

Using Aquaponics to Feed Our Class Guinea Pig

By: Mandy Hopper
3rd-5th Grade



Ms. Hopper's Notes

This lesson was created with my class in mind. I teach students in a severe special education program. I plan to spend several weeks completing these lessons with my students at the beginning of this coming school year. My students and I adore our little Wilbur. The kids will be so excited to find out we are getting an aquaponics system (and fish). I think they will love growing food for Wilbur and learning about age appropriate science concepts. I appreciate the opportunity provided by Pets in the Classroom and Donors Choose.

Mandy Hopper

Standards

Science:

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Standards Cont.

English Language Arts:

CCSS.ELA-LITERACY.W.3.2 CCSS.ELA-LITERACY.W.4.2 CCSS.ELA-LITERACY.W.5.2

Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-LITERACY.W.3.8

Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

CCSS.ELA-LITERACY.W.4.8

Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

CCSS.ELA-LITERACY.W.5.8

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

Cross-Curricular Instruction

English Language Arts

Life Skills

Science

Activity 1: Project Description and Review of Previously Learned Material

We received a guinea pig through a Pets In the Classroom grant. We also received a Back to the Roots Water Garden through a Donors Choose grant. We have spent time getting to know our guinea pig in the classroom. Students have learned the rules about our guinea pig and our water garden we will be setting up. The students have taken care to feed the guinea pig, Wilbur, in the morning, help clean his cage, refill water, provide hay, and handle gently.

Students will be told they have an Aquaponics Water Garden donated. The water garden comes with sprout seeds and wheatgrass that the students will plant to feed fresh food to the guinea pig. The teacher will show the parts of the water garden to the students. We will look up pictures of other peoples water gardens to get ideas about what we want to add for inside decorations and make a list. We will also decide what color of betta they would like and rate from 1-4 (dependent on what the fish store has in stock). Students will also make a list of the top 3 names for our fish to be chosen after the see the fish that was selected.

Activity 2: Name Fish and Set Up Aquaponics System

First, the teacher will show the fish to the class and pass the cup around so each student can see the fish. The students will then vote on a name for the fish.

Next, the parts of the aquaponics system will be taken out and viewed. The class will then follow the directions on the water garden box to set up the tank, prepare the seeds for 'planting' and add the betta fish.

Lastly, students will make estimations for how long they think it will take for the seeds to sprout.

*For students who require more visual supports you can view the step-by-step set-up video by Back to the Roots. <https://backtotheroots.com/pages/water-garden-support>



Activity 3: Symbiotic Relationships

Students will learn what symbiosis is and will draw a diagram of the symbiotic relationship of the fish (fuel), plants (filter), and bacteria (engine). They will then write a short paper on how the guinea pig also benefits from this relationship (he eats the food produced).

**Symbiosis is any type of a close and long-term biological interaction between two different biological organisms, be it mutualistic, commensalistic, or parasitic. The organisms may be of the same or of different species.*

Activity 4: Growth Charts and Environmental Factors

Students will complete a growth chart over the next several weeks to track how fast their plants are growing. They will also refer back to their sprouting estimates to see if they were correct. Students will then compare and contrast the differences between the seeds planted and their growth rates. They will discuss what may make the plants grow at different rates and what environmental factors may influence the growth.

Assessment

Assessment of content will be completed through the use of diagrams, hands on engagement, discussions, and written work completed by students.

Activity Extensions:

- Try different plants to see what grows best (Wilbur really wants basil!)
- Try different types of fish to see if there is a difference in growth/relationship/environment
- Adjust environmental factors (lighting, etc.)
- Complete a research paper on history of aquaponics
- Have a poem/song/rap contest on symbiosis
- Complete an art project of the water garden and guinea pig
- Complete a KWL chart
- Identify/research other symbiotic relationships in nature or at the zoo
- Perform a play or skit related to the relationships researched