Inquiry Project Design Plan

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Name of Project: Sustainability	**Grade Level: 9-12**
Est Launch Date: Fall 2023	**Est Duration (in weeks):** 4-6
Disciplines Involved: Science, Math, ELA	
Problem Statement: Our environment is impacted and affected by the actions of human beings. The negative impact of humans on living organisms and our great resources of Yonkers land and water resources need to be changed now. How can we as future inhabitants of the earth make changes now? Where do we start?	

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STAGE 1: DESIRED RESULTS

Big Idea: Sustainability

Enduring Understandings:	**Essential Question(s):** (MEANT TO BE SHARED WITH STUDENTS)
• We can make a difference in our world. • Human behavior (the decisions we make) affects other living organisms in our community. • Our ideas can become reality if we present our research in creative ways. • Determine problems that we can change.	• **How can we contribute to sustainability to better our Earth for all living creatures?** • What human behaviors can we change NOW to solve this problem? • How can I share what I know in ways that my audience will understand?

Established Goals (Standards, Performance Indicators, Learning Goals):
*choose relevant standards to unit/project plan timing and learning goals; do not need to use all disciplines below.
** unpack into SWK and SWBAT under identified standards as this will lead to aligned assessment design

Science Standards: HS-ESS2-5

Plan and conduct an investigation of the properties of water and its effect on Earth materials and surface processes. (Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transporation and deposition using a stream table, erosion using variations in soil mositure content, or rost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids.)
Communicate solutions that will reduce the impact of humans on living organisms and non-living things in the local environment. * [Clarification Statement: Examples of human impact on the environment (land, water, air, plants, and animals) could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

SWK:

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- Solutions that are found can be communicated in a variety of ways, depending on the audience to reach
- Humans are responsible for all living things at this time on earth
- All living things are interconnected
- We influence others with our behavior, actions and communication

SWBAT:

- Identify solutions (either through design or what they find already in existence through their research) for a problem they find.
- Analyze the role of human beings and their place in order of living things.
- Research how living creatures coexist.

Social Studies Standards: n/a

Mathematics Standards: AI-F.BF: Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Determine a function from context. Define a sequence explicitly or steps for calculation from a context. Connecting the Standards for Mathematical Practice to Mathematical Content. Students are reasoning abstractly (MP2) when they create abstract algebraic models of problems (AIA.CED.1-4 and AI-F.BF.1).

SWK:

- Two quantitites have a relationship
- What a function is in a context
- What a sequence is
- What an input and output is
- That there are steps to calculate a sequence to context

SWBAT:

- Describe the relationship between two variables
- Identify a function in its context
- Explain what a sequence is
- Define what an input and output is
- Follow the steps to calculate a sequence in a context

ELA Standards:

Describe how a text presents information (e.g., sequentially, comparatively, causally, visually, and graphically).

RST5 (9/10 Grades): Describe how the text structures information or ideas into categories or hierarchies, including how the major sections contribute to the whole and to an understanding of the topic.

SWK:

- Use graphic organizers to gather schemata/background information
- Discuss vocabulary and strategies
- Read sustainability articles for content
- Use timelines and pictographs for deeper understanding

SWBAT:

- Take notes to organize information
- Use vocabulary in context and application as a study tool

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- Compare and contrast articles for information
- Write a summary in sequential order of events that affect sustainability

9-10R6: Analyze how authors employ point of view, perspective, and purpose to shape explicit and implicit messages

SWK:
- Use graphic illustrations found online
- Discuss purpose of and message of articles

SWBAT:
- Create graphic illustrations, a poster or comic strip, to show point of view or perspective
- Write a summative paper on perspective or purpose of findings

RH6: Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize.

SWK:
- Note taking skills
- Compare and contrast the point of view of two articles on a similar topic

SWBAT:
- Using annotations to take notes as well as highlight vocabulary
- Write a three paragraph essay comparing and contrasting articles

Technology Standards:

- **NYS Computer Science and Digital Fluency:**
  9-12.IC.4 Assess personal and societal trade-offs related to computing technologies and data privacy.

- **ISTE: Standard 2:** Communication and collaboration. Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. **Activity 2:** Students work in teams to do a group book report on one aspect of an assigned text, creating a digital slide show from the teacher's template that they will present to the class

Social Justice Standards: Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

Other (Art, SEL, etc):

Links to Standards/Reference Frameworks:
NGSS, NGSS by DCI Nat'l C3 SS Framework, NYS K-8 SS Standards, Common Core, ISTE, Learning for Justice Social Justice Standards, CASEL SEL Framework, NYS CS and Digital Fluency

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STAGE 2: EVIDENCE & ASSESSMENTS:

Performance Task Narrative:

Goal: Our environment is impacted and affected by the actions of human beings. The negative impact of humans on living organisms and our great resources of Yonkers land and water resources need to be changed now.
I will design a solution that will address water polution in the Hudson River.

Role: *Define the roles of the students in the task. State the jobs of the students for the task.*
(Career Connections) Writers, Readers, Engineers, Computer Scientists, Lab Technicians, Researchers, Teachers

Audience: *Identify the target audience within the context of the scenario.*
Our audience is the high school population including our students and faculty.

Situation: *Set the context of the scenario. Define the narrative.*
Students will work to better the environment by recycling water bottles and encourage all to use recyclable bottles instead of asking teachers for disposable cups for water. Students will use water from the Hudson River and school fountains for sampling and research.

Students will read articles, research, write about the environment and how it affects human beings and other living organisms. Students may work individually or in small groups of three.Students will create and take surveys. Students will collect data and graph results. Students will test water from the Hudson River as well as the school fountains.

Product(s): *Clarify what the students will create and why they will create it.*

- Using drones, students will collect data for research.
- Using drones, photographs will be taken in hard to reach places including the River.
- Students will take photographs using their phones.
- Students will create and take a survey.

Criteria for Success: *Provide students with a clear picture of success. Identify specific standards for success.*

- ❑ Rubrics As Formal Assessment
- ❑ Writing Essays Edited by Peers and then Teachers
- ❑ Collection of Data in Labs (Chemistry, Mathematics)
- ❑ Visual Art: Posters and graphic illustratrations (comic strips)

Other Evidence/Assessments:

Graphic organizers to gather schemata/background information
Vocabulary expanded and applied through subject areas
Reading for content and critical thinking and text based evidence
Discuss purpose of articles
Using timelines and pictographs for deeper underst1 4d32tanding
Using graphic illustrations to pull data and explain
Summative papers on perspective or purpose of findings
Compare and contrast the point of view of two articles on a similar topic
Using annotations for note taking/note taking skills

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STAGE 3: THE LEARNING PLAN:

Learning Activities

(potential layout below. Can be daily, divided by periods, or even using the Engineering Design Process to divide into stages such as Ask, Imagine, Plan, Create, Improve)

Week 1

Learning Goals:
Our environment is impacted and affected by the actions of human beings. The negative impact of humans on living organisms and our great resources of Yonkers land and water resources need to be changed now

Learning Events:
Research the problem.
Plan by selecting a promising solution. We want to make the students more aware of how they impact the environment.
Create a prototype.
Build choice into student product. Students will be in small groups.
Create opportunities for student reflection.
Include discussion vehicles.

Formative Assessments:
Complete survey.
Identify checkpoints to gage understanding.
Submit three photographs related to field assignment.
Complete stations of testing waters.
Using rubrics.

Notes/Resources:

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Week 2
Learning Goals:
Learning Events:
Formative Assessments:
Notes/Resources:
Week 3
Learning Goals:
Learning Events:
Formative Assessments:
Notes/Resources:
Week 4

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Learning Goals:

Learning Events:

Formative Assessments: