

# Aquaponics-Kindergarten

Content Area: **Science**  
Course(s): **Science Gr K**  
Time Period: **Sept-June**  
Length: **6-8 weeks**  
Status: **Published**

## **Title Section**

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**Department of**

**Curriculum & Instruction**



**Belleville Public Schools**

**Curriculum Guide**

**Aquaponics Kindergarten  
Science**

**Belleville Board of Education**

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Board Approved:

## **Unit Overview**

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In the Aquaponics appendix students will.....

- Understand what an aquaponics system is
- Learn more about plants being able to survive in water versus soil

## **Enduring Understandings**

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**Enduring Understandings:**

- Support the claim of what an aquaponics system can do
- Identify plants and how they are important to aquaponics

## **Essential Questions**

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### **Essential Questions:**

- What is aquaponics?
- What do plants and animals need in the aquaponics system to grow?

## **Exit Skills**

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By the end of Kindergarten, Aquaponics Appendix, the student should be able to:

- Explain what aquaponics is
- Identify what plants and animals need to survive in the aquaponics system

## **New Jersey Student Learning Standards (NJSL)**

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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

SCI.K-LS1-1

Use observations to describe patterns of what plants and animals (including humans) need to survive.

Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

With guidance, plan and conduct an investigation in collaboration with peers.

## Interdisciplinary Connections

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LA.W.K.1

Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is...).

LA.W.K.2

Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

LA.W.K.8

With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

MA.K-12.1

Make sense of problems and persevere in solving them.

MA.K-12.3

Construct viable arguments and critique the reasoning of others.

MA.K-12.5

Use appropriate tools strategically.

## Learning Objectives

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### Learning Objectives:

- Discuss and identify the role of an aquaponics system
- Explain what plants and animals need to survive in the tank and how they can survive

**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    | Appraise  | Combine     |
| Describe | Defend        | Dramatize  | Classify      | Judge     | Compose     |
| Define   | Demonstrate   | Explain    | Compare       | Criticize | Construct   |
| Label    | Distinguish   | Generalize | Differentiate | Defend    | Design      |
| List     | Explain       | Judge      | Distinguish   | Compare   | Develop     |
| Locate   | Express       | Organize   | Identify      | Assess    | Formulate   |
| Match    | Extend        | Paint      | Infer         | Conclude  | Hypothesize |
| Memorize | Give Examples | Prepare    | Point out     | Contrast  | Invent      |
| Name     | Illustrate    | Produce    | Select        | Critique  | Make        |
| Omit     | Indicate      | Select     | Subdivide     | Determine | Originate   |

|           |             |             |              |         |             |
|-----------|-------------|-------------|--------------|---------|-------------|
| Recite    | Interrelate | Show        | Survey       | Grade   | Organize    |
| Select    | Interpret   | Sketch      | Arrange      | Justify | Plan        |
| State     | Infer       | Solve       | Breakdown    | Measure | Produce     |
| Count     | Match       | Use         | Combine      | Rank    | Role Play   |
| Draw      | Paraphrase  | Add         | Detect       | Rate    | Drive       |
| Outline   | Represent   | Calculate   | Diagram      | Support | Devise      |
| Point     | Restate     | Change      | Discriminate | Test    | Generate    |
| Quote     | Rewrite     | Classify    | Illustrate   |         | Integrate   |
| Recall    | Select      | Complete    | Outline      |         | 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**

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You solve It Simulations on HMH Digital Platform  
Study Jams on Scholastic.com

## **Assessment Evidence - Checking for Understanding (CFU)**

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Explaining - formative

Describing - alternative

Drawings - alternative

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light

- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports

## **Primary Resources & Materials**

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HMH Digital platform

Chromebooks

## **Ancillary Resources**

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

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

## **Technology Infusion**

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HMH Digital platform

Chromebook

Google classroom

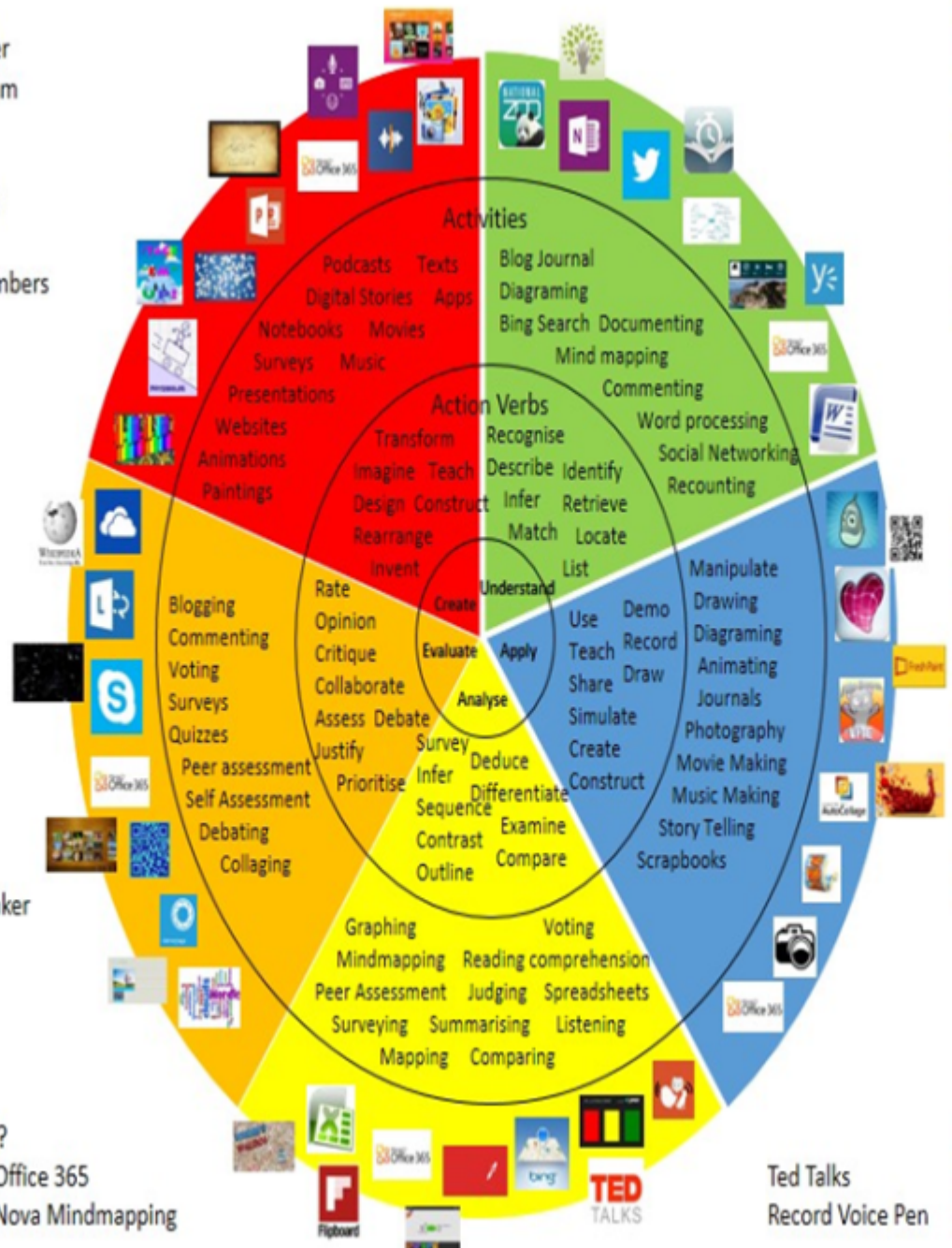
## Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts  
Photostory 3  
Kid Story Builder  
Music Maker Jam  
Paint A Story  
Office 365  
MS PowerPoint  
Stack 'Em Up  
NqSquared Numbers  
Physamajig  
Xylophone 8

Wikipedia  
Skydrive  
Lync  
SkyMap  
Skype  
Office 365  
Puzzle Touch  
Easy QR  
Memorylage  
Life Moments  
Word Cloud Maker

Where's Waldo?  
MS Excel  
Flipboard  
Office 365  
Nova Mindmapping

Ted Talks  
Record Voice Pen



Originally taken from <http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg>  
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst



## **Alignment to 21st Century Skills & Technology**

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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;
- Science and Scientific Inquiry (Next Generation);
- Technology;
- Visual Arts.

## **21st Century Skills/Interdisciplinary Themes**

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

Creativity and Innovation

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

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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

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### Repeat Directions

Extra time to complete assignments

#### Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition

- Dictation to scribe
- Small group setting

#### **Hi-Prep Differentiations:**

- 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
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

#### **Lo-Prep Differentiations**

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

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

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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
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- 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
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

### **English Language Learning (ELL)**

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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 clarify
- 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 work presented 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**

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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 work presented 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)**

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

Advanced problem solving

Allowing 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 blog or social media page about their unit
- 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