**Can You Survive The Habitat?**

**Objective:**

Students will be able to

* Explain the importance of an organism’s habitat by listing what the habitat provides the species.
* Demonstrate the importance of carrying capacity within a habitat.
* Identify factors that can change a habitat so that it no longer is able to support its species.
* Identify ways that human activities can contribute to the destruction of a habitat.
* List things that plants and animals need to survive in their habitats and predict what will happen to a plant or animal that is deprived of any of these elements in their habitat.

**Big Idea:**

In a role-playing simulation, students act as species in a habitat trying to survive by collecting cards that represent all of the essential habitat services: water, soil, shelter, space, air, and food

**Setting the Stage:**

Students need to understand that a habitat is an area that provides water, soil, shelter, space, air, and food for various species. Plants as well as animals depend on specific habitats to survive. Every habitat has a carrying capacity for the number of species that can be supported by that habitat’s resources. Often, human impact interferes with or destroys these habitats.

**Next Generation Science Standards (NGSS)**

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

**Other Common Core Standards:**

CCC.ELA.LITERACY. W.5.8- Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

**Science and Engineering Practices in the Next Generation Science Standards**

This lesson addresses the *first* Science and Engineering Practices in which students *ask questions and define problems*. Throughout the activity, students must formulate questions such as, “What other resource do I need to survive?”, “Do I collect everything I need to survive?”, and “Is my habitat able to support all of us?” In addition, this lesson also addresses the *eighth* Science and Engineering Practice where *students obtain, evaluate, and communicate information*. As the students go through a role-playing simulation, they obtain relevant information about the significance of resources needed in a habitat for living organisms to survive. Then, they use this understanding to evaluate the kind of disturbance that affects the habitat based on the resources that appear to be depleted. In the end, students communicate the information they learned through a drawing of a habitat that undergoes change.

**Structure and Function**

In this lesson, the students understand that the habitats consist of important resources that are vital to the lives of plants and animals that live in that environment. This is significant information for the students to fully understand because it will help them make observations of the habitat they live in during the activity and decide whether that habitat is viable or not, based on the amount of resources available for them to survive. Furthermore, students also understand the significance of carrying capacity of a habitat and the impact that human activity can have upon that environment.

**Background Knowledge:**

Students may have already learned about the different kinds of resources that we can find on Earth and their significance to the environments and living organisms. Students may already be aware of what natural disasters are and their impact on the environment. Students have basic knowledge about the structures of individual plants and animals from their kindergarten and first-grade science units.

In this unit they will learn about the different habitats that plants and animals live in and the basic elements they need to stay alive. (Adapted from Next Generation Science Standards [NGSS]). Students will learn that plants need light, air, water, minerals, favorable temperatures, and a mechanism to disperse seeds to survive, while animals need food, water, air, shelter, and favorable temperatures to survive. Students will use their developing literacy skills to gather information about the types of plants and animals that are typical of different environments such as the temperate forest, desert, tropical rainforest, grassland, arctic, and aquatic environments. Students may have already had practice with making observations and comparisons from previous grades.

**Materials:**

* Pencil and eraser
* Science Notebooks
* Hula hoops or rope (1 per group of four)
* Habitat cards (provided, 4 sets per habitat)
* Space for groups to spread out (can use outside as well)

**Roles:**

The students will be broken up into groups of 4, they will be counted off randomly.

***Materials Manager/Traveler (SPY):*** The person with the earliest birthday will be in this role. Their job is to grab any necessary materials that the group will need for their experiment and can also be a **“Spy”** and look at what other groups are doing and get information. (Look for teacher for instructions on what materials to get)

***Checker:*** The person with this role is in charge of checking the groups’ work and asking the teacher for any help or to answer any questions the group has. This person is also allowed to refer back to notes in the science notebook for help. (Remember the teacher is there to HELP you! Don’t be shy, come up and ask!)

*R****ecorder/Illustrator:***This person's role is to write down any important information such as directions or clues the teacher gives. This person will also be the **recorder** for the discussion questions later in the lesson. The whole group should assist the recorder in coming up with answers to the questions.

***Observer/Encourager:*** The person with this role will work along with the materials manager and help observe what people are doing. They will also be the encourager for their group and cheer them on as they go through the experiment.

The instructor/ facilitator begins this activity by assigning the materials manager/spy, checker, recorder/reporter, illustrator/observer. The materials managers will be provided with the items the groups need for the activity.

**The 5-E Framework**

**ENGAGE** (5 MINUTES)

***Checker’s Role:*** Lead your team in recalling what we have already learned about habitats. Students can look over any notes at this time. Review the term habitat and list the six characteristics of a good habitat – water, soil, shelter, space, air, food. These are printed on the Habitat Cards. Ask the students to name some animal species that live in particular habitats. Explain that the hula hoops on the floor represent habitats.

**EXPLORE** ​​​​​​​​​ (15 MINUTES)

***All groups Role/ Materials Manager:*** Lead your team in discussion about the questions.

Have students create their own questions or give them a list of the questions listed below.

Give directions for the lesson they will be doing. Students can observe and ask questions-

What questions do they have about the items? The materials manager will also get any necessary materials during this time. Make habitat areas using either hula hoops or circles of rope.

Initially there should be a habitat for each group of four students. Place four sets of Habitat Cards (24 cards total) inside each of the circles (habitats). These can be scattered in the circle, face up.

**Developing Questions** (10 MINUTES)

***Recorders/ Encourager Roles:*** Lead your fellow students in understanding that they will conduct an investigation while students collaborate in groups. Other questions include:

1. What are the characteristics of a healthy habitat, one that would make a good home for a species to live? *The characteristics are water, soil, shelter, space, food, and air.*
2. Can you think of a specific habitat and a species that lives there? Suggest that the students look outside or think about some place they visited on a field trip. *Possible answers: a woodland and a squirrel lives there, or a pond and a green frog lives there.*
3. Ask the students to help describe all the characteristics of the habitat that help the species survive. *Possible answer: If a squirrel lives in a woodland, the woodland has soil that allows trees to grow which provide food and shelter. Rain provides water for the soil and the trees, then the squirrel can chew on the buds and leaves for additional moisture. There is space for the squirrel to run around and collect what it needs.*
4. What do we as humans do to change the habitat for these species? *Answers will vary but may include: cut down trees, kill off the predators so there are too many squirrels for the limited resources, remove woodlands to build a new shopping mall or other buildings.*
5. How can we work to make sure that there are good habitats for the species that live in them? *Answers will vary but may include: recycling paper so we don’t need to cut down more trees, getting more natural areas zoned for habitat protection, preventing pollution and litter in habitat areas.*

**Independent Working Time**

***All Roles:***

1. Tell the students that only four animals/plants can survive in each habitat without it becoming too crowded or its resources becoming depleted.
2. Explain that when you give the signal, each person should go to a habitat, but that only up to four can live in each of the habitats.
3. Have the students find a habitat, allowing for cooperation among the students, so that only four are in each habitat (if the number of students isn’t a multiple of four, you will have one or two habitats with only three students)
4. Tell the students that they should look at the cards and collect what they need to survive. When all students find the cards they need, ask them if their habitat is healthy enough for them to all survive. Note: At this point in the simulation, each habitat should be healthy enough for all to survive since there are sufficient resources.
5. Have the students return their cards to the habitat area. Then have them leave their habitats and face away from the habitat area. Create some kind of disturbance in the habitats, so that they are no longer able to support all the species that live there. To do this, remove some of the cards from each habitat. Tell students what the disturbance is – it could be a natural disaster or land development.
6. Ask the students to return to their habitats. They can return to the same habitat or choose a different one. Tell the students that once again they need one of each card to be able to survive. If a participant does not have one of each of the cards, he or she steps away from the circle because he/she can no longer survive. Discuss what might have caused the cards to disappear. Examples: take away some water cards because there is a drought or the water has become polluted; take away some shelter cards because trees have been cut down or meadows have been mowed.
7. Once again have the groups leave their habitats and face away from the area. This time an entire habitat will be destroyed (remove a hula hoop and all the cards inside it). Have the students go back to a habitat area, reminding them that the carrying capacity is four per habitat. Some students will be without a habitat.

**Answering Questions** (10 MINUTES)

***All Roles:*** Record responses to all questions in their science notebook. Groups are permitted to share their questions, so other groups can see and hear their peers' responses—Traveler (Spy). Form and record the hypothesis- Problem-posing [Students are asked: write a hypothesis using an "IF and Then" statement]. Students can stay focused on completing the task by asking the students with habitats if those without habitats can join their habitats. (No) What will happen if they allow more species in their habitat? (The plants/animals that are already living there will run short on resources.) Here is a good time to discuss carrying capacity, showing how by destroying an entire habitat (clear cutting or building homes) another habitat can also be destroyed as more species compete for limited resources.

**Closing** (5 MINUTES)

**All Roles:**

Students will draw two pictures of a habitat, one picture will be of a habitat at a normal setting, and one after a natural disaster. On their first drawing, the students will label the aspects of the environment that make it a good habitat for a single animal of their choice. On their second drawing the students will also label how the habitat changed. On the back of their illustrations, they will explain their drawings of their habitats as well as the specific changes that occurred due to the natural disaster they decided to apply. At the very end of this lesson, students will fill out the “rate your mate” checklist.

**Collaborative Project Peer Assessment:**

Each group will have to come up and explain what they think they did well on, what their struggles were etc., then the class will give each group a different cheer.

***Rate your mates Checklist***

**Directions:** Put a checkmark on each box for what this person did in your group. You will fill one of these out for each person in your group including yourself.

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name of Checker:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 |
| Work | Did very little during work period | Did most of the work assigned to the team | Did all work assigned to him/her well | Graciously accepted extra work |
| Organization | Did their own thing | Followed directions | Helped organize the group | Took charge and organized the group |
| Contribution | Held our group back | Helped our group succeed | Our group was better because of him/her | Group was much better because of him/her |
| Motivation | He/she prevented me from doing my best | He/she expected too much from me | He/she pushed me to be better | He/she brought the best in me |

Total Score:\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Group members Overall Performance/ Comments :

**Habitat Cards**

|  |  |  |
| --- | --- | --- |
| Water | Shelter | Food |
| Soil | Space | Air |