Inquiry Project Design Plan

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Name of Project: Making Space for Change	**Grade Level:** 7/8
Est Launch Date:	**Est Duration (in weeks):4-6**
Disciplines Involved: Math, Science, Technology	
Problem Statement: Looking around our neighborhood, do you notice any unused spaces?	

STAGE 1: DESIRED RESULTS

Big Idea: Design

Enduring Understandings:

- ∉ Identify a local public space to research and redesign for sustainability.
- explore properties of open and closed systems;
- learn how to use models to simulate systems and interactions;
- learn that a system is made up of numerous parts, and they use system models to explain interactions within and between systems at different scales
- improve designs from 2D to 3D through peer feedback and revision.
- ∉ Create a physical model
- ∉ Apply the area formula in real world situations
- ∉ Understand how proportional relationsiops are used in real world scenerios

Essential Question(s):
(MEANT TO BE SHARED WITH STUDENTS)

- ∉ How can we create an environmentally sustainable redesign for a community space?

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

NY-7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Science Standards (list if using, unpack under each standard into SWK and SWBAT)**:**

- ∉ **HS-ETS1-3** Evaluate a solution to a complex real-world problems based on prioritized criteria and tradeoffs that account for a range of contraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

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- **HS-LS1-2** Develop and use a model to illustrate the hierrarchial organization of interacting systems that provide specific functions within multicellular organisms.
- **HS-ETS1-2** Design a solution to a complez real-world problem by breaking it down into smaller, more managable problems that can be solved through engineering.

SWK:

- Evaluate competing designs solutions
- Develop and use models
- Hierarchical organization of interacting systems
- Changes (even small ones) in one part of a system can influence humans resources

SWBAT:

- Engage in argument derived from evidence
- Define biodiversity in terrestial and oceanic ecosystems
- Use biodiversity to measure the health of an ecosystem
- Examine how change influences human resources

Mathematics Standards (list if using, unpack under each standard into SWK and SWBAT)**:**

NY-7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

SWK:

- Solve problems involvong scale drawings of geometric figures
- How to compute actual lenghts and areas
- How to reproduce a scale drawing at a different scale

SWBAT:

- Decide whether two quantities are in a proportional relationship
- Apply the area formula
- Use proportional relationships to solve multistep ratio and problems

ELA Standards (list if using, unpack under each standard into SWK and SWBAT)**:**
7W6: Conduct research to answer questions, including self-generated questions, drawing on multiple sources and refocusing the inquiry when appropriate. Generate additional related questions for further research and investigation.

7SL1c: Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

SWK:

- Answer questions based on research
- Generate questions related to other questions
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SWBAT:

- Conduct research to asnwer questions
- Generate questions about research and in response to other questions
- Respond to questions with relevant evidence

Technology Standards:

- **NYS Computer Science and Digital Fluency** (select at least 1 for Smart Start)**:**
  7-8.DL.4 Select and use digital tools to create, revise, and publish digital artifacts.

- **ISTE:**

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1.3A Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
Social Justice Standards:
Other (Art, SEL, etc):
Links to Standards/Reference Frameworks: **NYS NextGen ELA and Math, NGSS, NGSS by DCI Nat'l C3 SS Framework, NYS K-8 SS Standards, ISTE, Social Justice Standards, CASEL SEL Framework, NYS CS and Digital Fluency**
Teaching/Learning Goal Notes for Stage 1:

STAGE 2: EVIDENCE & ASSESSMENTS:

Performance Task Narrative

Goal: *Provide a statement of the task. Establish the goal, problem, challenge, or obstacle in the task.*

- Students will create an environmentally sustainable redesign for a community space, such as a park, public square, or empty lot.

Role: *Define the role of the students in the task. State the job of the students for the task.*

- Students will design a space (shape) for gardening – 2D and 3D
- Use scale factor to design the space in real life
- Plant the vegetation.

Audience: *Identify the target audience within the context of the scenario.*

- Fellow Gardeners (classmates, teachers, parents)

Situation: *Set the context of the scenario. Define the narrative.*

- Our neigborhood is robust and alive. However, I have noticed many unused or underutilized spaces. Our goal in this unit, is to locate those spaces and recreate a better vission for that space and build a sustainable system. To do so, we will be exploring our neighborhood with the use of drones to identify unused spaces, draft and build a garden bed, bring it to life.

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

- Scale drawing of a garden box using drones and co-space
- CoSpaces model to scale (cardboard model)
- 3D image of the community space
- Proposal or presentation of their designs

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Criteria for Success): *Provide students with a clear picture of success. Identify specific standards for success such as rubrics, checklists, quizzes, etc.*

- ❑ Lesson Quizzes
- ❑ 3-D scaled Model (cardboard)– rubric
- ❑ 3-D Model (cospaces) – rubric
- ❑ Presentation of design – rubric
- ❑ Group Collaboration – rubric

Other Evidence/Assessments:

- Revise/Edit models
- Class/Group discussions
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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 1-2: Launch & Research

Learning Goals:
-learning the tools (Cospaces, flying drone)
-garden beds
-surveying and mapping underutilized spaces (drones, Google Maps)

Learning Events:

ASK – introduce the problem and ask for solution
RESEARCH – students will research underutilized spaces in the area (use of drone)
- What are underutilized spaces? What do they look like?
- Use drone to sccout the area around the school building for underutilized spaces.
- Use google maps aerial view to take screen shots of underutilized spaces.
- What are flower beds? What do they look like? Materials?

IMAGINE – students will generate design ideas
- Students will draft 2D models on paper – 3 designs
- Students will use CoSpaces to create a 3D design

PLAN – design a garden bed on paper and cospaces
- Students will use proportional relationships (7^{th}) and dialation properties (8^{th}) to create a carboard model of a 3D design

Formative Assessments:

Aerial shots with evidence
Cospaces –3D design including dimesnsions

Notes/Resources:

Week 3: Ideation of Models

Learning Goals:

- scale factor
- scale drawings
- porportional relationships
- scale drawings in the real-world

Learning Events:

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- Exploration tool
- Lesson 4 (8th Grade) Lesson 3 (7th Grade)

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

- CREATE
    - Cardboard models with dimensions
    - 3D models with dimensions

- TEST (IMPROVE) – students will test their designs
    - Which types of plants will grow best? Seasonal? Year-round?
    - What is the most cost effective?
    - What is most sustainable?

Formative Assessments:

- Lesson Quizzes
- Cardboard models with dimensions
- 3D models (CoSpaces) with dimensions

Notes/Resources:

Week 3: Presentations & Voting

Learning Goals:

- evaluating the models
- presentation to peers

Learning Events:

- Guest Speaker
- REVISE – students revise their models
    - Consider cost, climate, and sustainability
- Presenations in Auditorium
- Evaluation of models

Formative Assessments:

- Presentation of model
- Evaluation of peers models

Notes/Resources:

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Week 4
Learning Goals:
Learning Events:
Formative Assessments: