

# THE AGE OF ANTHROPOTEENY

*BRINGING GLOBAL AWARENESS OF ENORMOUS PROBLEMS INTO A TEENY PLATFORM*



**Recommended Age(s)/Grade(s):** 6<sup>th</sup>-12<sup>th</sup> Grades

**Time Needed – Preparation:** 2 days (2 hour block periods)

**Time Needed – Execution:** 10 days – divided by sections from research of topics, rough and final draft concept, creation and implementation of model (2 hour block periods)

## **Standards:**

### ***NATIONAL GEOGRAPHIC STANDARDS***

2: The World in Spatial Terms – How to use mental maps to organize information about people, places, and environments in a spatial context

13: Human Systems – How the forces of cooperation and conflict among people influence the division and control of Earth’s surface

14: Environment and Society – How human actions modify the physical environment

16: Environment and Society – The changes that occur in the meaning, use, distribution and importance of resources

### ***NEXT GENERATION SCIENCE STANDARDS (NGSS)***

#### MIDDLE SCHOOL

MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem

MS-ETS1-2 Engineering Design

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

#### HIGH SCHOOL

HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics

Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS4-2 Biological Evolution: Unity and Diversity

Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

### ***STEAM STANDARDS (CPALMS – State of Florida’s official source for standards information and course descriptions)***

#### SCIENCE

*Environmental CTE Curriculum Framework*

02.06 - Identify conservation practices related to natural resources.

#### *Science Standards*

SC.9.L.17.In.2

- Identify that living things in an ecosystem are affected by changes in the environment, such as changes to the food supply, climate change, or the introduction of predators.

SC.9.L.17.In.8

- Describe ways the lifestyles of individuals and groups can help or hurt the environment.

#### *Language Arts Standards that Apply to Science*

LAFS.910.RST.1.1

- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LAFS.910.RST.1.2

- Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

## TECHNOLOGY/ENGINEERING

### Applied Engineering Technology

- 25.0 Demonstrate an understanding of the effects of technology on the environment.
- 26.0 Demonstrate the abilities to assess the impact of products and systems.
- 16.0 Demonstrate an understanding of the various approaches used in problem solving.
- 17.0 Demonstrate the abilities to apply the design process.
- 20.0 Perform an engineering project requiring design or re-design of an engineering system
- 27.0 Plan, organize, and carry out a project plan.

## ART

### VA.9.C.1.2

- Use critical-thinking skills for various contexts to develop, refine, and reflect on an artistic theme.

### VA.9.F.1.2

- Manipulate or synthesize established techniques as a foundation for individual style initiatives in two-, three-, and/or four dimensional applications.

## MATHEMATICS

### MAFS.K12.MP.1.1

- Make sense of problems and persevere in solving them.

### MAFS.K12.MP.5.1

- Use appropriate tools strategically.

### MAFS.K12.MP.6.1

- Attend to precision.

### MAFS.K12.MP.7.1

- Look for and make use of structure.

## **Objectives:**

By the end of this project, students will be able to:

- Identify global environmental problems and solutions to counter them
- Understand interrelationships between humans and the environment
- Define a problem and design a solution by illustrating and then creating 3 dimensional scalable models
- Communicate visuals effectively by implementing a plan using scientific knowledge and reasoning
- Analyze examples of how human activities have caused environmental destruction.

## **Materials and Preparation Needed:**

*What materials will need to be gathered or prepared for this project? Note what should be prepared in advance.*

- Colored paper
- Colored pencils
- Thin black markers for outlining
- Rulers
- Scissors
- Markers
- Variety of animal figurines from differing biomes
- Legos or people figurines
- Lights (\*Lume Cube Panel Mini)
- Light boxes (\*Orangemonkie Foldio2Plus 15" Portable Lightbox Studio)
- Camera (Sony Alpha 6500, iPhone or Android Phone)
- Tripod
- Documentary: Racing Extinction
- Tissue Paper of a variety of colors
- Colored clay and Air dry clay
- Mirrors
- Balsa Wood
- Cardboard boxes for those wishing to create dioramas with backgrounds

\*Items used/purchased for our in-class production

## **Overview:**

*What activities are included in the project? How is the project structured? Note actions taken by educators and learners in enough detail that another educator could implement a similar project.*

## DAY 1

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### Socratic Seminar

1. Ask students about what environmental problems they see in their own community. What about their state? Globally?
2. Watch National Geographic: *Man vs. Earth* - <https://www.youtube.com/watch?v=B-nEYsyRIYo&t=8s>
  - Discuss the video in class. Is there a solution to all the environmental problems we have created?

### Activity 1 – Environmental Ranking Cards

3. Hand out environmental ranking cards to groups of 3-4 students. (Soil Degradation, Ocean Acidification, Eutrophication, Overpopulation, Air Pollution, Overconsumption, Climate Change, Animal Agriculture, Fossil Fuel Extraction, Waste Disposal, Overfishing, Plastics).
4. Ask students to define the problems based on their understanding and rank them from the most problematic to the least. Without discussing deeply, explain topics that they don't understand by just stating the process to help them better rank the issues.
5. Have each group explain to the class their reasoning for the top 3 problems on their list.
6. After all the groups have discussed their top 3 problems, have students debate what should be at the top of the list. Have them vote in class to see which environmental problem is ranked highest.

*Note: You want to give students a fresh perspective on all the items on the Environmental Problems Ranking list so play devils advocate. If they claim one problem being the more important than others, show how another issue could be more important to a specific place or people. For instance, the islands of the Maldives located in South Asia are surrounded by water. Fishing is not just a lifestyle, it is a survival mechanism. For a fisherman not capable of catching enough fish, overfishing may be the most pressing problem. Another thing to think about is that these islands are slowly being inundated due to sea level rise. Rising sea levels can impact their freshwater, their coral reef systems, their fish populations, and their buildings due to climate change. Allow them to debate and disagree while gaining fresh perspectives on all the problems.*

## DAY 2

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1. Watch Leonardo DiCaprio's speech <https://www.leonardodicaprio.org/leonardo-delivers-landmark-speech-at-the-united-nations-climate-summit/>
2. illUmiNations: Protecting our Planet <https://www.youtube.com/watch?v=quVb1vNRRMc>
  - Prep students for the documentary Racing Extinction.
  - In the short clip, Jane Goodall states a fact. Ask them if they know who she is? What did she do?
  - How can people fix the problems we are currently facing?
  - Mention to students that Racing Extinction was filming this footage outside of the United Nations Building where Leonardo DiCaprio spoke that year. If you look closely, you can actually see him filming.
3. Watch Racing Extinction <https://racingextinction.com/> (if you contact them, they may give you access to watch the documentary for free. They have done this with me by giving me a password)
  - a. Explain that they will be focusing on one topic to highlight later on so that as they are watching the documentary, they can write down ideas about what they can work on.
  - b. Also give them the Environmental Problems discussed the first day. Have them check off which of the topics are mentioned throughout the documentary.

*\* Recommended that you pause throughout the documentary to shed light on the differing topics and have discussions throughout. The documentary itself is well laid out that you know when you're transitioning into a new discussion. During these times, I would suggest that you pause and go into more depth and ask questions to check for understanding as well as driving their curiosity. It usually takes me 2 full class periods (2 hours blocks) to finish the movie as we go into discussions for a good amount of the time.*

## DAY 3

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1. Finish watching Racing Extinction <https://racingextinction.com/>
  - a. Ask them the following questions:
    - i. What did you like/dislike about the documentary?
    - ii. What new information did you gain?
    - iii. What did you question and disagree with and why?

- iv. What environmental problems that we talk about did they not discuss?

*Activity 2 – Anthropoteeny Project*

1. Hand out the [Anthropoteeny Project](#) worksheet with guidelines.
2. Discuss the project (show the [STEAM powerpoint](#) on Anthropoteeny website to get ideas)
  - a. Mention to students that there are many environmental problems they can choose from it doesn't have to be based off of the documentary)
  - b. Have them come up with 3 environmental issues from specific locations around the world

***DAY 4***

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1. Anthropoteeny Project

*Activity 1 – Environmental Ranking Cards*

Hand out environmental ranking cards to groups of 3-4 students. (Soil Degradation, Ocean Acidification,

**Vocabulary:**

Anthropogenic Factors, Soil Degradation, Ocean Acidification, Eutrophication, Overpopulation, Air Pollution, Overconsumption, Climate Change, Animal Agriculture, Fossil Fuel Extraction, Waste Disposal, Overfishing, Extinction

***Scales and Perspectives, Human and Natural World Connections:***

*How does this lesson allow students to examine the world from different scales and perspectives? How are themes of the human and natural world, and their intersections, covered in this lesson?*

**Learning Framework Connections:**

ATTITUDES

<b>Curiosity</b>	By learning about birds and orcas of the South Atlantic, the central Pacific and their local regions students become more aware that human choices can lead to global problems.
<b>Responsibility</b>	Developing a connection with birds and orcas they have come to understand from life cycles to struggles, they assume a greater responsibility to the peril of birds and wish to find solution for the benefit of their own community.
<b>Empowerment</b>	Students will implement a strategy to share their knowledge of birds and solutions to help the populations increase by communicating through letters their concern for the wellbeing of orcas.

SKILLS

<b>Observation</b>	Students will be able to analyze ecological adaptations and relationships between species in differing environments across the globe.
<b>Communication</b>	Students will learn the art of writing professional letters to reach out to the organizations that control captivity of cetaceans.
<b>Collaboration</b>	Students will work together on various activities from analyzing the beaks they observed to role playing birds in South Georgia. They will need to hear other perspectives as they develop their own opinions about the topics discussed.
<b>Problem-Solving</b>	Students will understand varying perspectives for the decline of bird and orca species from climate change to invasive species, as they take action. They will relate historic action such as the eradication or control of invasive species to mitigate current trends in the system.

KNOWLEDGE

<b>Human Journey</b>	Plastic use is as much a cultural aspect of society in the United States as our cultural foods. It is comfort as much as it is convenient. Understanding how human populations
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	<p>influence these trends, how they are made and where they end up will help students understand how our society has impacted the planet.</p> <p>The way humans impacted places such as South Georgia allows students to recognize not only the severity of our impact but also the possibility of reversing dire effects of overfishing and the loss of a species.</p>
<b>Our Changing Planet</b>	<p>Students will understand how to make their own communities more sustainable through activities and conversation with displays and giveaways at a local farmers market.</p>
<b>Wildlife &amp; Wild Places</b>	<p>They will know their voices matter in creating positive changes by communicating ideas such as plastic reduction, reduction of pesticides, educating the public about feline friends, and not keeping song birds captive to bring back the populations and diversity of birds in South Florida.</p>

**Taking Action:**

*How will this project inspire and empower students to take action to make the world a better place? How will students' talents and interests drive this action?*

**Assessment:**

*How will student learning be assessed for this project?*

**Opportunities for Modifications and Extensions:**

This lesson can be modified for any grade level. Each activity is stand alone and can be used individually with other curriculum.

Extensions are also possible such as mapping activities connecting the environmental problems exposed within the classroom and understanding how one environmental issue can have indirect severe implications on other parts of the world.

**Resources:**

*What outside materials support this project? Please include links.*

*Activity 1*

**Soil Degradation**

**Ocean Acidification**

**Eutrophication**

**Overpopulation**

**Air Pollution**

**Overconsumption**

**Climate Change**

**Animal Agriculture**

# Fossil Fuel Extraction

## Waste Disposal

## Overfishing

## Plastics

Provide opportunities for individually suitable examples and real life experiences as well as high academic achievement and an ability for critical thinking, problem solving and creative thinking (Celik, 2007). In addition, the use of teaching materials in the classroom enriches the educational experience and provides the meaningful learning for the subject (Kurtdele Fidan, 2008; Stokes, 2002). The use of material and tools for the difficult and abstract concepts in science are particularly important (Begoray, 2001). Because teaching tools provide the opportunity to bring the world of abstract science, which does not fit into the class, into a concrete class environment (Taber, 2002). It gives students the opportunity to learn through living and producing (Aksoy, 2003). Another reason for using teaching tools in science teaching is that they provide students with a real-life environment (Arslan, 2007). It is important that science lessons are practiced with the help of teaching materials in order to contribute to the training of students who are interested in science, who are curious, observers, thinkers, thinkers, asking questions, solving problems, making inferences and designing and finalizing experiments (Justi & Gilbert, 2002, Marbach-Ad, 2001). One of the teaching materials used in science teaching is dioramas (Tunncliffe & Scheersoi, 2015). Diorama can be defined as a scene from a certain time period. Because of the nature of dioramas, this definition cover a vast area (Tunncliffe & Scheersoi, 2009). The reason dioramas have such a large scope is that any moment can be captured at any given time. All the details of the moment captured with the help of dioramas are revealed using many objects (Assa & Wolf, 2007). In addition, in dioramas the relation of objects to each other and their surroundings are described. These described items are perfectly handled in dioramas as depiction of the reality (Tunncliffe & Scheersoi, 2015). Dioramas can also be used to reach specific aims for teaching themes and topics. For example, in biological dioramas, the real habitat of an animal species can easily be demonstrated to students with real factors such as flora and soil structure. Also, dioramas can be used in teaching process to visualize the concepts such as prey-hunter, symbiotic life without the use of real animal examples. Furthermore, it helps identify biodiversity of the past, including extinct life forms (Marandino, Dias Oliveira & Mortensen, 2009). It also helps to demonstrate the changes that have taken place in the habitats of the living beings during a long period, from past to today, and facilitate learning in the process. Since 2004 there has been an attempt to shift the way science is taught in the classrooms in Turkey. The teacher centred learning in which teacher is the source of knowledge was changed to student centred learning that involves students being responsible for their learning and changes a



teacher's role to a guide for monitoring learning. Despite a relatively long duration the application of this paradigm shift does not see