What's Included?

Unit Planning

- NGSS and APES Standards document
- Unit Pacing Guide for 50 min classes
- Differentiation ideas for honors students and virtual students ***Digital links for virtual learning found here**
- Honors assignment list

Notes

- Intro PowerPoint (55 slides)
  - Intro to Environmental Science
  - Scientific Processes
  - Environmental Economics & Policy
- Cornell Notes Pages
  - Fill-in-the-blank (7 pgs)
  - Editable versions of all Cornell notes
- Doodle Notes Pages (3 pgs)
  - Guide to Using Doodle Notes
  - Doodle Note Keys & Examples

Student Pages

- This folder contains duplicate copies of every student page. They are in order according to the pacing guide for QUICK PHOTOCOPYING if you are using the pacing guide as is.

Activities

- Tragedy of the Commons Activity (2 pgs) & PPT slide
- Ecological Footprint Activity (1 pg)
- Environmental Scientist Research Project (3 pgs)
- Create Your Own Experiment (4 pgs)
- Environmental Policy Timeline Activity (4 pgs)
- Environmental Careers Flyer* (4 pgs)
- Answer Keys and/or Grading Rubrics for all activities

Extensions

- Digging Deeper: Cost-Benefit Analysis*
- Environmental Math Pre-test
- Math Review Practice Problems
- Science v. Pseudoscience*
- Answer Keys for all Extension activities

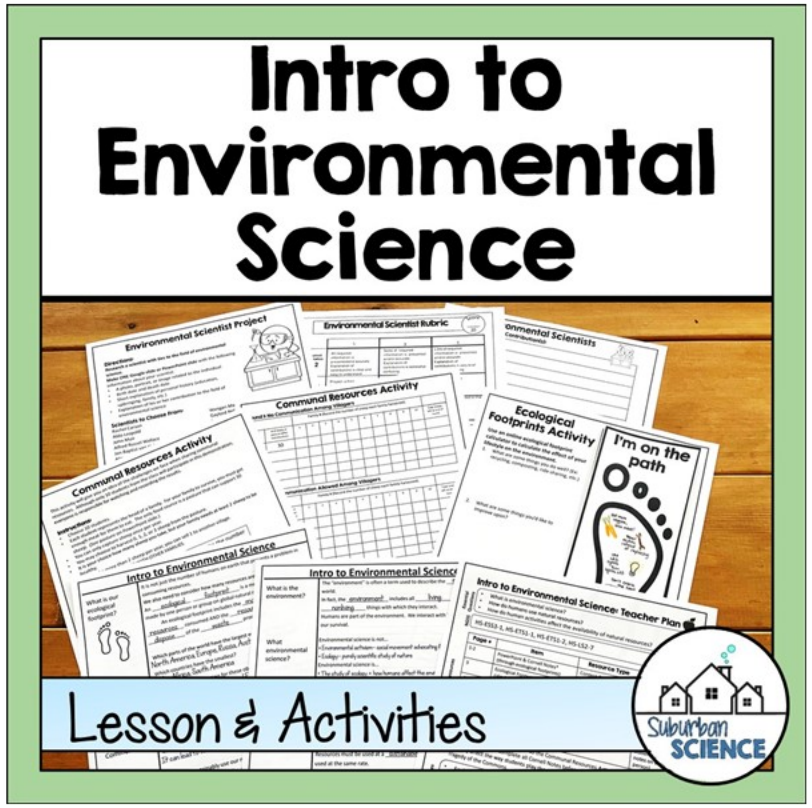
*Honors Options

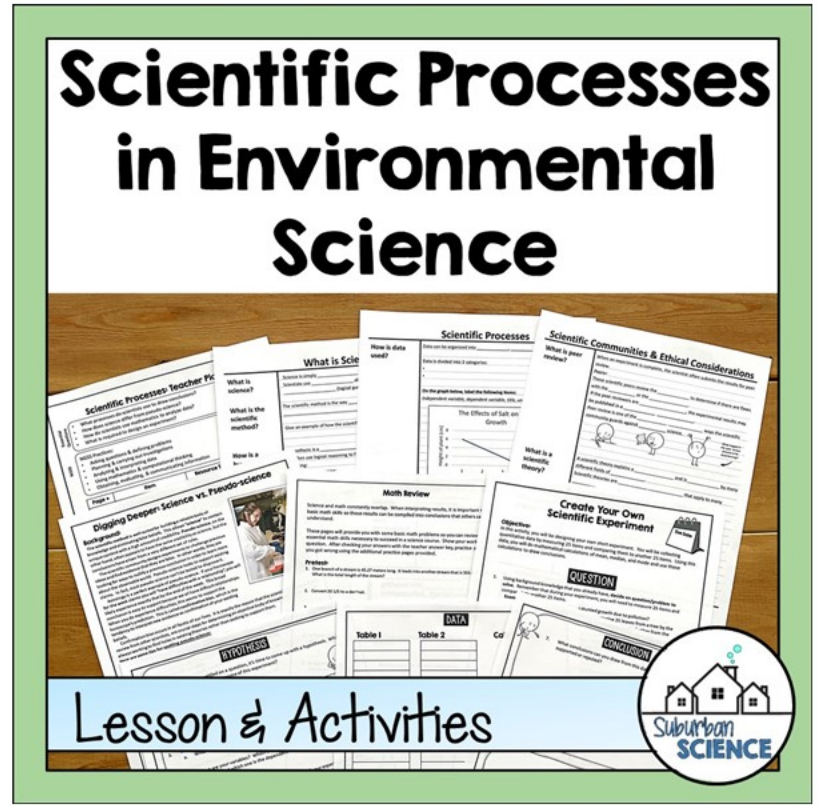
Review and Assessment

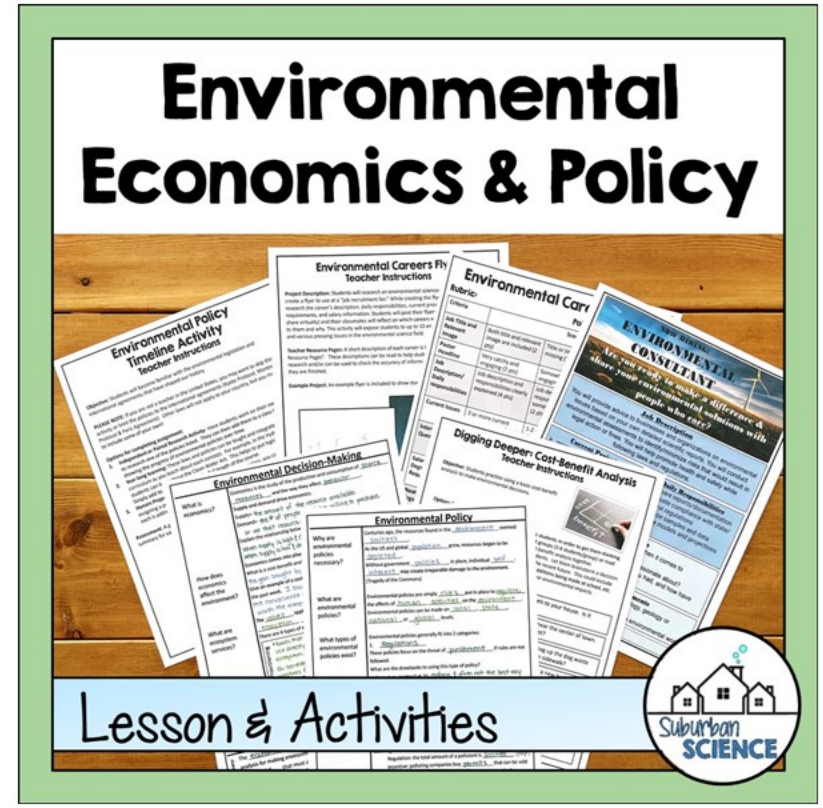
- Intro to Environmental Science Quiz through Google Forms
- Scientific Processes Quiz through Google Forms
- Economics & Policy Quiz through Google Forms
- Editable Task Card Review (24 cards) with student answer sheet and answer key
- Intro to Environmental Science Test (paper)- both Honors and Regular versions with answer sheets

All fully editable

Includes the following previously available lessons:







If you've previously purchased one of these lessons, please contact me at support@suburbanscience.com for a discount on this unit.

Unit Planning

What's Included? — Intro Unit

Included Resources by Folder:

Unit Planning
- NGSS Standards document
- Unit Pacing Guide for 50 min classes
- Differentiation ideas for honors students and virtual students
- Honors assignment list

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- Tragedy of the Commons Activity (2 pgs) & PPT slide
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*Honors Options

Review and Assessment
- Intro to Env Science Quiz through Google Forms
- Scientific Processes Quiz through Google Forms
- Economics & Policy Quiz through Google Forms

(Make a copy of these files to your Drive. Do NOT assign to students using this link.)

- Editable Task Card Review (24 cards) with student answer sheet and answer key
- Intro to Env Science Test (paper)- both Honors and Regular versions with answer sheets

Student Pages
- This folder contains duplicate copies of every student page. They are in order according to the pacing guide for QUICK PHOTOCOPYING if you are using the pacing guide as is.

Not included:

Supplementary Resources

Ecological Footprint Calculators: Department of Washington (20 min), Footprint Calculator (10-15 min), WWF Footprint Calculator (10-15 min for UK students)

Scientific Processes:
- "A Rough Guide to Spotting Bad Science" graphic is a good tool for helping students determine real science from pseudo-science
- Additional information on peer-reviewed journals
- For science experiment ideas, Science Buddies is a great resource that covers many fields of science

Economics & Policy:
- Oxford Academic Video: Environmental Economics- A Very Short Introduction
- Crash Course: Environmental Economics
- The Life & Legacy of Rachel Carson including the importance of *Silent Spring*
- Environmental Laws Through the Decades
- Environmental Career Research & Job Listings

Materials Needed
- General classroom use: computers, calculators, rulers, colored pencils, paper, scissors

Unit Overview Page
plus
Supplementary Resource Ideas
and **Materials Lists**

NGSS and APES Standards Document

If you have specific state standards, contact me by email (support@suburbanscience.com) and I'll help you figure out which ones are covered!

Standards:

Choosing Standards:
Although many states use NGSS, there are some states that do not. I would be glad to help you determine which of your state standards are covered in this unit. You can send me an email at support@suburbanscience.com to find out. Thank you!

The NGSS standards included in this unit are addressed multiple times throughout this course, rather than just once. As the course builds upon itself, the standards will be met with greater depth and detail further into the course.

Topic	NGSS Standard	Description	APES Topics
Intro to Environmental Science	HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	5.1: The Tragedy of the Commons 5.11: Ecological Footprints 5.12: Introduction to Sustainability
	HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	
	HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	
	HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	
Scientific Processes	NGSS Practices	-Asking questions & defining problems -Planning & carrying out investigations -Analyzing & interpreting data -Using mathematics & computational thinking -Obtaining, evaluating, & communicating information	
Economics & Policy	HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	2.2: Ecosystem Services
	HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	
	HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	
	HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	

*Note: NGSS is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involve in the production of this product, and do not endorse it.

Editable Pacing Guides

Intro to Enviro Science Unit Pacing Guide

50 min classes

	Day	Instruct	Assess	Homework
Environmental Economics & Policy	14	• Start **Environmental Policy Timeline Activity** by dividing students into pairs to research one of th… in…	• Cornell Notes summary • Informal discussion and questions	
	15	• Fi… • A… E…		
	*	• H… s… R… (2…		
Review & Assess	16	• Ta… Sh… • G…		
	17	• U…		

Coincide with State Standards document in Unit Planning Folder

Intro to Enviro Science Unit Pacing Guide

50 min classes

	Day	Instruct	Assess	Homework
Scientific Processes	7	• Take **Math Review Pretest** • **Use Math Review- More Practice** pages to work on math skills that need improvement	• Informal checks for understanding while completing review problems • Check accuracy of review problems by peer grading, teacher explanation or self-check with answer key	
	8	• View PPT (Section 5) • **Cornell Notes** (Scienti… Considerations) • Use **Scientific Process**… review of concepts	• Cornell Notes summary	
	9	• Plan and predict with **Scientific Experiment**… "Question" & "Hypoth…		
	10	• Plan and predict with **Scientific Experiment**… analyzing data		
	11	• Finish **Create Your Ow**… by doing calculations … conclusions, and cond…		
Environmental Economics & Policy	12	• View PPT (Section 6) • **Cornell Notes** (Enviror… • **Digging Deeper: Cost-**…		
	13	• View PPT (Section 7) • **Cornell Notes** (Enviror… • Use **Economics & Poli**… review of concepts		

Coincide with State Standards document in Unit Planning Folder

***Bold items** photocopied

Intro to Enviro Science Unit Pacing Guide

50 min classes

	Day	Instruct	Assess	Homework
Intro to Environmental Science & Natural Resources	1	• View PPT: Section 1 & 2 through Ecological Footprints (on slide 9) • **Cornell Notes** (Intro to Environmental Science & first half of second page)	• Cornell Notes summaries • Informal discussion and questions	
	2	• Students calculate their ecological footprint using an online calculator • Do **Ecological Footprint Activity**	• Informal discussion and questions • Informal check of Ecological Footprint Activity	
	3	• Use "Communal Resources Activity" slide (slide 11) from PPT with the **Communal Resources Activity** pages (2 pgs) • Finish Section 2 of PPT with **Cornell Notes** on Tragedy of the Commons (remaining half of second page)	• Cornell Notes summaries • Informal discussion and questions • Informal questioning during activity	
	4	• **Environmental Scientist Project** • After students have finished project slide, use **Environmental Scientists** page to record information from other students	• Informal checks for understanding and learning during research • Formal grade from **Environmental Scientist Rubric**	• Provide slides to students so they can finish recording information on all scientists
	5	• Use **Intro to Environmental Science Doodle Notes** (1 page) to review concepts		
Scientific Processes	6	• View PPT (Sections 3 & 4) • **Cornell Notes** (What is Science? & Scientific Processes) • Honors: Do question #1 from **Digging Deeper: Science v. Pseudo-science**	• Cornell Notes summaries • Informal discussion and questions	Honors • Digging Deeper: Science v. Pseudoscience

Coincide with State Standards document in Unit Planning Folder

***Bold items** must be photocopied.

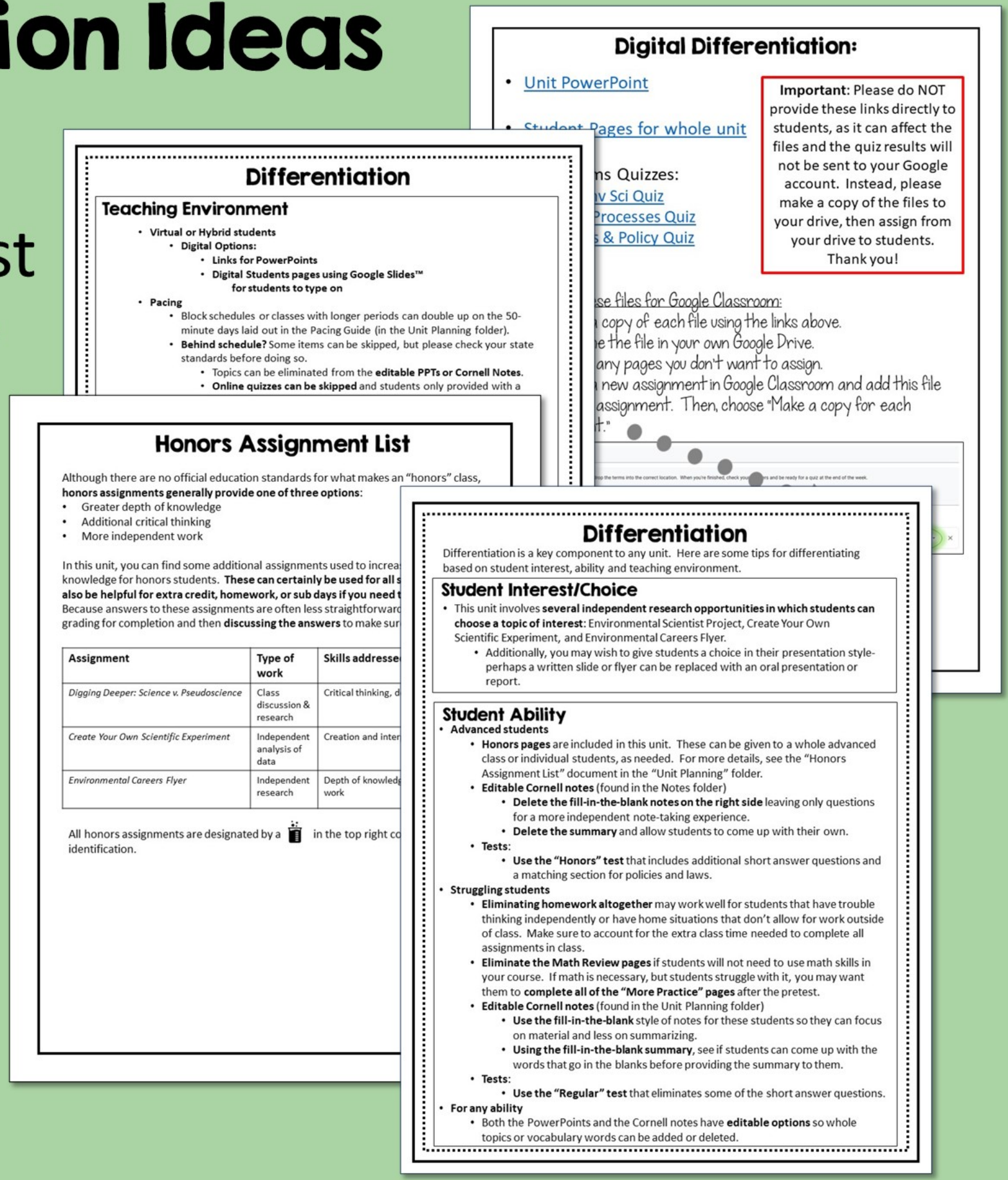
This icon is found on the top right corner of Honors pages for easy identification.

The daily topics coincide with the previous standards document.

Lesson planning is now quick and easy!

Differentiation Ideas for:

- Student Interest
- Student Ability
- Teaching Pace
- Teaching Environment (Virtual, in-class, or hybrid)



Digital Differentiation:

- Unit PowerPoint
- Student Pages for whole unit

Important: Please do NOT provide these links directly to students, as it can affect the files and the quiz results will not be sent to your Google account. Instead, please make a copy of the files to your drive, then assign from your drive to students. Thank you!

ns Quizzes:
v Sci Quiz
Processes Quiz
& Policy Quiz

se files for Google Classroom:
copy of each file using the links above.
e the file in your own Google Drive.
any pages you don't want to assign.
new assignment in Google Classroom and add this file
assignment. Then, choose "Make a copy for each
t."

Differentiation

Teaching Environment

- **Virtual or Hybrid students**
  - **Digital Options:**
    - **Links for PowerPoints**
    - **Digital Students pages using Google Slides™ for students to type on**
- **Pacing**
  - Block schedules or classes with longer periods can double up on the 50-minute days laid out in the Pacing Guide (in the Unit Planning folder).
  - **Behind schedule?** Some items can be skipped, but please check your state standards before doing so.
    - Topics can be eliminated from the **editable PPTs or Cornell Notes**.
    - **Online quizzes can be skipped** and students only provided with a

Honors Assignment List

Although there are no official education standards for what makes an "honors" class, **honors assignments generally provide one of three options**:

- Greater depth of knowledge
- Additional critical thinking
- More independent work

In this unit, you can find some additional assignments used to increa
knowledge for honors students. **These can certainly be used for all s**
also be helpful for extra credit, homework, or sub days if you need t
Because answers to these assignments are often less straightforward
grading for completion and then **discussing the answers** to make sur

Assignment	Type of work	Skills addresse
Digging Deeper: Science v. Pseudoscience	Class discussion & research	Critical thinking, d
Create Your Own Scientific Experiment	Independent analysis of data	Creation and inter
Environmental Careers Flyer	Independent research	Depth of knowledg work

All honors assignments are designated by a in the top right co
identification.

Differentiation

Differentiation is a key component to any unit. Here are some tips for differentiating based on student interest, ability and teaching environment.

Student Interest/Choice

- This unit involves **several independent research opportunities in which students can choose a topic of interest**: Environmental Scientist Project, Create Your Own Scientific Experiment, and Environmental Careers Flyer.
  - Additionally, you may wish to give students a choice in their presentation style- perhaps a written slide or flyer can be replaced with an oral presentation or report.

Student Ability

- **Advanced students**
  - **Honors pages** are included in this unit. These can be given to a whole advanced class or individual students, as needed. For more details, see the "Honors Assignment List" document in the "Unit Planning" folder.
  - **Editable Cornell notes** (found in the Notes folder)
    - **Delete the fill-in-the-blank notes on the right side** leaving only questions for a more independent note-taking experience.
    - **Delete the summary** and allow students to come up with their own.
  - **Tests**:
    - **Use the "Honors" test** that includes additional short answer questions and a matching section for policies and laws.
- **Struggling students**
  - **Eliminating homework altogether** may work well for students that have trouble thinking independently or have home situations that don't allow for work outside of class. Make sure to account for the extra class time needed to complete all assignments in class.
  - **Eliminate the Math Review pages** if students will not need to use math skills in your course. If math is necessary, but students struggle with it, you may want them to **complete all of the "More Practice" pages** after the pretest.
  - **Editable Cornell notes** (found in the Unit Planning folder)
    - **Use the fill-in-the-blank** style of notes for these students so they can focus on material and less on summarizing.
    - **Using the fill-in-the-blank summary**, see if students can come up with the words that go in the blanks before providing the summary to them.
  - **Tests**:
    - **Use the "Regular" test** that eliminates some of the short answer questions.
- **For any ability**
  - Both the PowerPoints and the Cornell notes have **editable options** so whole topics or vocabulary words can be added or deleted.

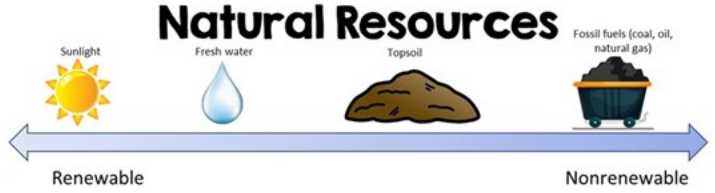
Content Delivery: PowerPoint Presentation

55 **editable**, fully-animated slides

What is Environmental Science?

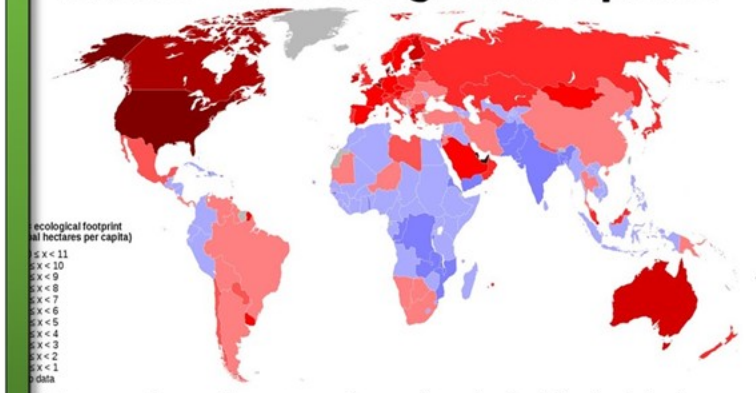
- **Environmental Science is not…**
  - **Environmental activism-** A social movement in which people or organizations advocate for protection of the natural environment.
  - **Ecology-** A purely scientific study of natural environments.
- **Environmental Science is…**
  - The study of ecology as well as focusing on how huma affect the environment and ways to address environmental problems.
  - An interdisciplinary approach- involves biology, chemis earth science, economics, an political science

Natural Resources



- **Renewable natural resources** are naturally replenished over short periods of time.
- **Nonrenewable natural resources** take a long time to replenish.
- All resources can be found somewhere on this continuum.
- Resources must be used at a **sustainable** rate- one that replaces what's used at the same rate.
- Environmental scientists can help us determine how to use resources sustainably.

What is our ecological footprint?



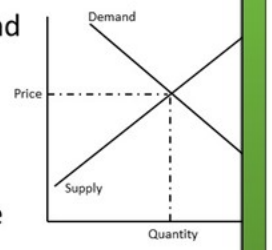
This map shows the comparison of ecological footprints for each country.

Although ecological footprints are generally used to refer to humans, all organisms have some ecological footprint.

Sample Slides

What is economics?

- When supply is high and demand is low, the price of a resource is low.
- When demand increases, however, or supply decreases, the price of the resource can be driven up.



- Can you come up with an example of how an increased demand for a scarce product allowed companies to respond by raising the price?

What are environmental policies?

- Environmental policies are simply **rules** put in place to **regulate** the effects of **human activities** on the **environment**.
- Environmental policies can be made on **local**, **state**, **national**, or **global** levels.

What types of environmental policies exist?

- 2. **Incentives-** the **encouragement** of an environmentally friendly activity through **subsidies** (payments by government) or **tax breaks** (reduction of taxes owed).
- **Example**: Residential homeowners can receive a tax credit for adding solar panels to their homes.

7 pages of Cornell Notes

Big concept questions

Content summary for each page

Scientific Communities & Ethical Considerations

What is peer review?

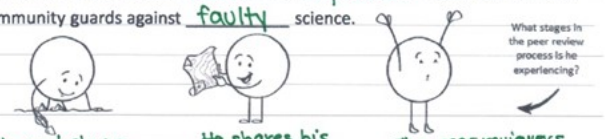
When an experiment is complete, the scientist often submits the results for peer review.

Peers= Individuals at the same level of education or specialization

These scientific peers review the experiment to determine if there are flaws with the process or the conclusions.

If the peer reviewers are satisfied, the experimental results may be published in a scientific journal.

Peer review is one of the most important ways the scientific community guards against faulty science.



What is a scientific theory?

A scientific theory explains a phenomenon and is supported by many different fields of evidence.

Scientific theories are broad explanations that apply to many situations.

How do ethics affect scientific processes?

Ethics= The branch of knowledge that deals with moral principles

How do ethics come into play particularly in environmental science?

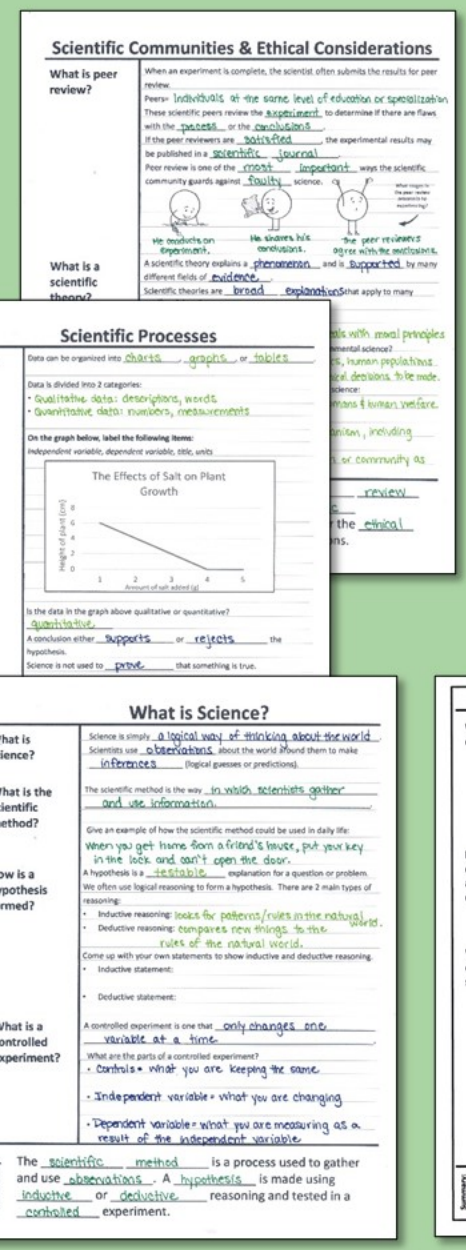
Environmental science includes economics, human populations and other organisms. There are many ethical decisions to be made.

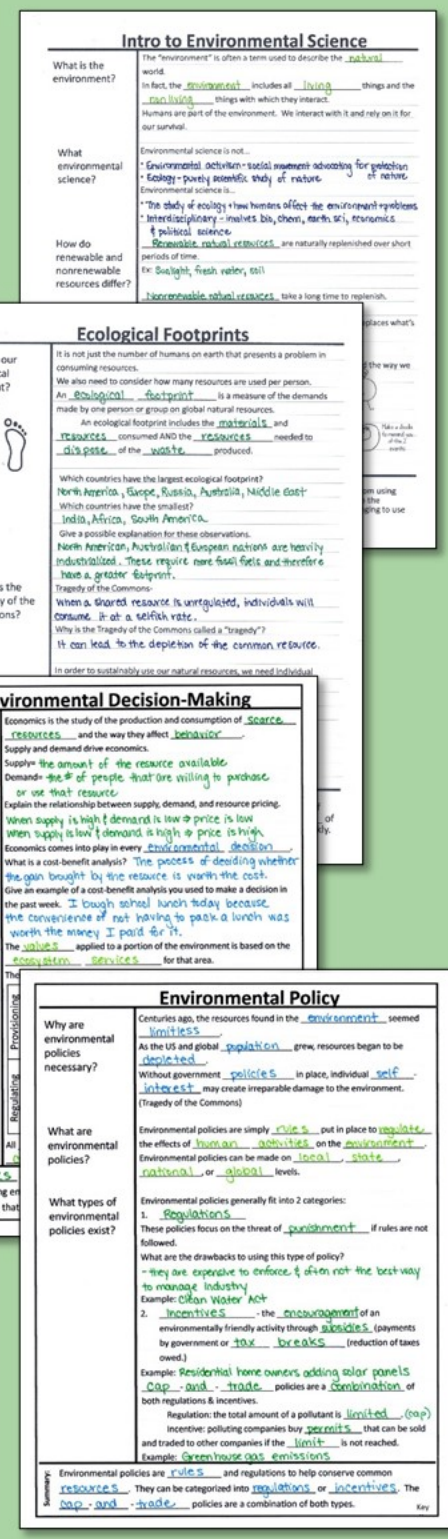
Three ethical world-views prevail in environmental science:

1. Anthropocentrism - most value is on humans & human welfare
2. Biocentrism - values each & every organism, including humans
3. Ecocentrism - values the ecosystem or community as a whole rather than individuals

Summary:

Scientific results can be submitted for peer review and may provide support for a larger scientific theory. All experiments must consider the ethical consequences of their processes and conclusions.



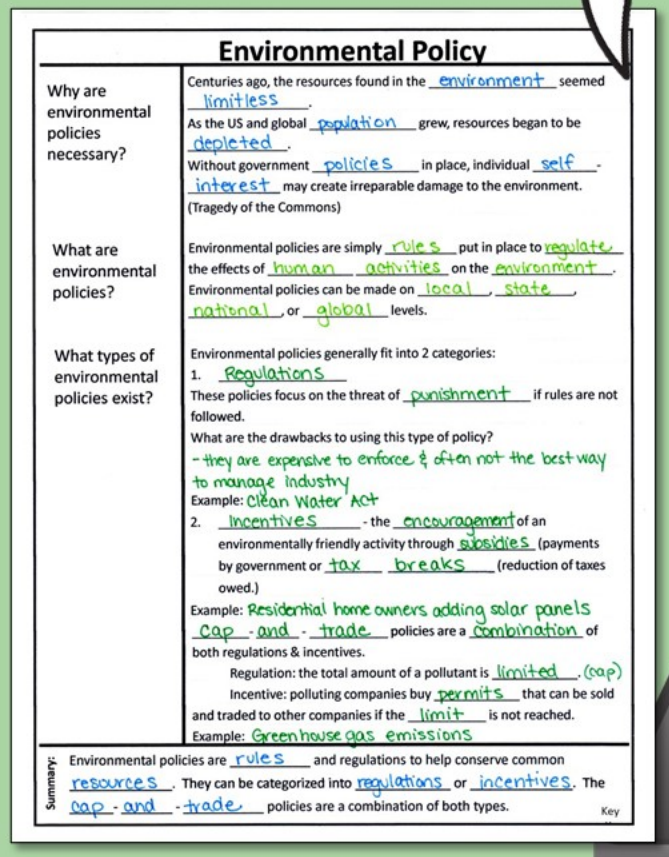


Each page is **editable**.

Add and delete text, questions, and summaries to meet the needs of your students.

Every student page also comes in a digital version on Google Slides

Virtual, hybrid, or absent students can stay right on track!



Environmental Policy

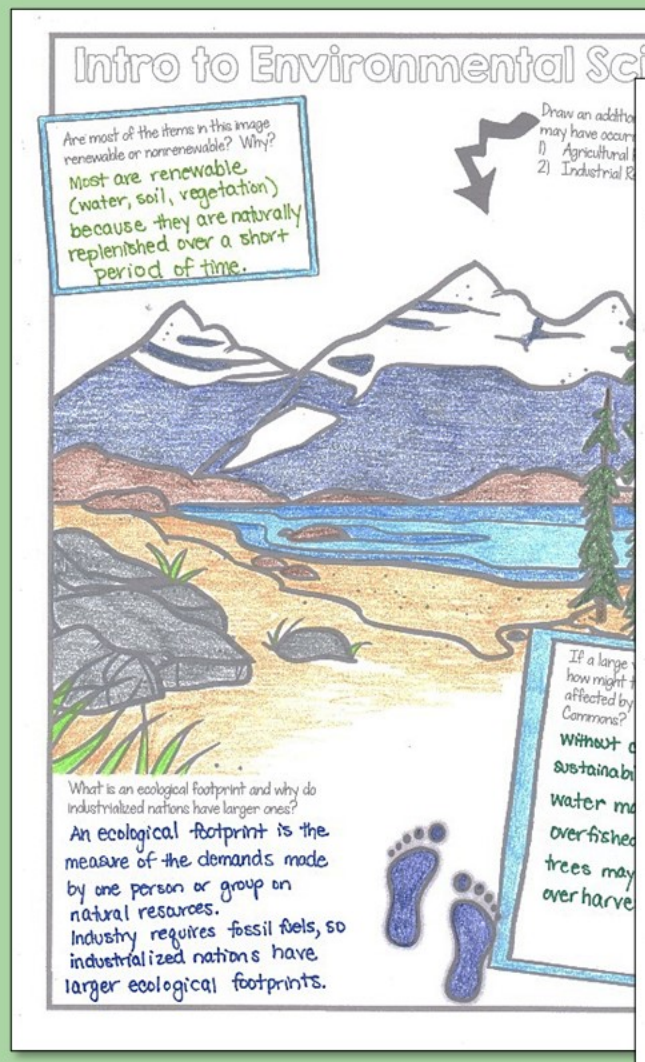
Why are environmental policies necessary?	Centuries ago, the resources found in the environment seemed limitless. As the US and global population grew, resources began to be depleted. Without government policies in place, individual self-interest may create irreparable damage to the environment. (Tragedy of the Commons)
What are environmental policies?	Environmental policies are simply rules put in place to regulate the effects of human activities on the environment. Environmental policies can be made on local, state, national, or global levels.
What types of environmental policies exist?	Environmental policies generally fit into 2 categories: 1. Regulations These policies focus on the threat of punishment if rules are not followed. What are the drawbacks to using this type of policy? - they are expensive to enforce & often not the best way to manage industry Example: Clean Water Act 2. Incentives - the encouragement of an environmentally friendly activity through subsidies (payments by government or tax breaks (reduction of taxes owed.) Example: Residential home owners adding solar panels Cap-and-trade policies are a combination of both regulations & incentives. Regulation: the total amount of a pollutant is limited. (cap) Incentive: polluting companies buy permits that can be sold and traded to other companies if the limit is not reached. Example: Greenhouse gas emissions
Summary:	Environmental policies are rules and regulations to help conserve common resources. They can be categorized into regulations or incentives. The cap-and-trade policies are a combination of both types. Key

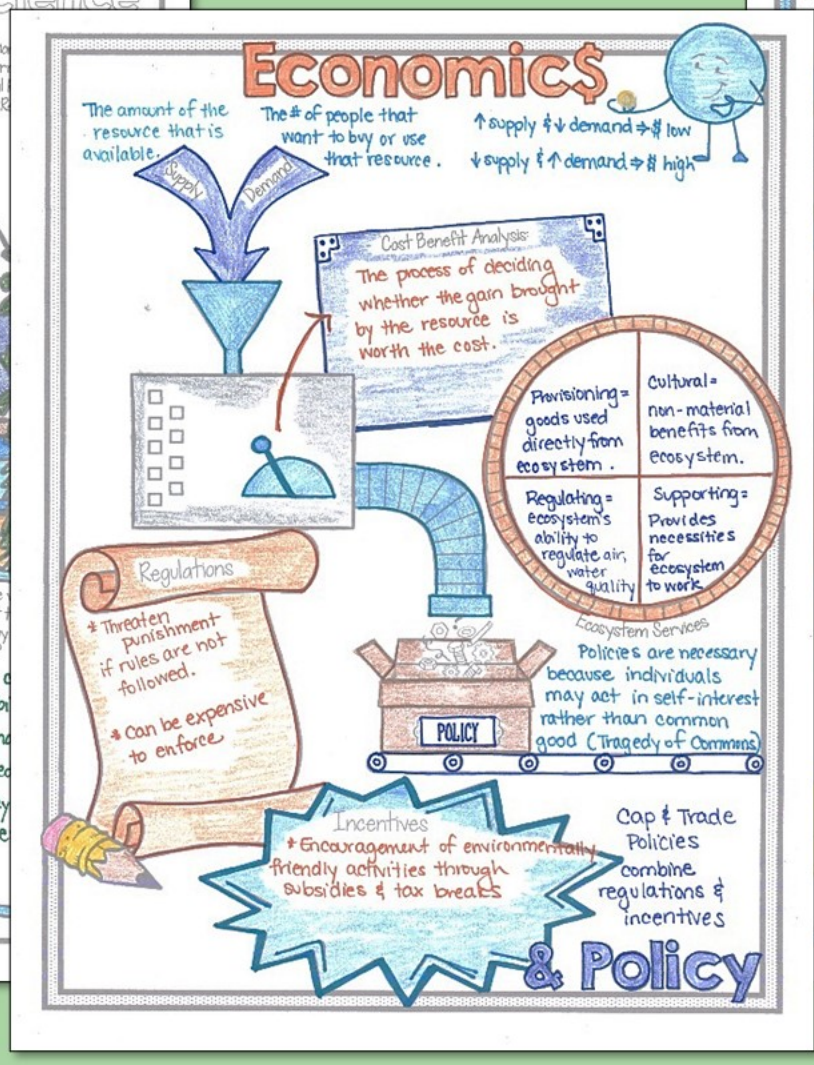
Environmental Policy

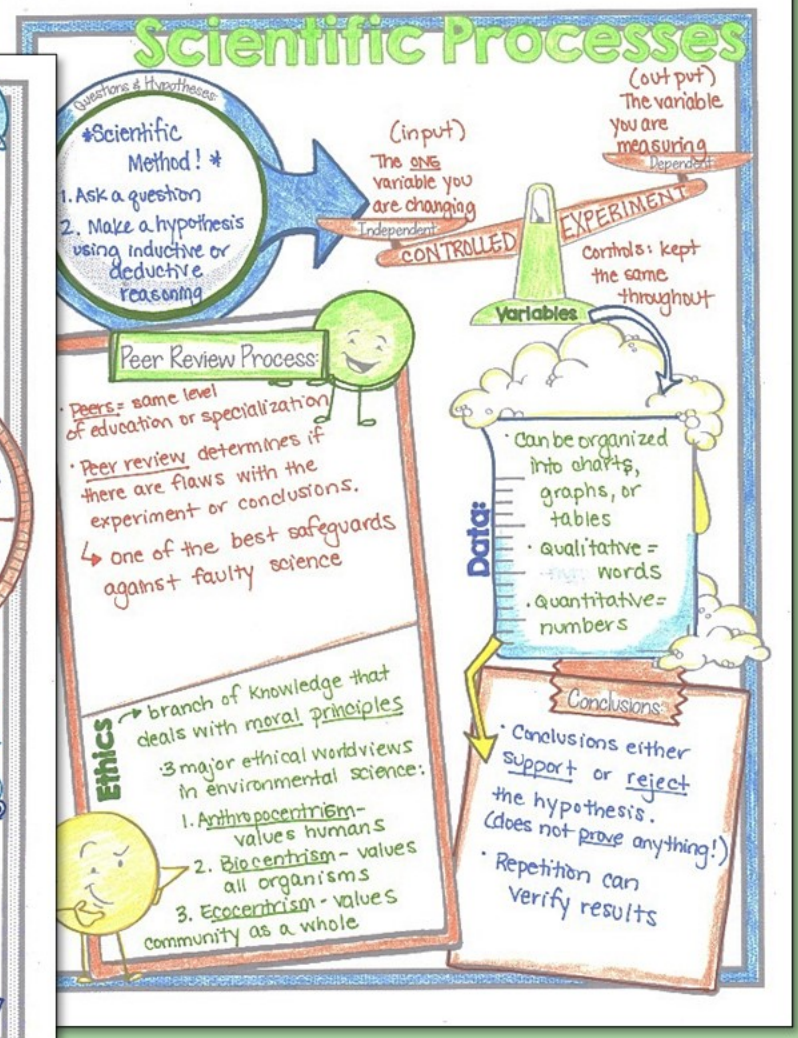
Why are environmental policies necessary?	Centuries ago, the resources found in the environment seemed limitless. As the US and global population grew, resources began to be depleted. Without government _____ in place, individual _____-_____ may create irreparable damage to the environment. (Tragedy of the Commons)
What are environmental policies?	Environmental policies are simply _____ put in place to _____ the effects of _____ _____ on the _____. Environmental policies can be made on _____, _____, _____, or _____ levels.
What types of environmental	Environmental policies generally fit into 2 categories: 1. _____

Can be used in Google Classroom, Microsoft OneDrive or many other platforms!

3 pages of Doodle Notes for Summarizing & Review





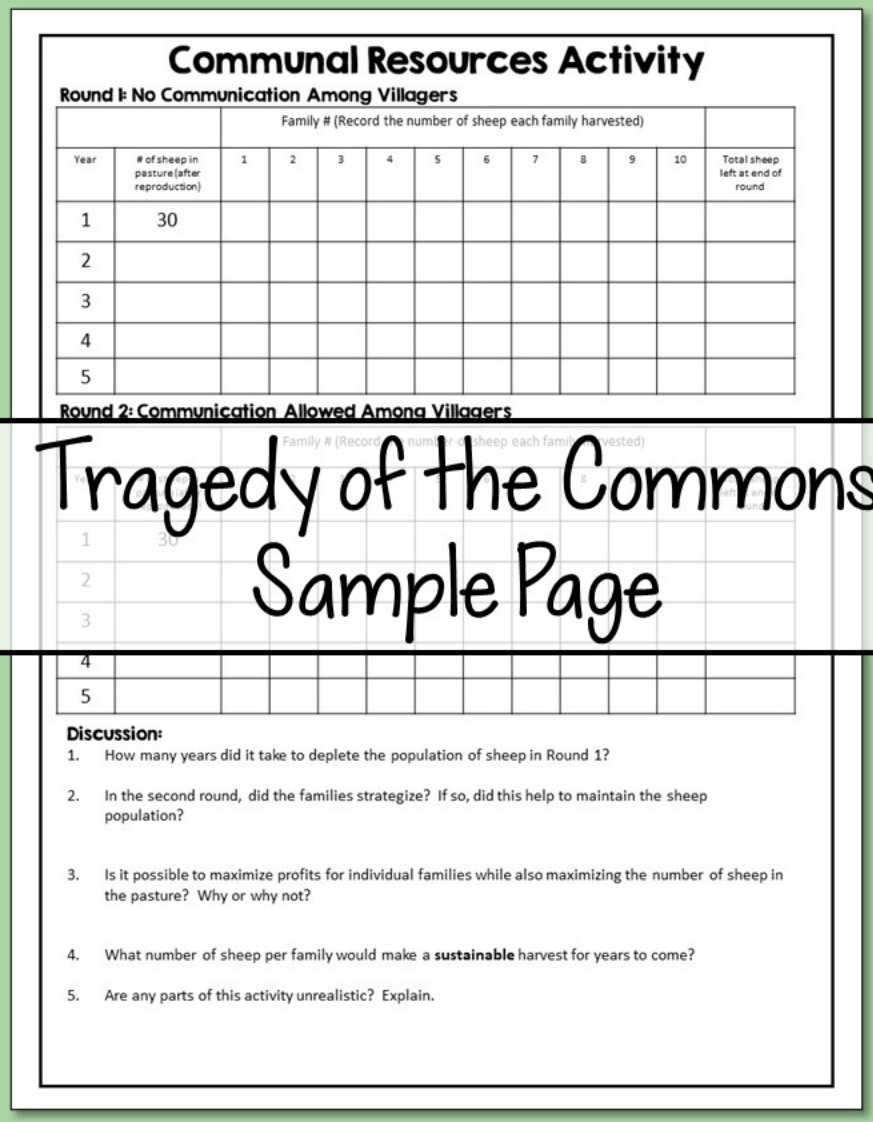


Doodle Notes™ increase student focus and memory- and they're great fun!

A guide for using them in your classroom is included.

Includes 6 Activities

- Tragedy of the Commons
- Calculating your Ecological Footprint
- Environmental Science Research Project
- Create Your Own Experiment
- Environmental Policy Timeline Activity
- Environmental Careers Flyer



Communal Resources Activity

Round I: No Communication Among Villagers

		Family # (Record the number of sheep each family harvested)										
Year	# of sheep in pasture (after reproduction)	1	2	3	4	5	6	7	8	9	10	Total sheep left at end of round
1	30											
2												
3												
4												
5												

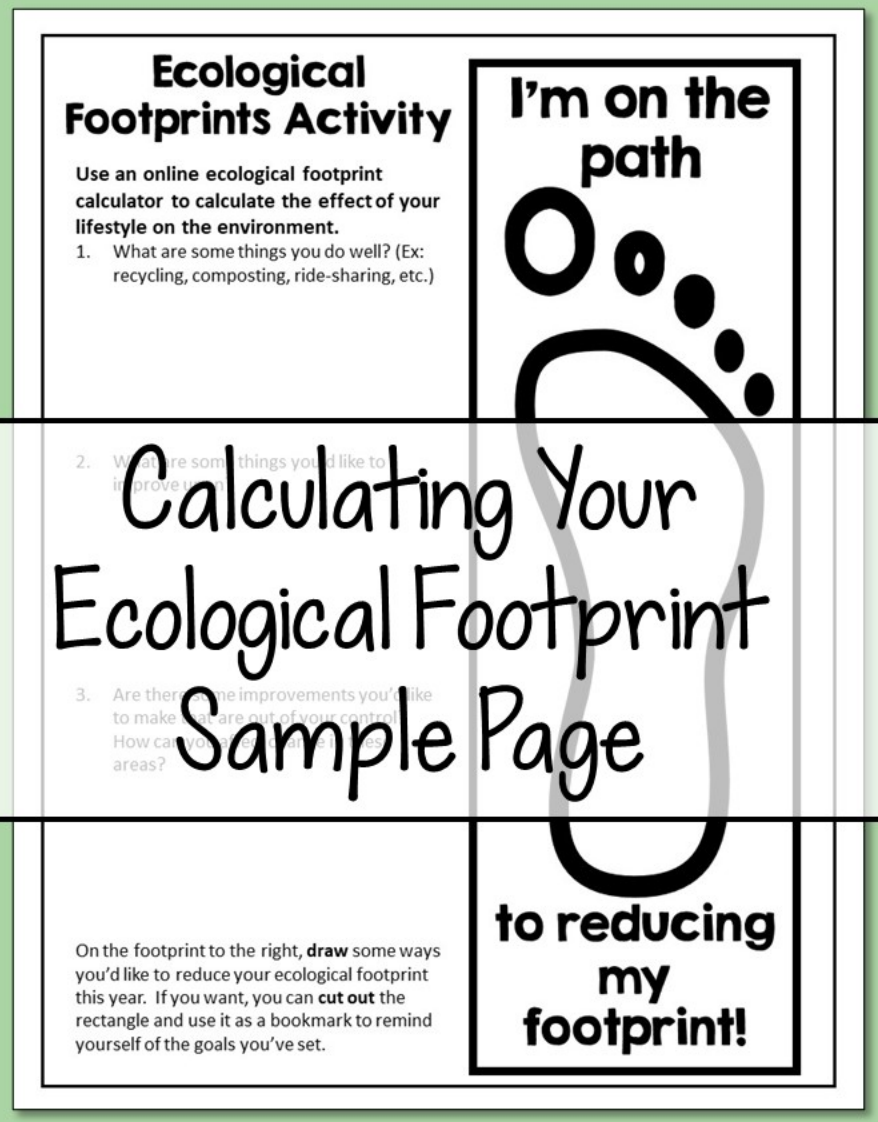
Round 2: Communication Allowed Among Villagers

		Family # (Record the number of sheep each family harvested)										
Year	# of sheep in pasture (after reproduction)	1	2	3	4	5	6	7	8	9	10	Total sheep left at end of round
1	30											
2												
3												
4												
5												

Discussion:

1. How many years did it take to deplete the population of sheep in Round 1?
2. In the second round, did the families strategize? If so, did this help to maintain the sheep population?
3. Is it possible to maximize profits for individual families while also maximizing the number of sheep in the pasture? Why or why not?
4. What number of sheep per family would make a **sustainable** harvest for years to come?
5. Are any parts of this activity unrealistic? Explain.

Tragedy of the Commons Sample Page



Ecological Footprints Activity

Use an online ecological footprint calculator to calculate the effect of your lifestyle on the environment.

1. What are some things you do well? (Ex: recycling, composting, ride-sharing, etc.)
2. What are some things you'd like to improve upon?
3. Are there some improvements you'd like to make that are out of your control? How can you change these areas?

On the footprint to the right, **draw** some ways you'd like to reduce your ecological footprint this year. If you want, you can **cut out** the rectangle and use it as a bookmark to remind yourself of the goals you've set.

I'm on the path to reducing my footprint!

Calculating Your Ecological Footprint Sample Page

Environmental Scientists

Name: Contribution(s):

Environmental Scientist Rubric

Score: ____ / 20

	5	3	1
Required Information X 2	All required information is presented and accurate. Explanation of contributions is clear and easy to understand.	Some of required information is presented and/or accurate. Explanation of contributions is somewhat confusing.	Little of required information is presented and/or accurate. Explanation of contributions is very brief or quite confusing.
Spelling/ Grammar	Project is free from spelling and grammar errors.	Project has 1 spelling or grammar error .	Project has 2 or more spelling or grammar errors .
Image	Image is appropriate and relevant to the scientist.	Image is unclear or distracting from the topic.	Image is unrelated to the topic.

Environmental Scientist Project

Directions:

Research a scientist with ties to the field of environmental science.

Make ONE Google slide or PowerPoint slide with the following information about your scientist:

- A photo, portrait, or image related to the individual
- Birth date and death date
- Short explanation of personal history (education, upbringing, family, etc.)
- Explanation of his or her contribution to the field of environmental science

Scientists to Choose From:

Rachel Carson
Aldo Leopold
John Muir
Alfred Russel Wallace
Jan Baptist van Helmont
Alexander von Humboldt
Gifford Pinchot
Chico Mendes
Sir Peter Scott
Wangari Maathai
Gaylord Nelson
David Brower
Jane Morris Goodall
Marjory Stoneman Douglas
E.B. Ford
Richard St. Barbe Baker

Name: _____

Environmental Scientist Research Project Sample Pages

Environmental Policy Timeline Activity

Student Instructions

The following list includes important environmental policies or laws throughout history. Research one of the following policies/laws and answer the following questions:

- When was the policy/law enacted?
- Is it still enforced? Has it been amended/replaced?
- Is the policy regulatory, incentive, or voluntary?
- What are the main points of the policy/law?
- What type of human impact is this policy/law designed to restrict?
- Who is this law written for (national, local, international, etc.)?

List of Policies and Laws:

- Clean Air Act
- Clean Water Act
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Montreal Protocol
- Kyoto Protocol
- Endangered Species Act
- Safe Drinking Water Act (SWDA)
- Resource Conservation and Recovery Act (RCRA)
- Energy Policy Act
- Noise Control and Abatement Act

Teacher Instructions

Objective: Students will become familiar with the environmental legislation and international agreements that have shaped our history.

PLEASE NOTE: If you are not a teacher in the United States, you may want to skip this activity or limit the policies to the international agreements (Kyoto Protocol, Montreal Protocol & Paris Agreement). Other laws will not apply to your country, but you may want to include some of your own!

Options for completing assignment:

1. **Independent or Paired Research Activity-** Have students work on their own or in pairs to research one of the policies listed. They can then add them to a class timeline showing the progress of environmental policies over time.
2. **Year-long learning:** These laws and policies can be taught and integrated into the curriculum as you teach about each concept. For example, in the Hydrosphere Unit, students can learn about the Clean Water Act. This helps to put legislation in context. Simply add to the timeline over the full length of the course.
3. **Honors Project-** If you have advanced students in your class, you can differentiate by assigning a policy to each of them and having them present a summary of the policy as each is addressed throughout the year.

Assessment: A grading rubric is included to assess student work, if desired. A short summary for each policy is also included for reference.

Example timeline

Environmental Policy Timeline Activity Sample Pages

CONCLUSION

7. What conclusions can you draw from this data? Was your hypothesis supported or rejected?

8. Are there any possible sources of error that may have affected your results? If so, what are they?

HYPOTHESIS

2. Now that you have settled on a question, it's time to come up with a hypothesis. What do you predict will be the outcome of this experiment?

EXPERIMENT

3. Plan your experiment.
   a. Which of your measurement sets is likely the control group?
   b. What are your variables? Which one is the independent variable (what is changing) and which one is the dependent variable (what you're measuring)?

4. Run your experiment by taking your 50 r… additional time, resources, or to be com… days.

5. Record your data on the data sheet on … can be recorded in Table 1 and the seco…
6. After recording all of your data, calcula…

Mean= Sum of all numbers / # of measurements

Median= The … idle value when meas…

Mode= The …

Create Your Own Scientific Experiment

Objective:
In this activity, you will be designing your own short experiment. You will be collecting quantitative data by measuring 25 items and comparing them to another 25 items. Using this data, you will do mathematical calculations of mean, median, and mode and use those calculations to draw conclusions.

QUESTION

1. Using background knowledge that you already have, **decide on a question/problem to solve**. Remember that during your experiment, you will need to measure 25 items and compare it to another 25 items.

   Examples: Do trees by the road have stunted leaf growth due to pollution?
   Is a blueberry bush in the sun more productive than one in the shade?
   This experiment is testable by measuring the number of blueberries on 25 branches of a bush in the sun and comparing with 25 branches of a …
   Do … drive faster than those driving …?
   This experiment is testable by measuring the height of 25 individuals that drive SUVs and comparing it with the height of 25 individuals that drive sedans.
   Do the test grades of … students vary depending on topic?
   This experiment is testable by … of 25 Biology … on a test of a different concept in … (Teachers providing these scores should keep the grades anonymous to protect student privacy.)
   Do the number of raisins differ in brand name Raisin Bran™ compared to generic?
   This experiment is testable by taking 25 random cup-sized scoops of cereal from a brand name box and counting the number of raisins per cup. Then, repeat with the generic cereal and compare.

***NOTE:**
Deciding on the problem you want to solve a time-consuming part of this project. Give yourself appropriate time to brainstorm a few ideas and decide on the best one.

Question:

Environmental Scientist Research Project Sample Pages

Environmental Careers Flyer
Student Instructions

The individuals that study ecosystem services and the complexities of environmental policies are specifically trained for this type of work. The field of environmental science is growing and becoming extremely important to our planet. Issues such as climate change, natural resource depletion, and environmental pollution must be addressed. Natural resources are being consumed at a rapid rate. The field needs employees with a strong understanding of environmental science who can provide innovative and sustainable solutions to protect our Earth. Jobs in the environmental science field are an excellent option for people who care about the environment and want to protect the living things on our planet.

Imagine you are a recruiter at a local job fair and are looking to hire someone who is passionate about working in the environmental science field. Your company/institution needs you to find the right person for the job TODAY. You will create a flyer to quickly draw the attention of the best candidates for the job. You will recruit employees for one of the following careers:

- Environmental engineer
- Environmental lawyer
- Environmental scientist
- Environmental geologist
- Environmental consultant
- Environmental science teach…
- Natural resource manager
- Hydrologist
- Zoologist
- Marine biologist

Your flyer should include the following:

- ❑ 1 - 2 relevant images
- ❑ Catchy headline to recruit the…
- ❑ Job title
- ❑ Job description
- ❑ Job's daily responsibilities
- ❑ Specific current projects/issu…
- ❑ 3 key questions for those you…
- ❑ Salary
- ❑ Degree requirements and any…

Environmental Careers Flyer

Rubric: **Points: ____/25**

Criteria	Score		
Job Title and Relevant Image	Both title and relevant image are included (2 pts)	Title or image are missing (1 pt)	Both title and image are missing (0 pts)
Poster Headline	Very catchy and engaging (2 pts)	Somewhat catchy or engaging (1 pt)	No headline included (0 pts)
Job Description/ Daily responsibilities	Job description and responsibilities clearly explained (4 pts)	Job description and responsibilities somewhat explained (2 pts)	Job description and responsibilities poorly explained (0 pts)
Current Issues	3 or more current issues are identified (4 pts)	1-2 current issues are identified (2 pts)	No current issues are identified (0 pts)
Interview Questions	3 strong questions are written (4 pts)	Only some question are strong, or less than three questions are written (2 pts)	No questions are written (0 pts)
Salary and Degree Requirements	Clear and reasonable salary and degree requirements are…	Salary or degree requirement are not clear (1 pt)	Both salary and degree requirements are…
Neatness/ Organization	… organized (4 pts)	… neat and well organized (2 pts)	…yer is not well organized (0 pts)
Spelling and Grammar	0-3 grammar, punctuation & spelling mistakes (2 pts)	4-5 grammar, punctuation & spelling mistakes (1 pts)	6+ grammar, punctuation & spelling mistakes (0 pts)
Name is on project (1 pt)			

Environmental Career Flyer Sample Pages

Extension Pages

Digging Deeper: Cost-Benefit Analysis
Teacher Instructions

Objective: Students practice using a basic cost-benefit analysis to make environmental decisions.

Options for completing assignment:

1. **Guided-** Provide the scenarios listed below to students in order to get them thinking. You can cut them out and hand out to student groups (2-4 students/group) or read them and have the class work through the cost-benefit analysis together.
2. **Student-led-** Don't provide scenarios to the students. Let them brainstorm a decision they've made recently or one that is coming in the recent future. This could include decisions about their own backyards or houses, additions being made at school, etc. Try to get them to focus on decisions that have clear environmental impacts.

Scenario 1: You have the option to add solar panels to your house. Is it worth it?

Scenario 2: Your town is building a new parking lot near the center of town. What type of surface should be chosen for the new lot?

Scenario 3: You take y
and throw it away at h

Scenario 4: The most
involves land that con

Scenario 5: The local v
disrepair. Should it be

Scenario 6: Your scho
transportation should

Scenario 7: You decid
it be watered?

Digging Deeper: Science vs. Pseudo-science

Background:

The **scientific method** is well-suited for building a reliable body of knowledge and eliminating false beliefs. This allows "**science**" to contain unique content with a high amount of credibility. **Pseudo-science**, on the other hand, often appears to have the same credibility as science, but the conclusions have arisen from a very different set of rules.

The scientific community designs experiments to challenge previous ideas and find evidence that they are false. In other words, they are looking for ways to nullify a previous conclusion in order to learn more about the observable world. Pseudo-science looks to support existing claims. In fact, most pseudo-science can't be tested to disprove it.

Astrology is a perfect example of pseudo-science. If your horoscope for the week claims you will "have difficulties with a relationship", you will likely experience exactly that by the end of the week. This broad conclusion is easy to support because we all have difficult relationships. When you do experience difficulties, this seems to support the horoscope's prediction. This is called **confirmation bias**, which is the tendency to interpret new evidence as confirmation of your existing beliefs. It is a hallmark of pseudo-science.

Confirmation bias occurs in all facets of our lives. It is exactly the reason that the scientific method and peer review from other scientists are crucial steps for determining an objective body of knowledge. Scientists are always working to find holes in existing theories rather than seeking to support them.

Here are some tips for spotting pseudo-science:

- **The claim is over-simplified or sensationalized.**
  - Example: "You can lose 20 pounds in 2 days!"
- **The sample size is very small, too selective or lacking a control group.**
  - Example: This helped 50% of viewers! If only 2 people were studied, the results aren't conclusive.
- **It confuses correlation with causation.**
  - Example: Electric car purchases have increased i
    increased in the last 10 years. This does not mea
    to increase.
- **The data is selectively reported (also called "cherry-pic**
  - Example: One study that supports the claim is us
- **There is a conflict of interest.**
  - Example: Coca-Cola claims that regular sugar inta

Your Turn:

1. As a class, brainstorm a list of claims that you think may
   great place to start: food with "health" benefits, fad die
   counter medicine claims, etc.
2. Independently, choose one of the claims to research. L
3. Conclude: Is this claim science or pseudo-science? Wh

Math Review

Science and math constantly overlap. When interpreting results, it is imp
basic math skills so those results can be compiled into conclusions that ot
understand.

These pages will provide you with some basic math problems so you can r
essential math skills necessary to succeed in a science course. Show your
question. After checking your answers with the teacher answer key, pract
you got wrong using the additional practice pages provided.

Pretest:

1. One branch of a stream is 45.27 meters long. It leads into another stream that is 5
   What is the total length of the stream?
2. Convert 20 1/5 to a decimal.
3. A cargo ship traveled 14640 kilometers from Indonesia to the United States. The trip took 10 days.
   What was the speed of the ship (in kilometers/hour)?
4. In some locations, the ocean is 10000m deep. Sunlight can only penetrate the first 200 m. What
   percentage of the ocean can sunlight penetrate?
5. In September 2007, crude oil prices were $50 per barrel. By March 2007, the price had increased to
   $63 per barrel. What percentage increase was this?
6. The Missouri R 3,767 miles long. How many meters is this?
7. Wind turbines turn at rates of 130 miles/hour. How many kilometers/minute would this be?
   (1 mile = 1.6 km)

Math Review- More Practice

Metric Conversions

1. 4 m = _____ cm
2. 80000 g = _____ kg
3. 1 L 680 mL = _____ mL
4. 9,630 m = _____ km

Dimensional Analysis Conversions

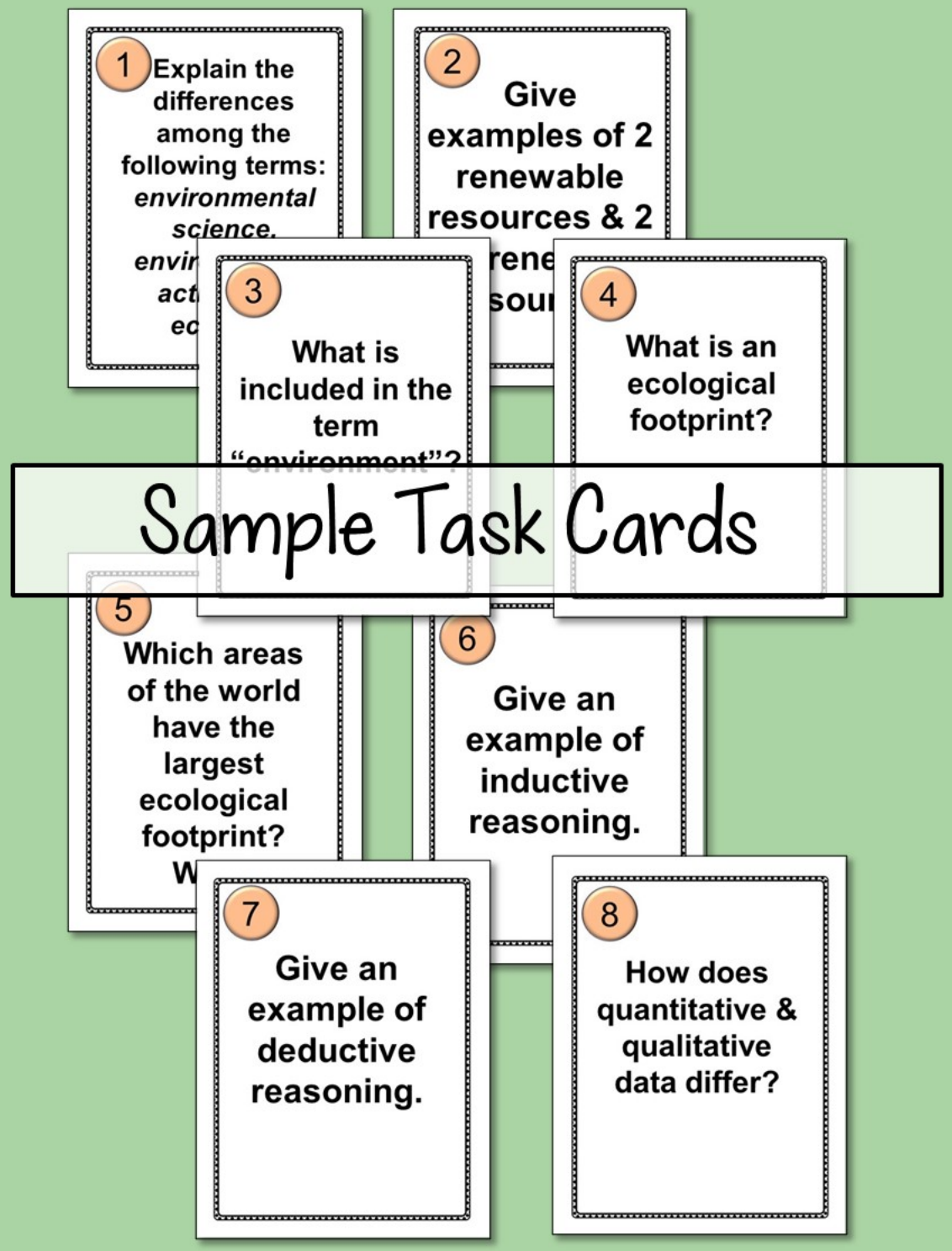
Use the formulas below to answer the following questions.
1 mile= 5280 feet 1 gallon = 3.78 liters
1 inch = 2.54 cm

5. Convert 1 mile to cm.
6. The average student creates 67 pounds of [illegible] waste per 180 day school year. How many
   pounds [illegible] per day?
7. In the United States, 1.5 plastic water bottles are used every second. How many are used in 1 year?
8. The average flow rate of a kitchen faucet is 2.2 gallons per minute. If you use your faucet for 23
   minutes per day, how many liters of water will you use in a year?

Math skills check! (great for standardized test prep)

Greater depth of knowledge, scientific literacy, & critical thinking

24 Editable Task Cards for Review



Sample Task Cards

Using Editable Task Cards

How to set-up:

1. Print the cards on cardstock or paper.
2. Cut the pages so that each card is separate. If you'd like to use them in future years, it may be worth laminating them to protect them from student writing and other damage.
3. Place each task card at a seat around the room.
4. Students will rotate to each seat until all cards are finished. Answers are recorded on their "Task Card Answer Sheet" or notebook paper.

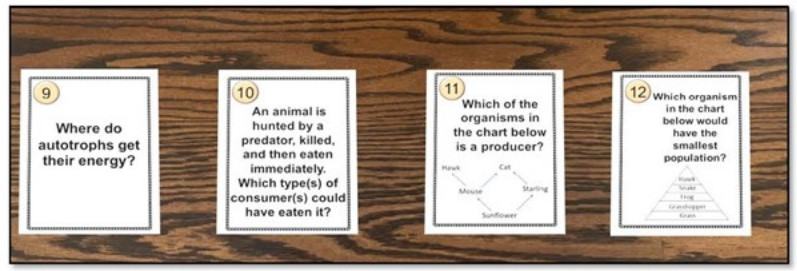
*TIP: It is important to set a timer for each rotation. Usually 2 minutes is appropriate. Without a timer, students will get backed up while rotating and chaos will ensue. ☺

Teacher Tips

Modifications:

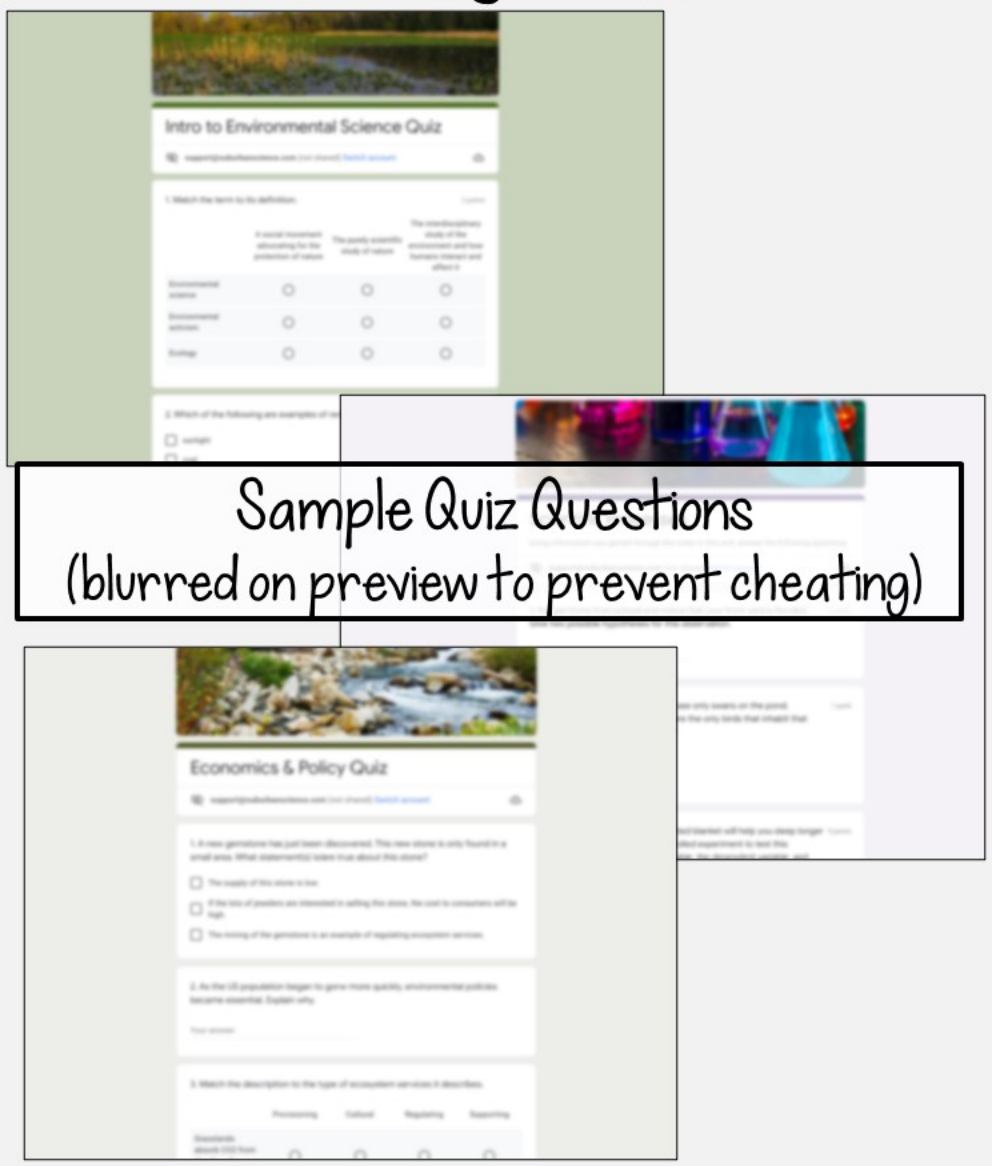
- These task cards are editable so you can change the text on any card.
- There are additional cards at the end of the document for adding questions. Be sure to add the correct number, as well!

- If moving around your room isn't possible, you can have students pass the cards in one direction.
- Other options:
  - Students can use notes or not depending on the level of memorization you expect prior to reviewing.
  - Students can work in pairs, which adds confidence.



Assessments

Editable Online Quizzes through Google Forms

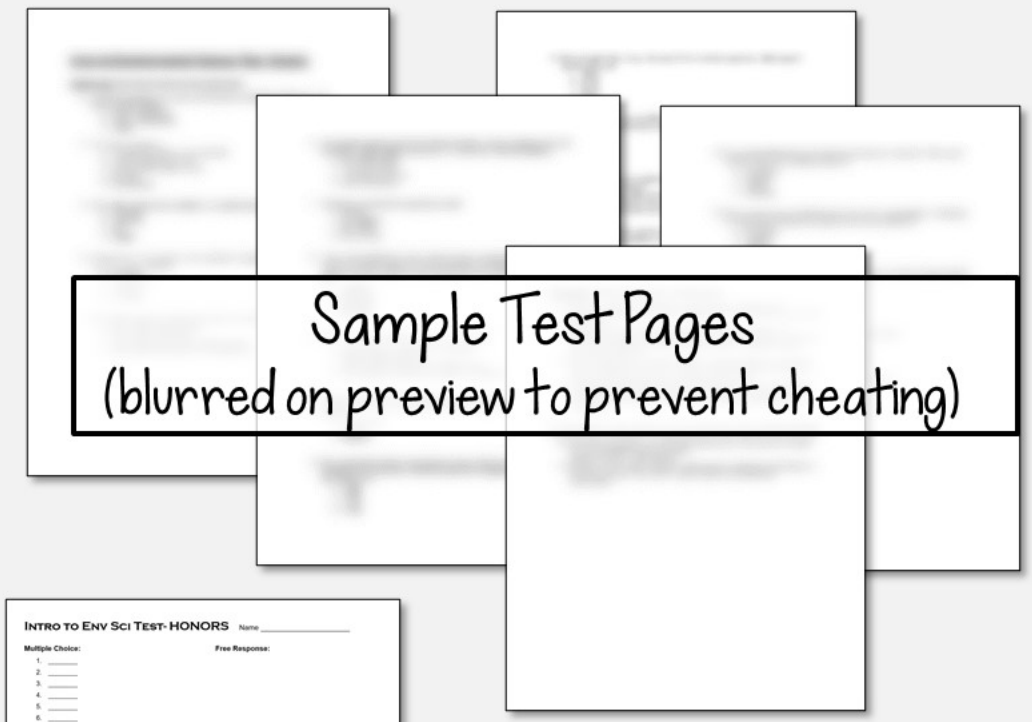


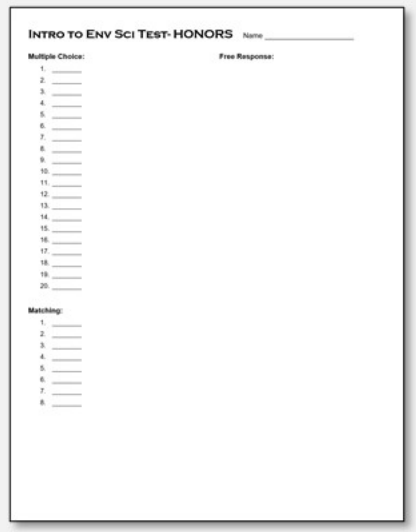
- 15 multi-part questions
- Fully editable
- Answer key included for automatic grading

Editable Unit Test

- 20 multiple choice questions
- 8 matching questions
- 5 free response questions

Two Versions: Honors & Regular





Student answer sheet & answer keys included (both fully editable)

I'd love to hear from you!

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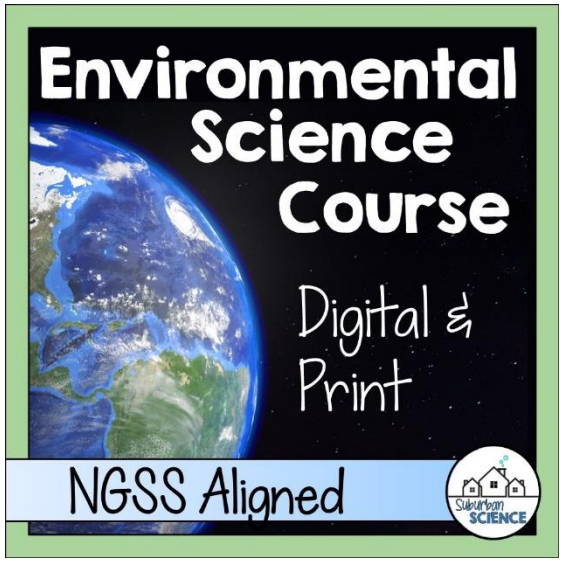
This unit is part of my Full Environmental Science Curriculum.



The full course includes resources for a full year of high school Environmental Science. If you **choose to purchase this full curriculum** after purchasing this unit, you can **receive a refund for the duplicate** unit. See the TpT return policy for details.

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Sincerely,
Anne from Suburban Science