Aquaponics Grade 1

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Title Section

Department of Curriculum & Instruction

Belleville Public Schools

Curriculum Guide

Aquaponics Grade 1

Belleville Board of Education

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Appendix Overview

This appendix is created to be aligned with Unit 4 of the HMH science curriculum and to be used as a guide into aquaponics

Students will.....

- investigate what an aquaponics system is
- learn and analyze how plants and fish can live and grow in the tank

Enduring Understanding

Enduring understandings:

- Support the claim of what an aquaponic system can do
- Understand the importance of an aquaponic tank and the role of the plants and fish
- Determine what plants and fish need to grow in the tank

Essential Questions

- What is aquaponics?
- How can fish and plants grow in the aquaponics tank and what is their purpose?

Exit Skills

By the end of Grade 1, Aquaponics Appendix tasks, the student should be able to:

- Explain what an aquaponics tank is and does
- Discuss how plants and fish can survive and grow in the tank and their purpose

New Jersey Student Learning Standards (NJSLS-S & NGSS)

SEP - Developing and Using Models

SEP - Engaging in Argument from Evidence

SEP -Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

SEP - Evaluating, Obtaining... Communicating Information

SEP - Planning and Carrying Out an Investigation

DCI - Organization for Matter and Energy Flow...

DCI - Interdependent Relationships in Ecosystems

Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Interdisciplinary Connections

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
LA.W.1.1	Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.
LA.W.1.5	With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers and self-reflection, and add details to strengthen writing and ideas as needed.

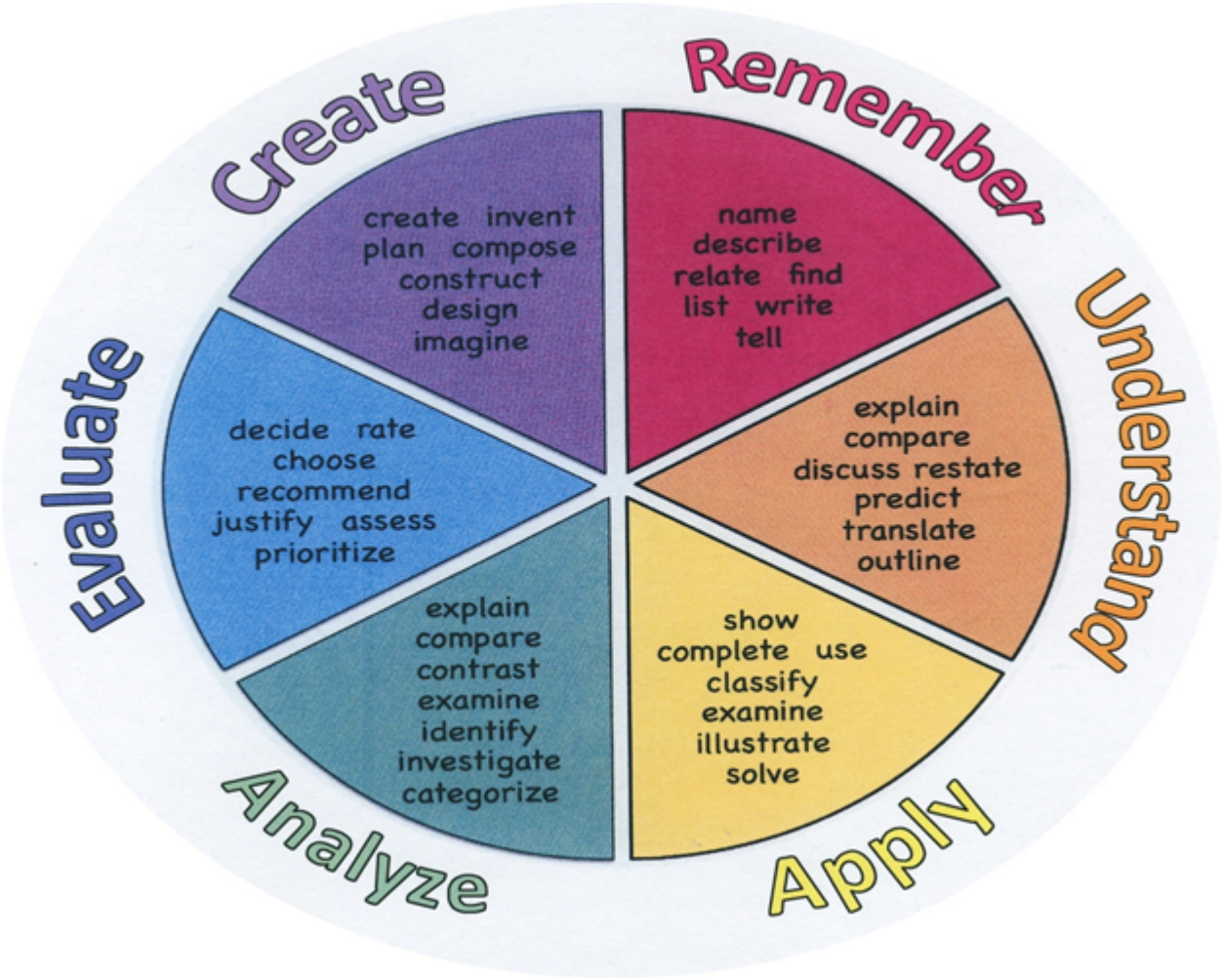
Learning Objectives

- Learn what aquaponics is and why it is important
- To learn how the aquaponics tank environment can help organisms grow and their role in the tank

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize		Combine
Describe	Defend	Dramatize	Classify		Compose
Define	Demonstrate	Explain	Compare	Appraise	Construct
Label	Distinguish	Generalize	Differentiate	Judge	Design
List	Explain	Judge	Distinguish	Criticize	Develop
Locate	Express	Organize	Identify	Defend	Formulate
Match	Extend	Paint	Infer	Compare	Hypothesize
Memorize	Give Examples	Prepare	Point out	Assess	Invent
Name	Illustrate	Produce	Select	Conclude	Make
Omit	Indicate	Select	Subdivide	Contrast	Originate
Recite	Interrelate	Show	Survey	Critique	Organize
Select	Interpret	Sketch	Arrange	Determine	Plan
State	Infer	Solve	Breakdown	Grade	Produce
Count	Match	Use	Combine	Justify	Role Play
Draw	Paraphrase	Add	Detect	Measure	Drive
Outline	Represent	Calculate	Diagram	Rank	Devise
Point	Restate	Change	Discriminate	Rate	Generate
Quote	Rewrite	Classify	Illustrate	Support	Integrate
Recall	Select	Complete	Outline	Test	Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct

Reproduce	Tell	Divide	Revise
	Translate	Examine	Rewrite
	Associate	Graph	Transform
	Compute	Interpolate	
	Convert	Manipulate	
	Discuss	Modify	
	Estimate	Operate	
	Extrapolate	Subtract	
	Generalize		
	Predict		



Suggested Activities & Best Practices

You Solve it Simulations on HMH Digital Platform
Study Jams on Scholastic.com for Science

Assessment Evidence - Checking for Understanding (CFU)

By identifying the **Evidence of Student Learning with Checking for Understanding (CFU)** techniques used during the lesson and/or for Closure (Madeline Hunter), please list the variety of means used to access students' learning (e.g. quizzes, tests, academic prompts, observations, homework, journals).

Explaining - formative

Illustration - alternative

Explaining - summative

- Anticipation Guide
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Explaining
- Illustration
- Learning Center Activities
- Multimedia Reports
- Outline
- Question Stems
- Self- assessments
- Study Guide
- Written Reports

Primary Resources & Materials

As a supplmental resource to go along with the aquaponics tasks teachers may use the You Solve it Simulation on the HMH Digital platform

HMH Science Dimensions S&E Leveled Readers

 On Level: What Can We Learn About Animals? What is a Plant?

 Extra Support: What Can We Learn About Animals? What is a Plant?

Aquaponics task outline (detailing task steps)

Ancillary Resources

Science Weekly, Scholastic News, NewsELA, YouTube/TeacherTube, National Geographics Kids, Science Channel

https://ngss-assessment.portal.concord.org/

Technology Infusion

HMH Digital platform

Chromebook

Google Classroom/Google resources used to create presentations (slides, docs)

Alignment to 21st Century Skills & Technology

Mastery and infusion of **21st Century Skills & Technology** and their Alignment to the core content areas is essential to student learning. The core content areas include:

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Technology;

9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.4.2.CT	Critical Thinking and Problem-solving
	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

21st Century Skills/Interdisciplinary Themes

Please list only the **21st Century/Interdisciplinary Themes** that will be incorporated into this unit.

Media Literacy

Critical thinking and problem solving

Creativity and Innovation

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

Please list only the **21st Century Skills** that will be incorporated into this unit.

Environmental Literacy

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

Differentiations:

Extra time to complete assignments

Project based learning

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Repeat directions
- Scheduled breaks
- Additional time
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning

- Problem-based learning

Special Education Learning (IEP's & 504's)

Please identify the **Special Education Learning** adaptations that will be employed in the unit, using the ones identified below.

Provide modifications as dictated in the student's IEP/504 plan

Modified assignment format

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner

English Language Learning (ELL)

Please identify the **English Language Learning** adaptations that will be employed in the unit, using the ones identified below.

Decreasing the amount of work presented or required

Using videos, illustrations, pictures and drawings to explain or clarify

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

Please identify Intervention Strategies that will be employed in the unit, using the ones identified below.

Decreasing the amount of work presented or required

Allowing students to select from given choices

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test

- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

Please identify the **Talented and Gifted** adaptations that will be employed in the unit, using the ones identified below.

Advanced problem solving

Allow students to work at a faster pace

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge