Authors: Rachel Shapiro & Melissa Williams

**Title of Lesson: Organism Interactions**

Date of Lesson: March 23rd, 2011

Length of Lesson: 100 minutes (two 50-minute class periods)

**Description of the Class:**

**Name of Class: Life science**

**Grade Level: 7th**

**Honors or Regular: 4th period is honors, 5th period is regular**

**Source of the Lesson:**

PBS Nature. (http://www.pbs.org/wnet/nature/lessons/symbiotic-strategies/activities/1495/)

http://www.sciencespot.net/Media/GoodBuddies.pdf

Concepts:

Introduction to the 5 kinds of organism interactions: predation, mutualism, commensalism, parasitism, competition. A relationship between two organisms where one organism benefits and the other is neither helped nor harmed is called commensalism (+,0). Some examples are the utilization of old gopher tortoise burrows by snakes, and barnacles on scallops. A relationship between two organisms where one lives on the other and benefits at the cost of the other is called parasitism (+,-). Some examples include ticks on dogs, heartworms in dogs, tapeworms in humans, and malaria in humans. A relationship between two organisms where they struggle against one another for space and the necessities for life is called competition (+,-).This can happen both between species, such as the competition between two animals for the same food source, such as zebra and antelope for plains grass, and within species, such as the competition between male cardinals for mates. A relationship between two organisms where one captures, kills, and feeds on the other is called predation (+,-). This can be seen between hunting species and their prey. Some examples include wolves and deer, ants and other insects, dolphins and fish. A relationship between two organisms where both benefit from each other is called mutualism (+, +). Some examples of mutualism include pollinator/plant interactions, as with bees and flowers, clownfish and anemones, dispersal of seeds through consumption of fruit.

Sourced from: Campbell, N. A., Reece, J. B., Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., & Jackson, R. B. (2008). *Biology*. San Francisco: Pearson, Benjamin Cummings. And various biology course lectures.

Performance Objectives:

Students will be able to:

1. Identify and describe the five kinds of organism interactions.
2. Compare and contrast the five kinds of organism interactions.
3. Develop a song including examples of each of the five kinds of interactions.

NGSSS for Science (including cognitive complexity):

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| **Benchmark Code** | **Benchmark** |
| SC.7.L.17.2 | Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism. *Cognitive Complexity/Depth of Knowledge Rating:* Moderate |
| SC.7.N.1.1 | Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, **analyze information**, make predictions, and defend conclusions.  *Cognitive Complexity/Depth of Knowledge Rating:* High |

Safety Considerations:

No likely safety issues are apparent.

Materials List and Advanced Preparations:

Materials:

48 copies of the exit slips for day 1. (Multiple slips per page; 24 slips/class.)

12 copies of Additional Practice worksheet.

48 copies of the entrance slip crossword for day 2.

6 copies of song rubric and instructions.

48 blue, 24 red, and 24 white index cards (or index card-sized pieces of paper.)

Materials available in class:

Individual notebooks

Large paper (1 per group)

Markers for each group

Advanced prep:

Day 1: The video needs to be pulled up ahead of time. The large papers should be on the tables before students arrive. The colored papers need to be sorted and bagged individually for each group.

Day 2: The crossword should be on the desks before the students enter the classroom.

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| **ENGAGEMENT Time: 10 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Have students watch 2nd and 3rd videos found at:  http://www.pbs.org/wnet/nature/lessons/symbiotic-strategies/video-segments/1496/  Essential Question: | Ask the following both before and after the video:  What are some ways that a shark might benefit from a fish (other than as prey)?  What are some ways that fish might benefit from a shark?  What kinds of relationships exist between the sharks and the fishermen?  What are the relationships between organisms and how are they alike and different? | [Fish could clean the shark/eat parasites on the shark.]  [They might get food. They might get a free ride. They might have a way to hide when hunting.]  [The sharks steal food from the fishermen. The fishermen sometimes provide food to the sharks. The sharks and the fishermen compete for the fish catch.] |

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| **EXPLORATION Time: 15 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Ask students to, as a group, come up with as many organism relationships as they can in the next 3 minutes using the formats similar to:  Organism A interacts with Organism B.  \_\_\_\_\_ eats \_\_\_\_\_  \_\_\_\_\_ use(s) \_\_\_\_\_\_ from \_\_\_\_\_\_  \_\_\_\_\_ needs \_\_\_\_\_ to \_\_\_\_\_  Examples include:  Wolves eat deer.  Snakes use abandoned burrows from rodents.  The Malaria parasite needs humans to reproduce.  Note: Tell students not to put more than two relationships from the same format. | How many interactions can you think of between organisms?  (Hint: think about animals in the video you just watched, and in the environments you learned about.) | [Student responses will vary.] |
| Specific instructions:  1) Along with the class, the teacher will model one of these.  2) By yourself, in your class notebook, write as many as you can think of in the next 5 minutes.  3) In groups, compare your examples and pick 5 to write on the large group paper. | 1) Could someone name an organism? (Ask the whole class. Get two.) How could these organisms interact? (Ask whole class. Get up to three different answers.) |  |
| Write (+,+), (+,0), and (+,-) on the board. Explain to students that:  (+,+) is a relationship where both organisms benefit. Explain that, for the next activity, a “+” will be represented by a blue card.  (+,0) is a relationship where one organism benefits and the other is unaffected. Explain that, for the next activity, a “0” will be represented by a white card.  (+,-) is a relationship where one organism benefits and the other is harmed. Explain that, for the next activity, a “-“ will be represented by a red card. |  |  |
| Ask students to write the corresponding symbols next to the relationships they described on their large group sheets. Tell students to be ready to explain their reasoning for each one.  While all groups are finishing, give them a sheet (“Additional Practice”) to help them identify organism relationships.  Explain to them to work on it after they have 5 examples on their large paper.  This worksheet will be collected and handed back to them the next day. |  |  |
| Have students share one relationship from their large group page with the class.  Have other groups hold up colored index cards (blue for +, red for -, and white for 0) to indicate what kind of relationship they think it is. Tally these numbers on the board.  Then have the group explain which kind it was and why they thought that. If some groups disagree, as them to explain why they thought it was a different one. | Why do you think it is that relationship?  Does anyone disagree?  (If they do…) Which kind of relationship do you think it is? Why? | [Answers will vary.] |
| After every group has shared one, have a mini-game (3-5 rounds, depending on time) where everyone is given a relationship, and the groups hold up the colored cards saying which kind of relationship they thought it was.  Each group that gets it “right” gets a point. If a group doesn’t have the “correct” answer, they will be asked to explain why they thought that. If their explanation makes sense, then also give their group a point.  (These relationships will be taken from the “Good Buddies” activity. We don’t really want to say a student is flat-out wrong without checking their reasoning. Also, if the students have outside information on a topic, that could influence their answer. For example, a remora on a shark. A student might state that it is commensalism, with the remora benefitting and the shark being unaffected. But they could also think the remora is eating parasites or dead skin off the shark, and so it benefits both, making it mutualism. If neither of us knew the specifics of the interaction, that would make both of them perfectly acceptable answers with perfectly acceptable reasoning, and the students should not be denied a point for that.) |  |  |

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| **EXPLANATION Time: 15 - 20 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| After students have given their examples, explain that there are five kinds of interactions. |  |  |
| Explain the 5 kinds of interactions with examples of each. Be sure to write each one near the symbols on the board. | What does it mean if both organisms benefit from a relationship? Does anyone know the scientific term for that?  What does it mean for one organism to not be affected? Does anyone know the scientific term for a relationship where one organism benefits and the other is unaffected?  What does it mean for one organism to be harmed? Does anyone know the scientific term for a relationship where one organism benefits and the other is harmed? | [Students may or may not know. If they know, write the ones they know on the board next to their corresponding (+,+), (+,0), or (+,-) symbols.  Correct answers are:  Mutualism  Commensalism  Parasitism, Competition, and Predation |
| A relationship between two organisms where one organism benefits and the other is neither helped nor harmed is called commensalism.  A relationship between two organisms where one lives on the other and benefits at the cost of the other, without killing it, is called parasitism.  A relationship between two organisms where they struggle against one another for space and the necessities for life is called competition.  A relationship between two organisms where one captures, kills, and feeds on the other is called predation.  A relationship between two organisms where both benefit from each other is called mutualism. | Looking at your individual and group papers, do you have any examples of commensalism?  Looking at your individual and group papers, do you have any examples of parasitism?  Looking at your individual and group papers, do you have any examples of competition?  Looking at your individual and group papers, do you have any examples of predation?  Looking at your individual and group papers, do you have any examples of mutualism?  What is the difference between mutualism and commensalism?  Would a bird species that uses the abandoned nest of another bird species be an example of mutualism and/or commensalism?  Why?  Would a fish eating parasites and dead scales off a shark be considered mutualism and/or commensalism?  Why? | Student answers will vary, but some may include:  [Animals living in vacated burrows or nests of other animals, barnacles on scallops, cattle egrets on livestock.]  [Malaria, ticks, tapeworm, bacteria.]  [Grazing animals compete for grass, birds compete for nesting sites, many animals compete for mates.]  [Carnivores, omnivores.]  [Pollinators, intestinal bacteria, clownfish and anemones.]  [With commensalism, both organisms benefit. In mutualism, only one organism benefits without affecting the other.]  [Mutualism. The bird that made the nest is not coming back to it, and is not affected by another bird nesting there. The second bird doesn’t have to make a new nest.]  [Commensalism. The fish gets food that it doesn’t have to spend time and effort searching for, and the shark gets cleaned. Both of them benefit.] |

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| **ELABORATION (Day 2)\* Time: 50 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Show a Disney movie song clip, the Bare Necessities from the Jungle Book.  http://www.youtube.com/watch?v=TcglnY\_xGfc  (Note: This will be converted to an accessible format outside of youtube. It will also be only the first 1:45 of the song, ending with “Of all the silly gibberish.”) | Identify the relationships between the animals and their environments you observed in this clip?  (Continue to elaborate on their responses to lead them in the right direction to present our lesson.)  (If this was being taught in the unit, we would also ask, “Does anything in this video remind you of our previous lesson on limiting factors?”) | [Responses are expected to be seen about animal interaction and interactions with the environment and an animal’s food.]  [Point out food supplies and living space, etc. in the video.] |
| ACTIVITY:  Students will create their own song or skit, or poem both to incorporate the relationships between organisms.  The rubric will be given to the students along with the instructions.  The instructions will also be told to the students before they start. The rubric will be available to them the whole time they are working on it.  (See MW\_RS\_Activity instructions\_final) | What types of relationships do you know of that involve mutualism, predation, parasitism, competition, commensalism?  Is this helpful or harmful to the individuals involved? | [Mutualism: pollination, seed dispersal, coral reefs, lichen…  Predation: spiders and bugs, fox and rabbit, cheetah and antelope…  Competition: vultures over fresh kill with predator…(for food) living in a cave (area for protection/ living space.)  Commensalism: barnacles, shark and pilot fish…]  [Answers will vary.] |
| Explain after each group presents the relationships they saw within the group presentations. | What relationships did you all see in their presentation? Give specific examples from the song.  Defend your answers. | [mutualism, predation, parasitism, competition, commensalism. (Examples will vary.)] |

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| **EVALUATION Time: 5 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Have students complete the exit slip individually on Day 1. | On your own, state what kind of relationship is being described. Then write 1-2 sentences explaining why you think that.  1) A whale is unaffected by the attached remora fish feeding on the whale’s leftover food.  2) Spider crabs are camouflaged by the green-brown algae growing on their shells.  3) African ants living in acacia trees feed on leaf-eating insects found on the tree.  (If this was our actual project we would ask them to write about their animal and the environment it is in and identify the possible relationships for the formative assessment.) | [Commensalism.]  [Mutualism.]  [Predation and Mutualism] (Either will be accepted with correct explanation.) |
| Day 2: Have students complete the organism relationship crossword in groups at the beginning of class.  (This is a formative assessment to understand how much they retain from before. It is also a useful reference for them with the definitions for the vocabulary words.) |  |  |
| Day 2:  A rubric will be made and presented to the students to allow them to know what is expected from them from their skits.  Please see MW\_RS\_Activity instructions\_final for this rubric/set of instructions. |  |  |

\*If this were actually in the middle of a unit, instead of just a “drop-in” lesson, then the elaboration would consist of time for students to piece together the information as to which animals in their environment are doing to exhibit any of these relationships with regard to the pet. The animals found in the specific environment will need to be either looked up at this point and classified by relationship, or will have been looked up previously and will be classified by relationship.

The compare and contrast occurs during the exploration and explanation. When students are choosing the symbols for their interactions, they are comparing them with respect to what organism benefits and what organism is harmed. When students are defending their choices, they are also comparing, as they will explicitly have to state why it IS something and why it IS NOT something else.

This is very similar to the sample test item (http://www.floridastandards.org/Standards/PublicPreviewSampleTestItem401.aspx) where students are given an example, and then asked to choose between a list of 4 other examples and select which is the most similar. In order to do this, they need to put the relationship in terms of which organism is benefitting, which is harmed, and which is not affected. This is exactly what we’re doing in the lesson.

**LESSON REVISION**

Authors: Rachel Shapiro & Melissa Williams

**Title of Lesson:**  The Five **Organism Interactions**

Date of Lesson: March 23rd, 2011

Length of Lesson: 100 minutes (two 50-minute class periods)

**Description of the Class:**

**Name of Class: Life science**

**Grade Level: 7th**

**Honors or Regular: 4th period is honors, 5th period is regular**

**Source of the Lesson:**

PBS Nature. (http://www.pbs.org/wnet/nature/lessons/symbiotic-strategies/activities/1495/)

http://www.sciencespot.net/Media/GoodBuddies.pdf

Concepts:

Introduction to the 5 kinds of organism interactions: predation, mutualism, commensalism, parasitism, competition. A relationship between two organisms where one organism benefits and the other is neither helped nor harmed is called commensalism (+,0). Some examples are the utilization of old gopher tortoise burrows by snakes, and barnacles on scallops. A relationship between two organisms where one lives on the other and benefits at the cost of the other is called parasitism (+,-). Some examples include ticks on dogs, heartworms in dogs, tapeworms in humans, and malaria in humans. A relationship between two organisms where they struggle against one another for space and the necessities for life is called competition (+,-).This can happen both between species, such as the competition between two animals for the same food source, such as zebra and antelope for plains grass, and within species, such as the competition between male cardinals for mates. A relationship between two organisms where one captures, kills, and feeds on the other is called predation (+,-). This can be seen between hunting species and their prey. Some examples include wolves and deer, ants and other insects, dolphins and fish. A relationship between two organisms where both benefit from each other is called mutualism (+, +). Some examples of mutualism include pollinator/plant interactions, as with bees and flowers, clownfish and anemones, dispersal of seeds through consumption of fruit.

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Performance Objectives:

Students will be able to:

1. Identify ~~and~~ ,describe, compare and contrast the five kinds of organism interactions.
2. ~~Compare and contrast the five kinds of organism interactions.~~

2) Analyze information presented to them via video in order to recognize examples of organism interactions and identify proper reference materials.

1. Develop a song including examples of each of the five kinds of interactions.

NGSSS for Science (including cognitive complexity):

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| **Benchmark Code** | **Benchmark** |
| SC.7.L.17.2 | Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism. *Cognitive Complexity/Depth of Knowledge Rating:* Moderate |
| SC.7.N.1.1 | Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, **analyze information**, make predictions, and **defend conclusions**.  *Cognitive Complexity/Depth of Knowledge Rating:* High |

Safety Considerations:

No likely safety issues are apparent.

Materials List and Advanced Preparations:

Materials:

48 copies of the **entrance and** exit slips for day 1. (Multiple slips per page; 24 slips/class.)

48 copies of the exit slips for day 2.

~~12 copies of Additional Practice worksheet.~~

48 copies of the entrance slip crossword for day 2.

6 copies of song rubric and instructions. One for each group.

48 blue, 24 red, and 24 white index cards (or index card-sized pieces of paper.)

Large paper (1 per group)

**Crossword puzzles**

Materials available in class:

Individual notebooks

~~Large paper (1 per group)~~

Markers for each group

Advanced prep:

Day 1: The video needs to be pulled up ahead of time. ~~The large papers should be on the tables before students arrive.~~ The colored papers need to be sorted and bagged individually for each group.

~~Day 2: The crossword should be on the desks before the students enter the classroom.~~ Students will be given the crossword puzzle to take home as homework to reiterate what they learned for the day and come to the next lesson prepared and on the right mindset.

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| **ENGAGEMENT Time: 10 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Do Now: Three examples of relationships will be on entrance slip for students to answer at the beginning of class.  Have students watch 2nd ~~and 3~~~~rd~~ video~~s~~ found at:  http://www.pbs.org/wnet/nature/lessons/symbiotic-strategies/video-segments/1496/ | See Entrance Slip Document. This will see what students know already about organism interactions and will start having them think about the topic appropriately.   1. Ostriches and gazelles feed next to each other. They both watch for predators and alert each other to danger. Because the visual abilities of the two species are different, they can identify threats that the other animal would not see as readily. 2. Ticks will feed on a deer’s blood and the deer loses blood. 3. In Africa, zebras gather by the limited ponds during the dry season for water. Crocodiles wait in the water for a zebra to come close. They then snatch the zebra in their mouth and drag it under the water.   Ask the following both before and after the video:  Before video, say specifically to students, “I want you to analyze this video to determine some relationships there are between fish and sharks.”  What are some ways that a shark might benefit from a fish (other than as prey)?  What are some ways that fish might benefit from a shark?  ~~What kinds of relationships exist between the sharks and the fishermen?~~  After showing this video, ask the students if they thought this was a reliable source they used to gather their information from.  Show students the clip is from PBS.org and explain to them that PBS is an educational station and website. It used to be called National Educational Television.  Ask students: “Do you know what .org stands for? And is it a good source for information?”  How do you know if other internet sources are credible? | 1) Mutualism.  They protect each other from danger. Both benefit.  2) Parasitism.  The deer is harmed from losing blood and the tick is benefited by getting food.  3) Predation.  The zebras are harmed because they are eaten and the crocodiles are benefitted by getting food.  BEFORE VIDEO:  [Shark with a remora, fish hangs out on sharks back to get food and the shark doesn’t really care.]   * [+ effect because fish gets food and + shark gets cleaned and no one will mess with the shark]   AFTER VIDEO:  [Jack fish was catching a free ride from the shark]   * [+ effect because fish gets a free ride and shark is not really effected]   [The minnows would rub against the sharks skin to get off parasites]   * [+ minnows were groomed and the shark wasn’t effected at all. Maybe the parasites could hurt the shark too.]   [Yellow and black fish were getting the parasites off the shark by nibbling at it.]   * [+ for both of them because one is getting off parasites and the other is getting food.]   [Fish could clean the shark/eat parasites on the shark.]  [They might get food. They might get a free ride. They might have a way to hide when hunting.]  ~~[The sharks steal food from the fishermen. The fishermen sometimes provide food to the sharks. The sharks and the fishermen compete for the fish catch.]~~  [Yes, because it is a scientific video.]  [Yes, because you are the teacher and you wouldn’t teach us false things.]  [Yes, because I’ve already learned these things before from books and my teacher.]  [Yes, because it is common sense.]  [Stands for organization.]  [Must be an accredited source with citations.]  [Yes it is a good source because they have sources they have looked up information at.]  [.com (not always reliable)]  [.org or .gov (usually good sites)]  [Wikipedia is not reliable.]  [It’s good if there are reliable sources accredited at the end of the site.] |
| Essential Question: | What are the relationships between organisms and how are they alike and different?  The engagement will allows students to find out on their own with the help of the video and teacher’s assistance what relationships are +, -, or 0. (beneficial, negative, or no effect.) | [Student’s previous answers will determine if they are grasping this concept and through teacher guidance the students will be on the right track to begin the exploration on their own.] |

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| **EXPLORATION Time: 15 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Ask students to, as a group, come up with as many organism relationships as they can in the next 5 ~~3~~ ~~minutes~~ using the formats similar to:  Organism A interacts with Organism B.  \_\_\_\_\_ eats \_\_\_\_\_  \_\_\_\_\_ use(s) \_\_\_\_\_\_ from \_\_\_\_\_\_  \_\_\_\_\_ needs \_\_\_\_\_ to \_\_\_\_\_  Examples include:  Wolves eat deer.  Snakes use abandoned burrows from rodents.  The Malaria parasite needs humans to reproduce.  Note: Tell students not to put more than two relationships from the same format. | How many interactions can you think of between organisms?  (Hint: think about animals in the video you just watched, and in the environments you learned about.) | [Student responses will vary.]  [Answers students gave can be found farther down in the exploration in the section where students will share their answers with the class.] |
| Specific instructions:  1) Along with the class, the teacher will model one of these.  1.5) Write (+,+), (+,0), and (+,-) on the board. Explain to students that:  (+,+) is a relationship where both organisms benefit.  (+,0) is a relationship where one organism benefits and the other is unaffected.  (+,-) is a relationship where one organism benefits and the other is harmed.  (-,-) is a relationship where both organisms are harmed.  2) By yourself, in your class notebook, write as many as you can think of in the next ~~5~~ 3 minutes along with if they are a +, -, or 0 relationship between the two.  3) In groups, compare your examples and pick 5 to write on the large group paper (about 15 minutes or until groups complete answers.)  Allow each group to have 2 minutes at the classroom computer to look up a relationship or double check an example they have thought of.  Have books available at each of the students groups to allow them to do research on organisms using a reliable source. | 1) Could someone name an organism? (Ask the whole class. Get two.) How could these organisms interact? (Ask whole class. Get up to three different answers.)  Tell students they are only allowed to use accredited sources on the internet. ie. no Wikipedia and careful selection with .com. Try to only use .org, .gov, or .edu websites.  Tell students they are only allowed to have a minimum of two sources from books, two sources from the internet, and one that they already knew.  Students will be told that if they choose an example from another source that they need to give credit to that source by stating where they got it from and who the author was.  This will allow students to analyze sources to come up with organism interactions. | [Platypus.]  [Horse.]  [They are not really in the same environment.]  [The horse knocks food off a tree into the water for the platypus.]  [The wild horses in a herd drink all of the water supply the one platypus has access to.]  [Blue bird.]  [Owl.]  [Help each other build each others nest. One bird kicked out would have to make a new nest.] |
| ~~Write (+,+), (+,0), and (+,-) on the board. Explain to students that:~~  ~~(+,+) is a relationship where both organisms benefit. Explain that, for the next activity, a “+” will be represented by a blue card.~~  ~~(+,0) is a relationship where one organism benefits and the other is unaffected. Explain that, for the next activity, a “0” will be represented by a white card.~~  ~~(+,-) is a relationship where one organism benefits and the other is harmed. Explain that, for the next activity, a “-“ will be represented by a red card.~~ |  |  |
| Ask students to write the corresponding symbols next to the relationships they described on their large group sheets. Tell students to be ready to explain their reasoning for each one. If they haven’t already.  ~~While all groups are finishing, give them a sheet (“Additional Practice”) to help them identify organism relationships.~~  ~~Explain to them to work on it after they have 5 examples on their large paper.~~  ~~This worksheet will be collected and handed back to them the next day.~~ |  |  |
| Point out the (+,+), (+,0), (+,-)and (-,-) written on the board.  Call on students to ask them as a reminder what these symbols stand for.  After students give answers, explain to them that they will be holding up what cards they think the relationship is.  Explain that a “+” will be represented by a blue card.    Explain that a “0” will be represented by a white card.  Explain that a “-“ will be represented by a red card. | What is going on when there is a (+,+) relationship?  What is going on when there is a (+,0) relationship?  What is going on when there is a (+,-) relationship?  What is going on when there is a (-,-) relationship? | [(+,+) is a relationship where both organisms benefit.]  [(+,0) is a relationship where one organism benefits and the other is unaffected.]  [(+,-) is a relationship where one organism benefits and the other is harmed.]  [(-,-) is a relationship where both organisms are harmed.] |
| ~~After every group has shared one, have a mini-game (3-5 rounds, depending on time) where everyone is given a relationship, and the groups hold up the colored cards saying which kind of relationship they thought it was.~~  ~~Each group that gets it “right” gets a point. If a group doesn’t have the “correct” answer, they will be asked to explain why they thought that. If their explanation makes sense, then also give their group a point.~~  ~~(These relationships will be taken from the “Good Buddies” activity. We don’t really want to say a student is flat-out wrong without checking their reasoning. Also, if the students have outside information on a topic, that could influence their answer. For example, a remora on a shark. A student might state that it is commensalism, with the remora benefitting and the shark being unaffected. But they could also think the remora is eating parasites or dead skin off the shark, and so it benefits both, making it mutualism. If neither of us knew the specifics of the interaction, that would make both of them perfectly acceptable answers with perfectly acceptable reasoning, and the students should not be denied a point for that.)~~ | **Will the groups be sharing their examples now with the symbols already written on them? Will the rest of the students just be agreeing or disagreeing with what the group wrote?** |  |

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| **EXPLANATION Time: 15 - 20 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| After students have given their examples, explain that there are five kinds of interactions using scientific terminology. |  |  |
| Explain the 5 kinds of interactions with examples of each. ~~Be sure to write each one near the symbols on the board.~~  Use PowerPoint slides to give the proper name of the relationship, the definition, show the symbols associated with it.  Make sure to give visual examples of each relationship so students can see what they have been learning about during the class period. | What does it mean if both organisms benefit from a relationship? Does anyone know the scientific term for that?  What does it mean for one organism to not be affected? Does anyone know the scientific term for a relationship where one organism benefits and the other is unaffected?  What does it mean for one organism to be harmed? Does anyone know the scientific term for a relationship where one organism benefits and the other is harmed?  What does it mean for both organisms to be harmed? Does anyone know the scientific term for a relationship where both organisms are harmed? | ~~[Students may or may not know. If they know, write the ones they know on the board next to their corresponding (+,+), (+,0), or (+,-) symbols.~~  Answers will be shown on PowerPoint slides.  Correct answers are:  Mutualism  Commensalism  Parasitism and Predation  [Preism…students made up answers.]  [example-shark eating fish.]  Competition  [cluism, criminalism, students made up words.]  [example- fighting over a mate or meat.] |
| A relationship between two organisms where one organism benefits and the other is neither helped nor harmed is called commensalism.  A relationship between two organisms where one lives on the other and benefits at the cost of the other, without killing it, is called parasitism.  A relationship between two organisms where they struggle against one another for space and the necessities for life is called competition.  A relationship between two organisms where one captures, kills, and feeds on the other is called predation.  A relationship between two organisms where both benefit from each other is called mutualism. | Looking at your individual and group papers, ~~do you have~~ share any examples of commensalism?  Looking at your individual and group papers, do you have any examples of parasitism?  Looking at your individual and group papers, do you have any examples of competition?  Looking at your individual and group papers, do you have any examples of predation?  Looking at your individual and group papers, do you have any examples of mutualism?  What is the difference between mutualism and commensalism?  Would a bird species that uses the abandoned nest of another bird species be an example of mutualism and/or commensalism?  Why?  Would a fish eating parasites and dead scales off a shark be considered mutualism and/or commensalism?  Why? | Student answers will vary, but some may include:  [Animals living in vacated burrows or nests of other animals, barnacles on scallops, cattle egrets on livestock.]  [Malaria, ticks, tapeworm, bacteria.]  [Grazing animals compete for grass, birds compete for nesting sites, many animals compete for mates.]  [Carnivores, omnivores.]  [Pollinators, intestinal bacteria, clownfish and anemones.]  [With commensalism, both organisms benefit. In mutualism, only one organism benefits without affecting the other.]  [Mutualism. The bird that made the nest is not coming back to it, and is not affected by another bird nesting there. The second bird doesn’t have to make a new nest.]  [Commensalism. The fish gets food that it doesn’t have to spend time and effort searching for, and the shark gets cleaned. Both of them benefit.] |

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| **ELABORATION (Day 1/Day 2)\* Time: 50 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Day 1:  Students will be given an exit slip with examples that they must explain, three relationships and how the organisms are affected, along with the scientific term associated with it. **????**  Day2:  Crosswords will be collected before class starts to see how the students did on their own with just being introduced to the scientific terminology and the teacher will quickly go over the answers with the students.  Do Now will be on board. Quick and simple questions will be assigned, but gets them in the right mindset.  Show a Disney movie song clip, the Bare Necessities from the Jungle Book.  http://www.youtube.com/watch?v=TcglnY\_xGfc  (Note: This will be converted to an accessible format outside of youtube. It will also be only the first 1:45 of the song, ending with “Of all the silly gibberish.”) | Exit Slip Questions: (see worksheet)  1) Male lions fight each other for control of a pride of female lions. One of the lions will win the fight and either gain or keep control of the pride, while the other lion loses, and is often harmed.  2) Some species of rhinoceros eat a fruit commonly called a “Rhino Apple.” By the time the fruit is digested, the rhino is far away from where it originally ate the fruit, and expels the seed.  3) A sparrow will build its nest under the nest of an osprey. The smaller birds get protection because other predators will not mess with the osprey. The ospreys ignore the presences of the sparrows.  On your own, state what kind of relationship is being described. Then write 1-2 sentences explaining why you think that.  1) A whale is unaffected by the attached remora fish feeding on the whale’s leftover food.  2) Spider crabs are camouflaged by the green-brown algae growing on their shells.  Students will be asked if they think this is a reliable source they are analyzing. Why or why not?  Identify the relationships between the animals and their environments you observed in this clip?  (Continue to elaborate on their responses to lead them in the right direction to present our lesson.)  (If this was being taught in the unit, we would also ask, “Does anything in this video remind you of our previous lesson on limiting factors?”) | 1) Competition. In this instance one benefits more than the other, but because of straining extra energy by fighting both are harmed at some level.  2) Mutualism. The rhinoceros benefits by getting food and the fruit benefits by its seeds being spread to other locations for it to grow.  3) Commensalism. The sparrow benefits by being protected but the osprey is not affected.  [Commensalism.]  [Mutualism.]  [Could be reliable, but is not an educational video so could be made up too. There are not talking bears and panthers and little boys do not live with them.]  [Responses are expected to be seen about animal interaction and interactions with the environment and an animal’s food.]  [The bees…the second relationship because the pollen goes around.]  [Ants parasitism because they eat them.]  [Animal eating a fruit, when they poop it out, they spread it around.]  [Point out food supplies and living space, etc. in the video.] |
| ACTIVITY:  Students will create their own song ~~or skit,~~ or poem ~~both~~ to incorporate the relationships between organisms.  The rubric will be given to the students along with the instructions before the activity. This will be set up like a game and students will be told that the more examples they can do, the more points they will get. They will be working with the group members that their tables are arranged in. Questions will be allotted after everything is explained. **What does that mean?**  The instructions will also be told to the students before they start. The rubric will be available to them the whole time they are working on it.  (See MW\_RS\_Activity instructions\_final)  Scientific terminology will be written on the board along with the definitions and the symbols for students to reference to while they are doing their activity.  Students will have information they gathered beforehand and will present their knowledge to the class, **defending their conclusions** when they present to the class.  To keep students on time, a countdown will be set up on the projector for them to keep an eye on their time. They will be given warnings in 5 minute intervals; “5 minutes remaining, 10 minutes remaining, 5 minutes remaining, 1 final minute to finish up final thoughts.” | What types of relationships do you know of that involve mutualism, predation, parasitism, competition, commensalism?  You will have 20 minutes in class to complete this activity.  Is this helpful or harmful to the individuals involved?  Since students are worried about points to win, while going over the rubric, emphasis will be put on:  You received ONE point for using EACH scientific term like commensalism, mutualism, etc.  You receive ONE point for EACH organism you mention in this relationship.  You receive ONE point for explaining what is happening to EACH organism. ie. They are benefited, harmed, or not affected.  Everyone in the group MUST participate for a total of 5 points! EACH individual who does not say a line while presenting will make their team lost ONE point.  Students will be told they have a few minutes to present their song to the class. If students do not share as soon as they get up there, they will be asked to sit down and wait until the end to try and present again. | [Mutualism: pollination, seed dispersal, coral reefs, lichen…  Predation: spiders and bugs, fox and rabbit, cheetah and antelope…  Competition: vultures over fresh kill with predator…(for food) living in a cave (area for protection/ living space.)  Commensalism: barnacles, shark and pilot fish…]  [Answers will vary.]  [The shark being cleaned by the fish, mutualism shark getting rid of parasites and fish eats.  Lion & Zebra being eaten. Predation. Lion + zebra –  Monkey & Tree. Tree is home. Commensalism. Monkey + Tree 0  Human & Leech. Parasitism. Human – Leech +.  Lion and Hyenas and injured antelope. Fighting. Competition because -,-]  [Dog & Flea, Parasitism.  Bird and Human. Commensalism  Fish Flamingo Eat same food competition  Fish and shark. Free rides. Mutualism.]  [Flowers & Bee. Mutualism. Bees’ use pollen for honey and spreads pollen for flower.  Ticks on gorilla. Parasitism. Eating gorilla. Predation gorilla friend eating ticks.  Wolf and Raven. Commensalism. Wolf 0 Raven +]  [Family & Dog. Give shelter and Food. HE gives companionship. Mutualism.  Lady sheep. Competition. Males fighting over her.]  [Commensalism. One is eating food and other isn’t benefited.  Banana and monkey. Mutualism. Monkey eats banana and poops out seed, both being benefited. Eats and plants seeds.  [Females fighting over a male lion.] |
| Explain after each group presents the relationships they saw within the group presentations if students said anything wrong or if classmates are confused. | What relationships did you all see in their presentation? Give specific examples from the song.  Defend your answers.  For times’ sake, students will be allowed to ask questions if they are confused.  To allow teacher to see if students are grasping the concept, they can call on students at random to receive answers.  Full attention is expected from all students when their peers are presenting. | [mutualism, predation, parasitism, competition, commensalism. (Examples will vary.)] |

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| **EVALUATION Time: 5 Minutes** | | |
| **What the Teacher Will Do** | **Probing/Eliciting Questions** | **Student Responses and Misconceptions** |
| Have students complete the exit slip individually on Day ~~1.~~ 2.  Definitions will be erased off the bored for this exit slip. | ~~On your own, state what kind of relationship is being described. Then write 1-2 sentences explaining why you think that.~~  ~~1) A whale is unaffected by the attached remora fish feeding on the whale’s leftover food.~~  ~~2) Spider crabs are camouflaged by the green-brown algae growing on their shells.~~  ~~3)~~ 1) African ants living in acacia trees feed on leaf-eating insects found on the tree.  An FCAT related question will be given to the students to both test them and prepare them for what will be expected of them on the FCAT.  Related Benchmark: [SC.7.L.17.2](http://www.floridastandards.org/Standards/PublicPreviewBenchmark1814.aspx)  Reporting Category: Life Science Type: MC:Multiple Choice  2)  Question: Mangrove trees are common to the Florida Everglades. The tree roots serve as a place for freshwater oysters to attach when the tide is high, as shown in the picture below. The oysters are protected from predators when attached to the roots underwater. http://floridastandards.org/Uploads/SampleItem/401/img/Pic33.JPG The oysters do not harm the trees nor do they provide any benefit to the trees.  Which of the following relationships is **most** similar to the relationship between the mangrove trees and the oysters?  Answer Options:  A. African ants living in acacia trees feed on leaf-eating insects found on the tree.  B. Spider crabs are camouflaged by the green-brown algae growing on their shells.  C. A whale is unaffected by the attached remora fish feeding on the whale’s leftover food.  D. Bees fly from one flowering plant to another gathering nectar and pollinating the flowers.  (If this was our actual project we would ask them to write about their animal and the environment it is in and identify the possible relationships for the formative assessment.) | ~~[Commensalism.]~~  ~~[Mutualism.]~~  [Predation and Mutualism] (Either will be accepted with correct explanation.)  Answer Key: C  Need to change first question because it is one of the choices in this question. |
| ~~Day 2: Have students complete the organism relationship crossword in groups at the beginning of class.~~  ~~(This is a formative assessment to understand how much they retain from before. It is also a useful reference for them with the definitions for the vocabulary words.)~~ |  |  |
| Day 2:  A rubric will be made and presented to the students to allow them to know what is expected from them from their ~~skits.~~  Song or poem.  Please see MW\_RS\_Activity instructions\_final for this rubric/set of instructions. |  |  |

\*If this were actually in the middle of a unit, instead of just a “drop-in” lesson, then the elaboration would consist of time for students to piece together the information as to which animals in their environment are doing to exhibit any of these relationships with regard to the pet. The animals found in the specific environment will need to be either looked up at this point and classified by relationship, or will have been looked up previously and will be classified by relationship.

The compare and contrast occurs during the exploration and explanation. When students are choosing the symbols for their interactions, they are comparing them with respect to what organism benefits and what organism is harmed. When students are defending their choices, they are also comparing, as they will explicitly have to state why it IS something and why it IS NOT something else.

This is very similar to the sample test item (http://www.floridastandards.org/Standards/PublicPreviewSampleTestItem401.aspx) where students are given an example, and then asked to choose between a list of 4 other examples and select which is the most similar. In order to do this, they need to put the relationship in terms of which organism is benefitting, which is harmed, and which is not affected. This is exactly what we’re doing in the lesson. And will be presented to the students to help their confidence level in feeling prepared for the FCAT.