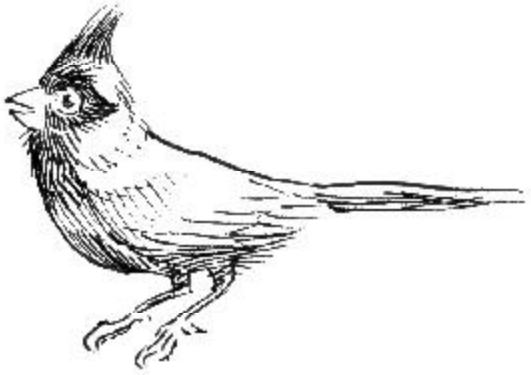
Carle, E. *A House for Hermit Crab.* (New York: Scholastic Inc.), 1987.

www.facingthefuture.org
Information on the earth's carrying capacity

www.popinfo.org
Population information

www.nwf.org/international/pop/
National Wildlife Federation population page

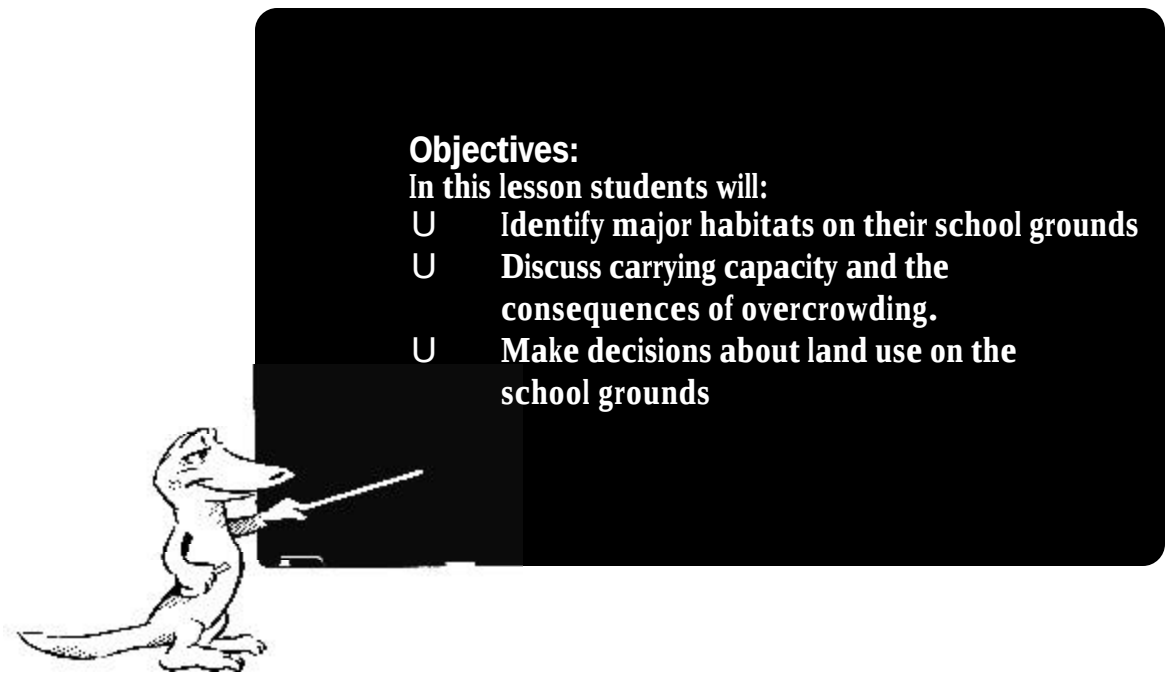




LESSON 3

Making Places, Taking Spaces

Human expansion and development can cause some unique problems for humans, animals and the environment that can result in competition among the animals and other living things for food, shelter, water, and space. In this activity, students will try to solve the problem of overcrowding in the school, while minimizing the impact on the school yard habitats.



Standards of Learning:

Science 4.5; English 4.1, 4.9; Math 4.18

Skills:

Observing
Concluding
Interpreting
Predicting
Defining problems
Decision making

Key Terms/Concepts:

Habitat
Survival Needs
Carrying Capacity
Population
Pollution
Consequences

You Will Need

- Clipboards or writing surfaces
- Drawing materials
- Hand lenses (if available)
- Scissors
- Graph paper
- Tape

Background:

All habitats combine to form the biggest habitat of all—the earth. Because the earth is a finite system that supports a diversity of life, humans and animals depend on the continued functioning of the earth's system for their own survival. The limiting factor of a habitat to sustain living things is called carrying capacity. The Earth's carrying capacity is defined as the maximum population the planet can sustain indefinitely without reducing its ability to support future populations. The earth's population is growing by 90 million a year and the United Nations expects it to reach 11.5 billion early in the twenty-second century (Douglas).

"Since 1950, the world's population has more than doubled and its economic output has increased almost six fold. In that time, the world water use, and demands for grain, firewood, beef and mutton have tripled, and fossil fuel use has nearly quadrupled (Facing the Future)."

Human expansion and development can cause some unique problems for humans, animals and the environment. Human activities need to be in harmony with the environment and must consider the ability of the earth to provide food, water, shelter and enough space for all. Pollution hurts the long-term health of the environment and imposes costs on our ecological and economic systems.

The earth has a carrying capacity and can only support a limited number of humans and other forms of life without reducing its ability to support those populations into the future. The ability of the earth to sustain ever-increasing populations vying for diminishing resources will depend upon the choices humans make about lifestyles, consumption, and political and social priorities. The choices have economic, ecological and social/ecumenical consequences.

Getting Ready:

Prepare for a field trip on the school grounds.

Prepare an aerial view of the school yard on a bulletin board. Make four copies for each group of the Trailers (H 5), and enlarge as needed. Make enough copies of the Choices and Consequences questions (H 3), for each student. Prepare an overhead transparency of the questions for use in a classroom discussion. *If using the provided school yard map (H 4), make copies of the map for each group.*

Activities:

Activity 1

1. Divide the class into 3 or 4 teams and conduct the schoolyard field trip as described in the previous lessons.

2. Have students construct a line or bar graph using a key to illustrate their data. Have students complete their drawings of the animals and attach them to the schoolyard bulletin board in the proper habitat.

3. Discuss with students the carrying capacity of the schoolyard. Ask the students if they think the school grounds can hold more animals and where would more animals live? Where would they get their food and water?

Activity 2

1. Make an aerial view of the school and grounds on a bulletin board. Review what each element on the map is and where the various habitats the students have been investigating are located on the schoolyard. Or, if desired, use the provided school yard map (H 4) as an aerial view. You may wish to make copies for each group to have a map.

2. Describe the case /problem and explain to student that they will be conducting a land use simulation that includes locating some mobile classrooms on their school yard. Tell students that their community has grown in population very rapidly and the school must find room for more students. The school leadership has decided to use mobile classrooms (trailers) to accommodate the new students. However, they have not been able to decide where to put the mobile classrooms. They have asked for the students' help. It is their job to select a location on the school grounds for four mobile classrooms.

   Students will need to locate them in a safe and convenient place. Not all four trailers have to be in the same part of the schoolyard, but they should be close enough to the main building to allow students to use the cafeteria and rest rooms. Students will be working in several problem-solving teams of four members each to come to the best decision for everyone. As students debate their selections, give all members of the team the opportunity to express their ideas. All members of the team must agree on the location.

3. After the teams make their decision, students need to examine the possible effects of their decision. Complete the Choices and Consequences questionnaire (H 3). Students will prepare a presentation to the rest of the class on their solution which includes placing the mobile classrooms on the bulletin board map and explain why it was placed where it was. Each member of the team needs to be part of the presentation.

4. Divide the class into teams of four and have each team discuss. Distribute 4 trailers to each group. *Distribute provided map of school yard to each group if using this map.* Students need to decide on a solution. All members of the team must agree on their choice.

5. When the team has agreed on their solution, have each team make a presentation on their solution and place the mobile classrooms on the school yard bulletin board. If using provided map, teams should present their map with placed trailers.

6. Using a transparency of the Choices and Consequences questionnaire (H 3), examine the consequences of the various placements of the mobile classrooms. Explain to students that every problem may have more than one solution. One of the ways we decide which solution to select is to look at the consequences of each choice. The consequences can be positive and negative. Discuss each team's solution and the ecological, economic, and social/ecumenical aspects of their choices. For example, if the trailers are located on the soccer field, the positive economic consequences would be that the school sports fund would have more money because it is not buying soccer equipment. The negative economic impact is the sporting good store will have reduced sales. The positive ecological consequences are the buildings are not permanent and can be moved. However, placing them on the school grounds means a loss of habitat and creatures. The social/ ecumenical consequences are that the students can not play soccer on the school grounds. There probably is not a positive social impact.

7. Following the presentations, have the students write a short paragraph on the solution they liked best and why.

Enrichment:

1. Have students research local census data and determine the populations of their community and the state over the past 100 years. Graph the results. Write a paper on how the local economy, ecology and society changed during that time.

2. Develop a skit on three ways students can reduce the environmental impact of their activities on the school grounds, in their homes, neighborhood, and community. Present the skit to other classes.

3. Write a skit or story from the point of view of one of the animals on the schoolyard. Include information on whether the schoolyard meets their needs. Include dialogue on what will happen to them when the mobile classrooms are moved in. Discuss the pros and cons of each viewpoint.

Assessment:

1. Assess student contributions to the class discussions and observations.

2. Evaluate student abilities to contribute to group discussions and seek the ideas and opinions of others.

3. Examine the graphs for accuracy.

4. Assess the student's understanding of the consequences of their problem solving case.

References:

Douglas, Carole. "Images of Home." *Wilderness Magazine*, Fall 1993, p.14.

Facing the Future Website: *The Carrying Capacity Debate*, www.facingthefuture.org

Resources:

Cohen, Joel. *How Man People Can the Earth Support*. (W.W. Norton), 1995.

Miller, G. Tyler. *Living in the Environment*. (California: Wadsworth Publishing Co.), 1992.

www.facingthefuture.org
Information on the earth's carrying capacity

www.popinfo.org
Population information

www.nwf.org/international/pop/
National Wildlife Federation population page

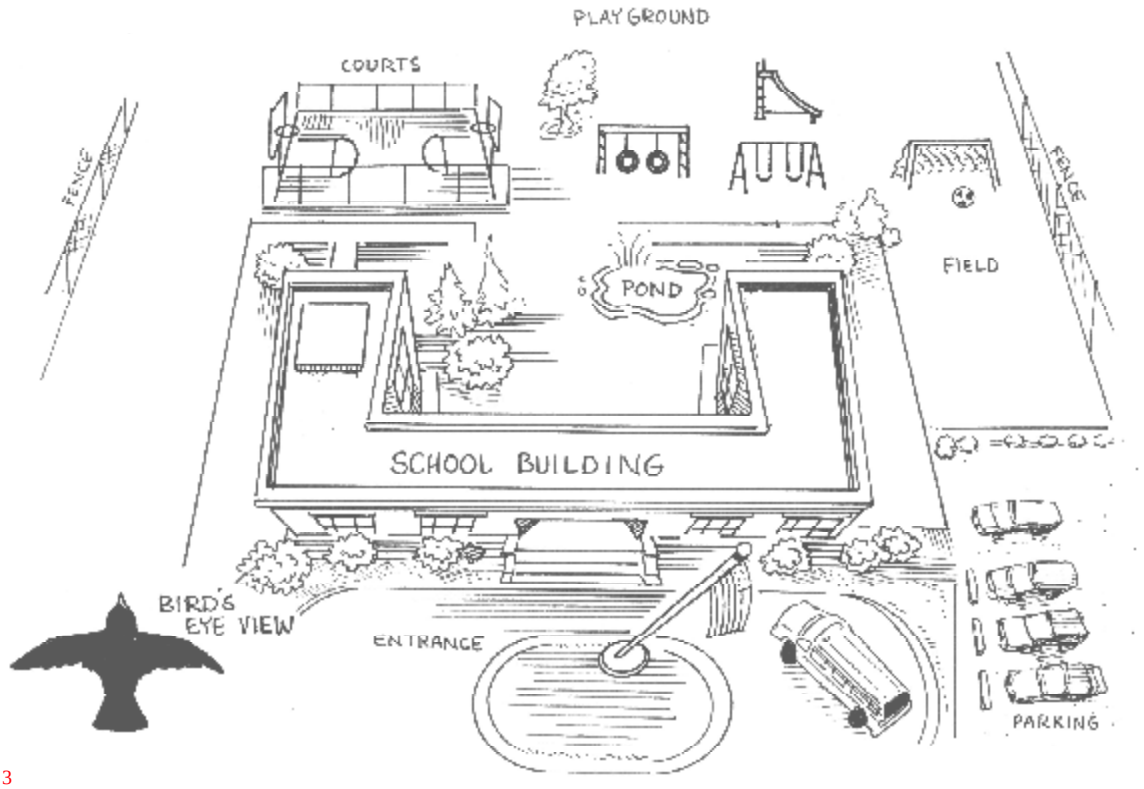
www.prb.org
World population data sheet

www.worldbank.org
World Bank Homepage

CHOICES and CONSEQUENCES

Questions to Consider When Locating Mobile Classrooms

1. What habitats will be affected by placing the trailers at different locations?
2. What creatures will be affected?
3. Will the creatures have more or less space?
4. Will their food and water be affected?
5. If you put the trailers on the soccer field, where will you play soccer?
6. If you put the trailers on the parking lot, where will you park the cars and school busses?
7. What are the consequences of not using the mobile classrooms to house the extra students?
8. What will the impact on the environment be with so many more students?
9. Who in the community will benefit from the expanding school?
10. What are some of the negative effects to the community?



FENCE
FIELD
PARKING
PLAY GROUND
AUJA
POND
SCHOOL BUILDING
COURTS
ENTRANCE
BIRD'S EYE VIEW
FENCE

Trailers for Schoolyard