|  |  |
| --- | --- |
| **Lesson Title:**  It’s a Parasite’s Life*\*Must have the book: What’s Eating You? Parasites—The Inside Story to complete the challenge.* |  |
| **Grade Level:** 5th | **Quarter:** 4th |
| **Standards:** **Science:****S5L4b** Harmful MicroorganismsIdentify harmful microorganisms and explain why they are harmful.**Math:****MGSE.5.MD.5.** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. b. Apply the formulas *V=l x w x h* and *V = b x h* for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. **ELA:****ELACC5W4**. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.**ELACC5L6**. Acquire and use accurately grade-appropriate general academic and domain-specific wordsand phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition). |
| **Lesson Essential Question:** * How can we show our understanding of harmful microorganisms by creating a board game about the life cycle of parasites?
 | **Vocabulary:** * Parasite
* Harmful
* Life Cycle

Vocabulary from Non-fiction Reading: What’s Eating You?* Ectoparasites
* Endoparasites
 |
| **Lesson Materials:**What’s Eating You? Parasites—The Inside Story, by Nicola Davies ISBN 978-0-7636-3460-5http://ecx.images-amazon.com/images/I/51A8%2BzvbT8L._SY311_BO1,204,203,200_.jpg(use whole book as a resource, but focus on the illustration for “The 2-Host Tapeworm Game” as springboard for activity)-Cardboard -File Folders -Pipe Cleaners-Cardstock -Markers-Construction Paper -Crayons-Index Cards -Pencils-Poster Paper -Scissors-Colored Pencils - Glue-Ruler -Measuring Tape | **Lesson Assessment:** * Completed games
* Student Journals
* Student Participation
 |
| **STEM Challenge Overview:**After reading the book, What’s Eating You? Parasites—The Inside Story, students will create a board game which demonstrates their understanding of how parasites depend upon a host for their life cycle. |
| **Teacher Background:*** What’s Eating You? Parasites- The Inside Story summary: <http://www.amazon.com/Whats-Eating-You-Parasites-Science/dp/0763645214>
* This activity should take place after students have begun their study of microorganisms.
* Information about parasites:
	+ 1. Parasites depend upon a host to ensure a successful life cycle.
		2. For some parasites, the host is merely a living carrier, such as the mosquito which transports and injects the plasmodium parasite into a human bloodstream.
		3. For other parasites, such as the flea, the host provides a complete habitat.
		4. Since the parasite is usually harmful to its host, the host uses various techniques which are within its abilities, to remove the parasite, for example, grooming, cleaning, medication or an animal’s immune system.
		5. If a host is successful in removing the parasite, then the parasitic life cycle is interrupted and the parasite will die.
 |
|  |
| 1. **Ask/Engage Day 1 – 45 min.**
 |
| * Tell the students that as a part of their study about microorganisms they will be learning about harmful microorganisms, such as parasites, and working in groups to make a board game to show their knowledge.
* Read the book What’s Eating You? Parasites—The Inside Story to students, using a document camera to enlarge the pages to viewable size. Briefly discuss insights with students.
* Review the 2-page border illustration “The Two-Host Tapeworm Game”. Students will be working in groups to create a board game about the parasitic life cycle, focusing on how preventions by the host can keep the harmful parasite from successfully reproducing itself.
* Since the book’s information is a key resource, teacher and students will work together to chart key information about parasites and hosts, which will be used as a reference during the creation of the board game.
* Introduce the challenge and have students fill out the ask/engage part of their journal.

**Challenge:**You are to create a board game which demonstrates your understanding of how parasites depend upon a host for their life cycle. |
| 1. **Imagine/Brainstorm Day 2 – 35 min**
 |
| * Explain the criteria and constraints for the challenge.

**Criteria:**1. Game must demonstrate that the group understands how parasites depend on their hosts for continued life2. Game must cover the life cycle of parasites and must contain at least six actions a host could take to get rid of the parasite so it wouldn’t be able to reproduce3. Game must have rules, playing pieces, a game board, and a storage box no larger than 14” x 14” x 2”. **Constraints:**1. Game board will be an open file folder2. Determine the volume of the group-created storage box.3. Complete the challenge in the time allotted* Ask each student to work independently to come up with 1-2 possible design solutions. Students should draw/label their designs.

  |
| 1. **Plan/Design Day 3 - 35 to 45 min. (could be combined with Day 2, if time allows)**
 |
|  * Students present their ideas to their teams.
* Teams will collaboratively discuss the ideas and decide upon a final design plan.
* Teams will draw their final design, assign tasks and draw up a list of materials for the project.
 |
| 1. **Create / Test Day 4 – 60 min.**
 |
| * Student teams build their design according to their design plan.
* Work groups will build their games, using their design plans.
* Each group will play a round of their game, using their rules, to test for a successful product
* Each group will list problems or technical difficulties which need to be addressed in their game.
* If there is time, trade games and play another group’s game.
 |
| 1. **Evaluate/Improve –** and repeat Steps 1-5 – **Day 5 - 25-30 min.**
 |
| Student teams complete their journals, then collaboratively discuss their games: * Was the game successful?
* Did the game meet the criteria and design constraints?
* Did the final design match the final product?
* What improvements might be added to improve the game?
 |

***Extensions:***

Add a math component by giving students a “budget” for their game; charge for construction materials; each group has an accountant who will be in charge of budgeting; after games are made, have each group construct a graph showing their costs (discuss which game segments were the most/least expensive); create a class budget graph showing which group had the most/least expensive games.

Groups who need a challenge might like to create an interactive game using a white board (Promethean or Smart Board) or a Promethean Table game.



 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

It’s a Parasite’s Life:Game Board

5th Grade STEM Challenge

**Challenge**: Create a game board which demonstrates your understanding of how parasites depend upon a host for their life cycle.

**Criteria:**

1. Game must demonstrate that the group understands how parasites depend on their hosts for continued life

2. Game must cover the life cycle of parasites and must contain at least six actions a host could take to get rid of the parasite so it wouldn’t be able to reproduce

3. Game must have rules, playing pieces, a game board, and a storage box no larger than 14” x 14” x 2”.

**Constraints:**

1. Game board will be an open file folder

2. Determine the volume of the group-created storage box.

3. Complete the challenge in the time allotted

**Materials:**

-Cardboard -File Folders -Pipe Cleaners

-Cardstock -Markers -Colored Pencils

-Construction Paper -Crayons -Glue

-Index Cards -Pencils -Ruler

-Poster Paper -Scissors -Measuring Tape

1. **ASK / ENGAGE:** What is the problem you are being asked to solve?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **IMAGINE/BRAINSTORM:** What are some possible solutions to the problem that you are trying to solve? After you brainstorm, draw and label your ideas below.

|  |  |
| --- | --- |
| **Idea #1** | **Idea #2** |

1. **PLAN/DESIGN:** Share your ideas with your group and collaborate to decide on a final design plan. Draw your team’s design below and make a list of the materials that you will need to complete your design.

|  |  |
| --- | --- |
| **Team Design Plan** | **Materials List** |

1. **CREATE/TEST**: Use your Final Design Plan to create and build your solution. Test your design. Did it work? Why or Why not?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **EVAULATE/IMPROVE:**  How well did your design work? Did your solution solve the problem within the given constraints?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

How can you improve your design? How can you make it better? Draw and label your improved design below.

|  |
| --- |
| **Improved Design Plan** |