Project Earth

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Target Grade: 6th grade Science

Time Required: 5 classes, 60 minutes each

Standards:

- MS-ESS3-3.3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
- S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth processes.
- S6E5. Obtain, evaluate, and communicate information to show how Earth's surface is formed.
- S6E5j. I can describe methods for conserving natural resources such as water, soil, and air.
- S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth.
- MGSE6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths (1/2 u), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = (length) x (width) x (height) and V= (area of base) x (height) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- MGSE6.RP.3d Given a conversion factor, use ratio reasoning to convert measurement units within one system of measurement and between two systems of measurements (customary and metric); manipulate and transform units appropriately when multiplying or dividing quantities.
- SS6E4. The student will explain personal money management choices in terms of income, spending, credit, saving, and investing.

Lesson Objectives:

Students will:

- Be able to identify environmental concerns related to the ocean, soil, and the air.

- Create a prototype of their own design that will reduce the human environmental footprint.
- Create a Public Service Announcement (PSA) that will address an environmental issue on earth.

Central Focus:

In this series of lessons, students will learn about pollution and the effect of their own environmental footprint on our planet's sustainability. Students will create a prototype that will have the potential to reduce the amount of pollution on earth. Over the course of 5 class meetings, students will learn about the environmental issues surrounding our planet. Additionally, students will create a final project that will address an environmental issue, find a solution, and explain what steps were taken in their project design process.

Background Information:

Students will be familiar with the acronym "STEM" and what that includes. (Science, Technology, Engineering and Math) Students can define reliable and unreliable research regarding peer reviewed journals and acceptable sources. Students can define the term "data" as facts and figures recorded from experiment through observations. Students will be fluent in using the metric system. Additionally, students can define the terms: control vs. experimental variable, hypothesis, design, contrive, plan, and redesign.

Materials

Teacher:

- Smart Board (for video projection)

Students:

- "Ask, Imagine, Plan, Create, Improve" worksheet
- "Thinking it Out" worksheet
- Recycled materials (i.e. clean garbage, cardboard, plastic, etc.)
- Tools to assemble student's project (screw drivers, pliers, box cutter, hand drill, socket set, hot glue gun, and etc.)
- iPad, iPhone, or iMac

Day 1 Instruction

<u>Introduction (30 minutes):</u>

- Introduce students to environmental concerns related to the ocean, soil, and the air using various YouTube videos.

Whale: https://youtu.be/tcXU7G6zhjU
Straw: https://youtu.be/1IJTpceS4uo
Spoon: https://youtu.be/VRiTABRQOjk
Garbage Patch: https://youtu.be/1qT-rOXB6NI
How much trash: https://youtu.be/hfwmlps0Lco
Deforestation: https://youtu.be/M4jhjt1_eyM
Deforestation time-lapse: https://youtu.be/hllU9NEcJyg

Activity (20 minutes):

- After students watch each video together in class, discuss the environmental concern, human impact, and possible solutions.
- In groups, students will discuss the environmental issues from the videos and decide which issue they'd like to address with their project. Students will be encouraged to begin the process of drawing pictures of their prototype, taking notes, and brainstorming ideas.
- Students will be given a "Thinking it Out" and "Ask, Imagine, Plan, Create, Improve" worksheet to begin the research and brainstorming process.

Questions to encourage the research and brainstorming process:

1. What is the environmental problem you'd like to address?
2. What can I do as a 6th grader to help control, prevent, and/or decrease this environmental problem?
3. What materials will you need to build your prototype?
4. What step-by- step procedures will you follow? Sketch your idea.
5. What will a model of your design look like (include measurements to include but not limited to: length, width, height, volume, etc.)

Days 2-3 Instruction

Introduction (40 minutes):

- Students will begin building their prototype for the environmental issue they have selected during class time. The teacher will be available for guidance and to answer any questions that the students may have.
- Materials will be available for students to use in developing their prototype. Students will be asked to build their design following their step by step procedures, measurements and supply lists. Remind students as they create their projects:

1. Is it working like you had planned? If not, what are some possible changes that can be made to your design?
2. If it does work, what can you do to make it better?

Day 4 Instruction

Activity (60 minutes):

Students will create a Public Service Announcement (PSA Earth) using iMovie. Students will be given a "Planning/Brainstorming Worksheet" (attached) prior to beginning their iMovie projects. After analyzing the data from their STEM project, they will create a 3-4 minute movie that will address the environmental issue on earth. It should give advice or information about what we can do to stop or reduce the impact rate on earth ensuring our environmental sustainability. The video should also have the following elements (rubric attached):

- 3-4 minutes in total length
- Title Page (NOT PSA: Project Earth)
- Credits page with all reliable resources cited
- 2-5 Informational Keynote Slides
- 2-4 Video clips
- Video clips are no more than 15 seconds
- Transitions within iMovie
- 2-3 other Apps used in iMovie
- 6-10 images (Copyright Free)
- Image play for no more than 5 seconds
- Music (as needed)
- Sound is appropriate for iMovie scene
- CLEAR persuasive argument
- Visuals/Images are directly related
- CLEAR evidence to support opinion
- Word choice enhances argument
- Free of grammar or spelling errors
- Engaging / grabs viewer's attention
- Evidence of research
- Logical order
- Technology used to enhance presentation

Day 5 Instruction

Students will present their final projects addressing the environmental issue that they chose, explaining their solution, and what steps were taken in the project design.

Differentiation

Groups will be formed by the teacher to support all learners. Worksheets are designed so that students can move at their own pace throughout the project. Each lesson is built on the previous lesson to create a consistent scaffold of information.

Assessment

Formative Assessment of student work includes the "Ask, Imagine, Plan, Create, Improve" and "Thinking it Out" worksheets. Students who do not demonstrate comprehension of the project process will be paired with a partner within their group for more support.

Summative Assessment of student work includes a final project demonstrating the objectives for this lesson. Students will show mastery in understanding the issues and environmental concerns related to the ocean, soil, and the air. Additionally, students will present an iMovie reflecting the environmental concern that they chose to research.

Name:_____Period:

Group:_____

(ASK) What is the PROBLEM?

_____
_____
_____
_____
_____

(IMAGINE) What are some possible SOLUTIONS to your problem?

_____
_____
_____
_____
_____

(PLAN) What MATERIALS will you need? What step-by-step PROCEDURES will you follow?

_____
_____
_____
_____
_____

(CREATE) What MODEL of your design look like? (sketches, images, pictures, etc)

(IMPROVE) What are some possible IMPROVEMENTS to your design?

_____
_____
_____
_____
_____

Name of your design _____

What is your design's purpose?

_____
_____
_____
_____
_____

Thinking it Out Topic: _____

PSA: Project Earth

Directions:

1. *Write the **goal** for your project in the first box.*
2. *Write three **reasons** this issue must be addressed in the center boxes.*
3. *List **facts (research based) and examples** of your environmental issue in the boxes on the right.*

Goal

Reason 1

Fact / Example

Fact / Example

Reason 2

Fact / Example

Fact / Example

Reason 3

Fact / Example

Fact / Example

Planning / Brainstorming Name _____

PSA: Project Earth Date _____ Period _____

Topic: _____

Write your **PURPOSE** for the following:

- To explain how to do something
- To give an opinion
- To ask something

Answer the following questions about your **AUDIENCE**:

1. Who will watch this Public Service Announcement?

2. What do they (the viewer) already know about the topic I have chosen?

3. What do I want them to know or learn?

4. What part of my topic would interest them most?

5. What lasting message or belief do I want to leave them (the viewer) with once the video is over?

iMovie Project Earth Rubric

Student: _____

Group Members: _____

- 3-4 minutes in total length ____/5_____
- Title Page (NOT PSA: Project Earth) ____/5_____
- Credits page with all reliable resources cited ___/5_____
- 2-5 Informational Keynote Slides _____/5_____
- 2-4 Video clips (Video clips are no more than 15 seconds) ____/5_____
- Transitions within iMovie _____/5_____
- 2-3 other Apps used in iMovie ___/5_____
- 6-10 images (Copyright Free) ____/5_____
- Image play for no more than 5 seconds _____/5____
- Music (as needed) ____/5_____
- Sound is appropriate for iMovie scene ____/5_____
- CLEAR persuasive argument ____/5_____
- Visuals/Images are directly related _____/5_____
- CLEAR evidence to support opinion ____/5_____
- Word choice enhances argument _____/5_____
- Free of grammar or spelling errors _____/5_____
- Engaging / grabs viewer's attention ____/5_____
- Evidence of research ____/5_____
- Logical order ___/5_____
- Technology used to enhance presentation _____/5_____

Total Points: _____/100

Percent: _____