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| **Science Objectives** * Students will develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
* Students will describe the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.

**Vocabulary*** Producer
* Primary Consumer
* Secondary Consumer
* Tertiary Consumer
* Decomposer
* Food Web
* Ecosystem

**About the Lesson*** In this lesson students result, students will:
* Describe the flow of energy through an ecosystem
* Explain the role of each individual in the transfer of energy in an ecosystem.

**TI-Nspire™ Navigator™*** Send out the .tns file.
* Monitor student progress using Class Capture.
* Use Live Presenter to spotlight student answers.

**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** Aquatic\_Food\_Webs\_Student.doc
* Aquatic\_Food\_Webs\_Student.pdf

*TI-Nspire document* * Aquatic\_Food\_Webs.tns
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| **Discussion Points and Possible Answers**Have students read the background information stated on their activity sheet. |
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| **Move to page 1.2.** |
| 1. After reading the instructions on page 1.3, students should then close the directions box by selecting .2. Move the organisms on the left by dragging and dropping them on the correct label. If the organism correctly matches its ecosystem label the border of the label box will turn green. 3. Once the organisms are in the correct position, click on two different organisms to show their ecological connection. Click on the organism that provides the energy first and then click on the organism in which the energy is transferred. There should be 10 connections.  |  |
| **Tech Tip:** To access the Directions again, select **> Directions** |
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| 4. The students should get a final food web listed to the right. When all the ecological connections have been made correctly a Gold Star and “Nicely Done!” will appear.  |  |
| **Move to page 1.3.**Have students answer questions 1-13 on the device, the activity sheet, or both. |
| Q1. Identify the ecological relationship of each the following organism: Algae**Answer:** A. ProducerQ2. Identify the ecological relationship of each the following organism: Sea Star**Answer:** B. Primary ConsumerQ3. Identify the ecological relationship of each the following organism: Grunt**Answer:** C. Secondary ConsumerQ4. Identify the ecological relationship of each the following organism: Dolphin**Answer:** D, Tertiary ConsumerQ5. Identify the ecological relationship of each the following organism: Crab**Answer:** E. DecomposerQ6. Identify the ecological relationship of each the following organism: Jellyfish**Answer:** B. Primary ConsumerQ7. What organism(s) gives the crab energy? (Multiple answers possible)**Answer:** All ChoicesQ8. What organism(s) gives the Jellyfish energy? (Multiple answers possible)**Answer:** A. AlgaeQ9. What organism(s) gives the Sea Star energy? (Multiple answers possible)**Answer:** A. AlgaeQ10. What organism(s) gives the Dolphin energy? (Multiple answers possible)**Answer:** E. GruntQ11. What organism(s) gives the Grunt energy? (Multiple answers possible)**Answer:** Jellyfish & Sea StarQ12. What is the main source of energy for all living things? **Answer:** The SunQ13. What does a food web tell us about an ecosystem? **Sample Answer:** A food web shows the flow of energy through an ecosystem**.**  |

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| **TI-Nspire Navigator Opportunities**Make a student a Live Presenter to illustrate show how to move the sliders. Throughout the activity, monitor student progress. At the end of the activity, collect the .tns file and save to Portfolio.  |

**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 Slide Show.

**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 could consist of questions/problems on the chapter test or a performance assessment in which they create their own food web.