**Subject area/course**: Science/AP Environmental Science

**Grade level/band**: 11-12

**Task source**: Summit Public Schools

**Sustainability**

**TEACHER'S GUIDE**

1. **Task overview**:

Students will write or film a response discussing their relationship with the environment, how they view sustainability, and how their background and experiences brought them to those views. Students have the option (but are not required) to discuss these topics with a family member as part of their response. Students will also participate in a Socratic discussion about sustainability and write a reflection discussing how their views have, or haven't, changed over the course of the project.

1. **Aligned standards:**
2. **Primary Common Core State Standards & NGSS**

CCSS.ELA-LITERACY.CCRA.W.3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

CCSS.ELA-LITERACY.CCRA.W.2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.CCRA.SL.4 Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

1. **Critical Abilities**

Analysis of Information:Integrate and synthesize multiple sources of information (e.g., texts, experiments, simulations) presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to address a question, make informed decisions, understand a process, phenomenon, or concept, and solve problems while evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

Communication in Many Forms:Use oral and written communication skills to learn, evaluate, and express ideas for a range of tasks, purposes, and audiences. Develop and strengthen writing as needed by planning, revising, editing, and rewriting while considering the audience.

Use of Technology:Present information, findings, and supporting evidence, making strategic use of digital media and visual displays to enhance understanding. Use technology, including the Internet, to research, produce, publish, and update individual or shared products in response to ongoing feedback, including new arguments or information.

1. **Next Generation Science Standards (NGSS)**
* NGSS Science and Engineering Practice: Engaging in argument from evidence.
* NGSS Science and Engineering Practice: Asking questions and defining problems.
1. **Time/schedule requirements:**

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| Day 1:* Entry Event - Tragedy of the Commons simulation
* Tragedy of the Commons reading/video & discussion
* Tragedy of the Commons Exit Slip
 | Day 6:* *Tragedy of the Commons simulation*
* Geologic Time & Plate Tectonics
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| Day 2:* *Tragedy of the Commons simulation*
* “Welcome to the Anthropocene” video
* Overview of the project/unit
* Review involved Cognitive Skills
 | Day 7: * *Tragedy of the Commons simulation*
* Cookie Mining Lab
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| Day 3:* *Tragedy of the Commons simulation*
* Easter Island & Sustainability
* Introduce Environmental Ethics & work time
 | Day 8:* *Tragedy of the Commons simulation*
* Mining Strategies
* Mining Exit Slip
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| Day 4:* *Tragedy of the Commons simulation*
* Work time: Environmental Ethics
 | Day 9:* *Tragedy of the Commons simulation*
* Global Fisheries
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| Day 5:* *Tragedy of the Commons simulation*
* Peer Feedback: Environmental Ethics
* Teacher Feedback after Peer review
 | Day 10:* Socratic Discussion
* Final Reflection
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1. **Materials/resources:**
* Item A. Tragedy of the Commons Simulation
* Item B. Tragedy of the Commons Reading
* Item C. Tragedy of the Commons Cartoon
* Item D. Environmental Ethics Essay Assignment
* Item E. Ethics Essay Scaffold
* Item F. Environmental Ethics Peer Feedback Checklist
* Item G. Cookie Mining Lab
* Item H. Mining Types Jigsaw
* Item I. Graphic Organizer for Socratic Seminar
* Item J. Environmental Ethics Reflection
1. **Prior knowledge:**

None provided.

1. **Connection to curriculum:**

None provided.

1. **Teacher instructions:**
* Day 1: Students work in teams to complete the entry event, a simulation of the Tragedy of the Commons phenomenon. Review directions on activity sheet, then let students play the simulation for around 20 minutes. Show Tragedy of Commons video and have students read article (links are in activity sheet). Use a class discussion to debrief the 3 sources of information about Tragedy of the Commons. 3 questions on the last page are an exit ticket.
* Remaining days: The idea behind having a short (1-2 rounds) Tragedy of the Commons activity each day following the large simulation on the first day is to really hammer home the idea of long-term vs short-term consequences - actually giving, or not giving, students M&Ms every day should help them to understand these effects. If we keep ‘score’ on the board this will provide a large data set for students to look at.
* Day 2: Show “Welcome to the Anthropocene” video and introduce the project task and rubric. Review and discuss the skills required to succeed at task.
* Day 3: Students learn about the concept of sustainability and how this issue pertains to Easter Island. Students receive essay prompt and begin working on essay or video.
* Day 4: Students work on Environmental Ethics essay or video.
* Day 5: Students give peer feedback about each other’s environmental ethics essays/videos. Teacher gives further feedback and students finish task for homework.
* Day 6: Students learn about earth processes and time.
* Day 7: Students learn about sustainable and unsustainable forms of mining using a cookie mining simulation. Exit ticket should highlight the harm caused by certain types of mining strategies.
* Day 8: Students learn more details about different types of mining and their benefits and impacts.
* Day 9: Students learn about sustainable and unsustainable ways to catch fish.
* Day 10: Students participate in a Socratic Discussion about their beliefs and experiences relating to sustainability. Students should complete graphic organizer prior to the discussion in order to prepare.
* Students should be preparing for the discussion throughout the project – exit slips, etc. asking them how the day made them think about sustainability, or new questions they have, would be great. Students should also write down these thoughts so that they remember them.
1. **Student support:**
* Graphic organizers and scaffolds are provided for several parts of the task, including the data table during the Entry Event, essay scaffold, preparation for the Socratic Seminar, and types of mining. These supports allow students to engage and organize their learning easily.
* Peer and teacher feedback of the essay/video allows students to get support on their writing, which is helpful for students with special needs and language difficulties.
* Option to write an essay or make a video makes the Environmental Ethics component accessible to students with writing difficulties.
1. **Extensions or variations:**

None provided.

1. **Scoring:**

Student work can be scored using the Summit Public Schools Sustainability Rubric.