

Bonefish: Feeding Frequency

Objectives:

At the end of the lesson students will be able to explain how energy is passed between organisms in a food chain and a food web. Students will be able to explain the idea of ecological niche and energy transfer.

Differentiation:

How about this instead: Having students work in heterogeneous groups will allow for students to work as a team to complete tasks, and allow for each student to complete different parts of the task based on their own readiness and unique skills and talents. Students who might experience issues with writing in the limited space allocated may use an open sheet of paper to write their answers for the vocabulary or have a group member act as a scribe for the group.

Lesson background:

Bonefish are ecologically important species and are often found in varying habitats in warm waters around the world. Bonefish have different dietary needs throughout their lifecycle. During their juvenile and adult life cycles they rely on shallow grass flats, mangroves and near shore reefs to get the energy that they need. The bonefish diet is a great example of the many consumers and producers present in these habitats and this is a perfect species to use to teach food chains, food webs, animal niches and dependency. This lesson does exactly that. Using the reading on bonefish (both student and teacher versions for their respective audiences and abilities) and the reading on consumers and producers the students should be able to complete the vocabulary and also their group food chains. These chains are then combined as a class into a larger web. This combination will show the students that individual food chains create these larger and more complex webs. The students will also be able to connect their new knowledge to appreciate and recognize that each organism plays an important role in the chain and web.

Florida State Standards (NGSSS)

- SC.4.L.17.2: Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.
- SC.4.L.17.3: Trace the flow of energy from the sun as it is transferred along the food chain through the producers to the consumers.
- SC.4.L.17.4: Recognize ways plants and animals, including humans, can impact the environment.

National Standards (NGSS)

- 5-LS1-1: Organization For Matter & Energy Flow in Orgs
- 5-LS2-1: Cycles of Matter & Energy Transfer in Ecosystems
- 5-PS3-1: Energy in Chemical Processes & Everyday Life

Instructional Materials Needed:

- Flats Vocabulary sheet
- Food Web cards (one set per group)
- Scissors, Pencils, Glue
- Paper for food group food chain to be glued onto



Activity:

Bonefish: Feeding Frenzy

Procedure:

- The class should be started off with the important vocabulary words that are listed under “Fishing Flat Vocabulary” document. These words are likely new to the students and would need to be covered with the teacher prior to the reading exercises.
- Break the class into small groups of 4 and have the students read the bonefish student document. *“Rally reading” is a great reading strategy to use for this document. One student reads a paragraph and then another the next and so on.*
- Here, there is some flexibility depending on the needs of classroom. The teacher may choose to discuss the Producer and Consumer document as a class and write key words on the board, or have the class continue reading the Producer and Consumer document in groups.
- The teacher should have the students fill in their “my cue” section of the vocabulary after they have finished the reading. This is their own explanation of what each vocabulary word means. After the students have completed reading and their vocabulary sheet, the teacher should start the food web activity.
- Each group should get their own food chain to complete. Alternatively, you may have the class brainstorm different aquatic animals they know, make a list on the board, and ask the students to draw their animals. This can be independent of or in addition to the included food web cards.
- Using what they have studied about food chains and webs, they should work hierarchically through the chain, putting the cards in order of primary producer to top consumer. Students should be prepared to individually answer questions about their food chains that are created within the group. Each student should understand how the parts connect and be prepared to describe the energy flow if called upon.
- As they are getting their chains in order, the teacher should provide individual group feedback. The teacher should pay attention to group dynamics and assure that all group members are participating. The students should underline or highlight any words or facts that they are struggling with for clarification post reading.
- The food webs are chains that interconnected. After all groups are finished with their chains, each group should share their food web and the teacher may use this opportunity to talk more about food webs. Then, using tape or magnets, the teacher should ask each group to come and hang their food chains in a manner so that it creates a food web. One way to proceed is to have two groups come up at a time and interconnect the arrows of energy transfer between their individual food chains and then invite two more groups up to then to present their interpretation.

Name: _____

Date: _____



Bonefish: Feeding Frenzy

Looking at your food chain answer the following questions:

1. Looking at your group's food chain, how many "living things" are in the chain you created? _____
2. When a crab is eaten by a bonefish, what happens to the energy of the crab that was eaten? Explain what happens using your own words.

3. Looking at your chain, if one of your living things was no longer there how would it impact your food chain? What other creatures in the food chain would still be able to eat, and what would not?

4. Who were the producers in your food chain?

5. Who were the primary consumers in your food chain?

6. Who were the secondary consumers in your food chain?

Looking at your class food web answer the following questions:

1. Looking at your entire class food web how many living things are in the entire web?

2. How many chains do you see within your class's food web?

3. If you took out one of the food chains how many animals would be impacted?

4. Does each living thing play a role in the balance of the food web? Explain your answer.

5. How do environmental issues like extinction of a species impact a food web in a habitat? Explain your answer.

Name: _____

Date: _____



Fishing Flats Vocabulary



| WORD | MEANING | MY CUE |
|-----------------------|---------|--------|
| Angler | | |
| Elusive | | |
| Spawn | | |
| Spawning Aggregations | | |
| Broadcast spawning | | |
| Cell Division | | |
| Larvae | | |
| Flat | | |
| Transparent | | |
| Juvenile | | |
| Sub-adult | | |

Activity Rubric:

| Area | 1 Does not meet expectations | 2 Partially meets expectations | 3 Meets expectations | 4 Exceeds expectations |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Science Content | NONE of the cards interlink to create a food chain. The group does not have the chain moving from producer to consumer in the correct order. | SOME of the cards interlink to create a food chain. The group has some of the chain moving from producer to consumer in the correct order but there are major problems. | MOST of the cards interlink to create a food chain. The group has most of the chain moving from producer to consumer in the correct order. | ALL of the cards interlink to create a food chain. The group has all of the chain moving from producer to consumer in the correct order and can explain in detail why the organisms interlink. |
| Use of science vocabulary | NONE of the introduced scientific vocabulary is adequately defined in the vocabulary portion of the activity and the answers on the worksheet are lacking entirely or incomplete. | SOME of the introduced scientific vocabulary is not adequately defined in the vocabulary portion of the activity and the answers on the worksheet are lacking or incomplete. | MOST of the introduced scientific vocabulary is adequately defined in the vocabulary portion of the activity and the answers on the worksheet are complete. | ALL of the introduced scientific vocabulary is adequately defined and extremely detailed in the vocabulary portion of the activity, connections are present in the writing and the answers on the worksheet are complete and detailed in their explanation. |
| Writing fluency | Writing flow and errors in sentence structure are multiple, making the activity close to impossible to comprehend. | Writing flow and errors are evident, but few, and make the activity difficult to comprehend. | Writing flow and errors are few, and the activity is easy to read and understand. | Writing flow and errors not present, and the activity is easy to comprehend and follow the information presented to the reader. |
| Conventions | Spelling, capitalization, and punctuation errors are numerous and make the written narrative impossible to understand. | Spelling, capitalization, and punctuation errors are evident and make the written narrative difficult to understand. | Spelling, capitalization, and punctuation errors are few. | Spelling, capitalization, and punctuation errors are completely absent from the writing. |