



Science Objectives

- Students will describe and identify the survival needs for both plants and animals.
- Students will simulate what will happen to a population when limiting factors in its environment are manipulated.
- Students will match an animal with its appropriate feeding type, water requirements, and living space.
- Students will analyze the impact humans have had on different environments.

Vocabulary

- Biomes
- Limiting Factors
- Carnivore
- Autotroph
- Herbivore

About the Lesson

- This lesson will have students analyze the different limiting factors that allow an organism to thrive in a particular environment.
- As a result, students will:
 - Understand that there are different biomes on Earth, each with its own unique limiting factors which provide specific species what they need to survive.
 - Manipulate environmental factors and analyze what happens to a population if placed in an unsuitable environment.
 - Evaluate the impact humans have had on different biomes around the world.



TI-Nspire™ Navigator™

- Send out the .tns file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.
- Enter items as appropriate for use of TI-Navigator.

Activity Materials

- Compatible TI Technologies: TI-Nspire™ CX Handhelds, TI-Nspire™ Apps for iPad®, TI-Nspire™ Software



Tech Tips:

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>

Lesson Files:

Student Activity

- Needs_of_Living_Things_Student.doc
- Needs_of_Living_Things_Student.pdf

TI-Nspire document

- Needs_of_Living_Things.tns



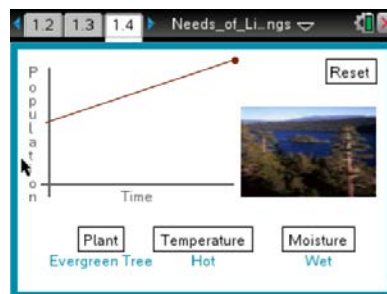
Discussion Points and Possible Answers



Move to pages 1.2 – 1.3.

1. Have students read through pages 1.2 and 1.3 in the .tns file as well as the background information on their activity sheet as it reviews what limiting factors are and how they impact the survival of an organism. Page 1.3 will also give instructions on how to complete the simulation on page 1.4.

Move to page 1.4.

2. On this page, students will see four buttons—Plant, Temperature, Moisture, and Reset.
 - Each time they select the Plant button, a different plant will appear.
 - The same thing goes for Temperature and Moisture.
 - Once all three variables have been selected, a new button will appear, Show Population.
 - When the student selects Show Population, a graph will appear showing the change in population of that specific plant over a period of time.
 - Select the correct conditions and the plant population will increase; select the wrong conditions and the plant population will decrease.



Tech Tip: Students can also modify the variables by selecting , the desired variable, and then the desired option. Students may need to back-out to the main Tools Menu  to see the desired menu option.

Have students go through the simulation, attempting all of the combinations before progressing onto the subsequent pages to answer the questions.

Move to page 1.5.

3. Before moving onto the questions, students will read this page which discusses biomes. It gives the student some background knowledge about the four biomes discussed in the previous simulation, which includes boreal forest, temperate forest, tropical rainforest, and desert.

Move onto pages 1.6 – 1.9.

Have students answer questions 1 – 4 in the .tns file, the activity sheet, or both.



- Q1. Of the four different kinds of plants, which plant is most capable of adapting to a variety of living conditions?

Answer: A. Evergreen Tree

- Q2. In which biome would you most likely find a willow tree?

Answer: C. Temperate Forest

- Q3. Palm trees are typically found in a sub-tropical or tropical climate. Which conditions most accurately describe a tropical climate?

Answer: B. hot and wet

- Q4. Name three limiting factors in a Hedgehog Cactus' environment.

Sample Answers: Answers may include temperature, moisture, sunlight, or type of soil.

Move to page 2.1.

4. Have students read through page 2.1. It explains how to complete the simulation on page 2.3. On page 2.3, students will see four different buttons, similar to the ones they saw in the previous simulation. This time, the four buttons are Feeding Type, Biome, Living Space, and Reset. Again, they will be able to manipulate the limiting factors in this simulation.
- Once they have selected the buttons and selected their three variables, another button will come up indicating Show Animal.
 - This time, they manipulate the environment and an animal that is adapted to those living conditions will be displayed on the screen.
 - Once they have seen their animal, students can select the Reset button and try a different combination.
 - Have the students explore the different conditions before moving on.

Move to page 2.2.

5. Have students read through page 2.2. It reviews key vocabulary the students will need to know in order to fully understand the simulation.



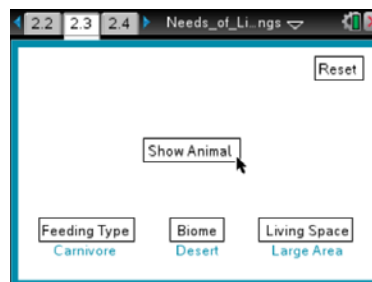
Move to page 2.3.

6. On Page 2.3, students can manipulate the three major categories including Feeding Type, Biome, and Living Space to show a specific animal that lives in that particular region.

- Feeding type is broken down into three options including carnivore, herbivore, and autotroph.
- Biome is broken down into three options including desert, lake, and swamp.
- Living space is broken down into 2 options including minimal area and large area.

Note: Once students have made a selection in all three categories a new button will appear displaying Show Animal. Have them select Show Animal to display the animal that best fits with the limiting factor choices they made.

- They can restart the simulation by selecting the Reset button on the top right corner of the screen.



Move onto pages 2.4 – 2.11.

Have students answer questions 1 – 4 on the device, the activity sheet, or both.

Q5. Which of the following animals is NOT an example of a carnivore?

Answer: C. macaw

Q6. Which term best describes an organism that is capable of producing its own food through photosynthesis?

Answer: C. autotroph

Q7. Which of the following organisms would most likely be found in a desert?

Answer: A. lizard

Q8. According to the simulation, which environment best fits a coyote's needs?

Answer: B. desert, large area

Q9. Which organism in this simulation is most acclimated to a variety of living conditions?

Answer: D. grass

Q10. Pick an animal and indicate at least three things it needs in order to survive. Place both parts to



your answer below.

Answers may include: (Animal) and energy source, sufficient water resource, suitable temperature range

Q11. Using what you have learned from both simulations on pages 1.4 and 2.3, what would most likely happen if an organism was removed from its natural environment? Why?

Answers may include: An organism removed from its natural environment would have a hard time surviving due to differences in climate, food sources, water availability, etc. Some exotic species, however, become invasive in habitats other than their own because they have characteristics that enable them to survive.

Q12. Living organisms have a direct relationship with the environment they live in. How have humans affected the natural environments of other organisms?

Answers may include: overuse of natural resources, climate change, human population increase

Extension

On a separate sheet of paper design your own ecosystem using one of the four major biomes listed in this activity (boreal forest, temperate forest, tropical rainforest, and desert). Include at least six organisms in your drawing and indicate how each organism is dependent upon one another.



TI-Nspire Navigator Opportunities

Throughout the simulation, discuss the activity with students using live presenter. You can also monitor student progress using the class capture feature. At the end of the simulation, collect the .tns files and save to Portfolio and review the students' responses as a whole class discussion.

Wrap Up

When students are finished with the activity, retrieve the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using the Review Workspace.

Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.
- Summative assessment will consist of questions/problems on the chapter test.