

# Classroom Aquaponics

<b>Date:</b>		<b>Subject:</b>	Science
<b>Pre-Requisite:</b>	Initial Aquaponics system is completed (attached to bottom)		
<b>Grade Level:</b>	PK-2		
<b>Lesson Title:</b>	Aquaponics: What plants should we use?		
<b>Standard(s):</b>	<p><b>AG Standard: 21.K–2.HL.3</b> Essential Concept and/or Skill: <i>Recognize critical literacy/thinking skills related to personal, family and community wellness.</i> Demonstrate decision making skills.</p> <p><b>Clarification Statement:</b> Done during anticipatory set by sharing daily decisions and why their decision to use their plant is the best</p> <p><b>W.2.8</b> Recall information from experiences or gather information from provided sources to answer a question.</p>		
<b>NGSS:</b>	<p><b>K-2ETS1 1.</b> Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool</p> <p><b>Clarification Statement:</b> Students will argue why their plant is the best in an aquaponics system to improve it from the original aquaponics system made as a class.</p>		
<b>Objective (cognitive):</b>	Students will be able to use sources provided to argue why their plant would do best in an aquaponics system with 75% accuracy based on a rubric (criteria 1-3).		
<b>Objective (affective):</b>	Students will be able to express their feelings about their plant with 100% accuracy based on a rubric (criteria 4).		
<b>Objective (psychomotor):</b>	After doing their research, students will be able to make their aquaponics system based on the plant they researched with 100% accuracy based on a rubric (criteria 5).		

## Book(s) or Supported Reading(s):

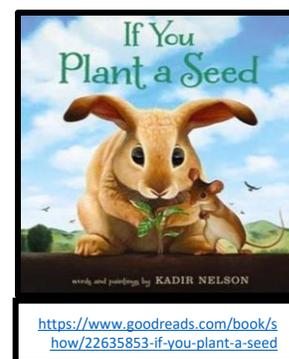
- *If You Plant a Seed* by Kadir Nelson

## Materials & Supplies LISTED:

- Computers or piece of technology to look at sources
- Lined Paper
- 1 Poster paper for each group for presentation
- Pencil

## Anticipatory Set/ **Enticement** (Pre-reading & Prerequisite Skills):

- Talk to students about decisions and how we make decisions everyday
- Ask students to provide examples of decisions they make
- Prompt students to pay attention to decisions that were made in the book
- Read the book *If You Plant a Seed*
- After reading, ask students what decisions were made during the book
- Tell students the decisions they make affect the people/things around them just like the plant chosen for an aquaponics system will have different affects as well



## Modeling/ **Explanation** (I can):

- Split students into groups and assign them a plant to research:
  - any leafy lettuce
  - kale
  - arugula
  - basil
  - chives
  - common house plants
  - tomatoes
  - peppers
  - cucumbers
  - beans
  - peas
  - squash

# Classroom Aquaponics

- broccoli
  - cauliflower
  - cabbage
  - strawberries
- Show the students their question:
    - “Why is my groups plant the best for the aquaponics system?”
  - Remind students they should use the sources provided to them and if they need more to ask before searching for their own (unless you are comfortable with your students finding their own research)

## **Guided Practice/ Engagement & Exploration (We can):**

- Find sources about the plants in our original aquaponics system to create a mock presentation
- Look at sources, take notes, transfer notes to poster paper, and present

## **Independent Practice/ Elaboration (You can):**

- Use the sources provided for your plant to make your argument
- Write findings on paper to be shared with class
- Put final ideas on poster paper for class to see

## **Closure:**

- Each group will make their aquaponics system with their plant they researched using the setup lesson attached

## **Assessment/ Evaluation**

- Each group will share their findings
- Each student will share their own feelings about their plant
- Use rubric to assess

## **Enrichment/ Extension**

- With more time, students can do their own research about a plant of their choosing and present in the same manor

## **Modification/ Differentiation:**

- RTI: Students will have a peer to work with and keep each other on task
- TAG: Students can do their own research on a plant provided to them

# Classroom Aquaponics

<b>Name:</b>	<b>Group Members:</b>	<b>Plant:</b>
<b>Concerns</b> <i>Areas that need work</i>	<b>Criteria</b> <i>Standards for this performance</i>	<b>Advanced</b> <i>Evidence of exceeding standard</i>
	<b>Criteria #1: /4</b> Uses information from sources provided.	
	<b>Criteria #2: /4</b> States why plant is the best in aquaponics system.	
	<b>Criteria #3: /4</b> Presents information clearly and effectively.	
	<b>Criteria #4: /4</b> Directly expresses feelings about plant.	
	<b>Criteria #5: /4</b> Creates aquaponics system using plant that was researched.	

Additional Comments:

**/20**

# Classroom Aquaponics

## Initial Aquaponics Lesson:

<b>Candidate:</b>		<b>Date:</b>		<b>Subject(s):</b>	Sciences
<b>School:</b>		<b>Grade Level:</b>	k-2	<b>Student #:</b>	
<b>Cooperating Teacher:</b>					
<b>Lesson Title:</b>	Aquaponics Introduction				
<b>Standard(s):</b>	K-ESS3-1 Earth and Human Activity Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.				
<b>NGSS:</b>	1-LS1-1 From Molecules to Organisms: Structures and Processes Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.				
<b>Objective (cognitive):</b>	After the lesson, students will be able to write/draw the main parts needed to create aquaponics system. This can be done in 5 minutes with 90% content accuracy.				

## Book(s) or Supported Reading(s):

- Modeled/ Shared: AgToday Issue 3 (pg.6)
- Interactive/ Personal: <http://www.odec.ca/projects/2011/otoshe/index.html>

## Materials & Supplies LISTED:

- For Teacher: 1 Large Mason jar, plant clippings, rocks, water, small fish, bacteria, large poster paper, marker
- For every student: Computer, internet access, paper, pen

## Anticipatory Set/ **Enticement** (Pre-reading & Prerequisite Skills): **10 min**

- Students will begin by answering 3 questions verbally:
  - o *Do you eat fish?*
  - o *Where does most of your food grow?*
  - o *Do you think everyone in the United States eats the same food as you?*
- Then a discussion will be had reviewing answers that student had. Guide conversation towards the limited amount of resources and supply that the United States has versus the demand for food. Pose questions for students to ponder like:
  - o *Where does the grocery store get your food?*
  - o *How is that food grown?*
  - o *Is every place in the United States fit to grow the same foods?*
- Introduce 3 new vocabulary words
  - o Sustainability:
  - o Agriculture:
  - o Aquaponics:

## Modeling/ **Explanation** (I can): **15 min.**

- Read aloud page 6 of *AgToday* Journal
- Have students get on <http://www.odec.ca/projects/2011/otoshe/index.html>

# Classroom Aquaponics

- Read through (good pictures of students who cannot read): Home, Water vs. Dirt, Fish, Bacteria, and Plants
- Pass out sticky notes and have students write 2 new things they learned from these readings

## **Guided Practice/ Engagement & Exploration (We can): 10 min**

- Have students draw a picture that represent an ecosystem
- Have students place pictures in front of classroom
- Ask for personal definitions of what their drawing was showing
- Introduce them to the Aquaponics system model already complete. Include the type of plant, fish, and bacteria you used.
- Ask them to save questions for 3 minutes writing next.

## **Independent Practice/ Elaboration (You can): 5 min**

- Students will then write/draw how they think the Aquaponics System that is already prepared (Mason jar with fish and plants) will be in a couple weeks. If needed, include prompts: their observations, their educated guesses, any previous experiences or background knowledge that may relate to aquaponics.

## **Closure: 5 min**

- Review chart of definitions and terms. Answer questions students may have about the terms, the Aquaponic system, or the content of this lesson.

## **Assessment/ Evaluation: 5 mins**

- Students will write/draw the parts included in the aquaponics system. They also will include 1 thing they want to learn more about with aquaponics or sustainability.

## **Enrichment/ Extension:**

- Students who may be in need of enrichment can write 2 sentences draw a picture everyday of what changes are happening in the system. Including base, container, water, fish, plants, etc.

## **Modification/ Differentiation:**

- Students who may be in need of modification for this lesson can verbally provide the definition for aquaponics with 80% accuracy. They also may be paired with an aid or teacher if being paired with another student is not appropriate.