Aquaponics Grade 3

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Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Aquaponics Grade 3

Belleville Board of Education

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Appendix Overview

This appendix is created to be aligned with Unit 5 of the HMH science curriculum and to be used as a guide into aquaponics

Students will.....

- investigate what an aquaponics system is
- how water affects both plants and fish in the tank
- design the best layout for an aqauponics tank with plants and fish

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
- Use models to explain the best plants and fish together in the tank and what they are used for

Essential Questions

- What is aquaponics?

- How can plants and fish live together in the aquaponics tank?
- How can environmental changes in the tank affect the fish and plants?

Exit Skills

By the end of Grade 3, Aquaponics Appendix tasks, the student should be able to:

- Explain what an aquaponics tank is and does
- Discuss why certain plants and fish should live together in the tank and how they help contribute to the aquaponics system

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

	Changes organisms go through during their life form a pattern.
	Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.
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.
	Cause and effect relationships are routinely identified and used to explain change.
LS2.C	Ecosystem Dynamics, Functioning, and Resilience

	A system can be described in terms of its components and their interactions.
	Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

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.3.1	Write opinion pieces on topics or texts, supporting a point of view with reasons.
LA.W.3.1.B	Provide reasons that support the opinion.
LA.W.3.1.C	Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons.
LA.W.3.2.A	Introduce a topic and group related information together; include text features (e.g., illustrations, diagrams, captions) when useful to support comprehension.

Learning Objectives

- Learn what aquaponics is and why it is important
- To learn how the aquaponics tank environment can help both plants and fish grow together

Suggested Activities & Best Practices

You Solve it Simulations on HMH Digital Platform
Study Jams on Scholastic.com
Brainpop video and activity

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).

Multimedia Reports - Summative

Explaining - Formative

Commerical Scripts - Alternative

- 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: How Are Living Things Connected to Their Ecosystem?

 Extra Support: How Are Living Things Connected to Their Ecosystem?

Aquaponics task outline via Google Docs (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;

TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.A.CS1	Understand and use technology systems
TECH.8.1.5.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.5.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media

TECH.8.1.5.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.

21st Century Skills/Interdisciplinary Themes

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

Information literacy

Media Literacy

Life and Career Skills

Critical Thinking and Problem Solving

- 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

Global Awareness

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

Differentiation

Differentiations:

Project based Learning

Extra time to complete assignments

- 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 student's IEP/504 plan

Computer or electronic device utilized

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 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