

# Full Environmental Science Curriculum:

- Editable PowerPoints
- Cornell Notes AND Doodle Notes™
- Webquests
- Labs & Activities
- Math Extensions
- Literacy Extensions
- Task Cards
- Online Quizzes
- Editable Tests



# 370+ Editable PowerPoint slides that match perfectly with Cornell Notes!

## How do renewable and nonrenewable energy sources differ?

Renewable energy sources can be easily **replenished**, while nonrenewable sources **cannot**.



All student pages  
come in PRINT or  
DIGITAL!

**Energy**

What is energy? Energy is the ability to do work.

How do renewable and nonrenewable energy sources differ? Renewable energy sources can be easily replenished, while non-renewable sources cannot.

How is energy produced in the United States? Label the sections of the pie chart to the right with the type of energy represented by each percentage.

Solar	Wind	Hydro
Must be in areas with lots of land & high sun year-round. Often not near consumers.	Inconsistent Kill migrating birds	Can adversely affect aquatic ecosystems

In addition to the three largest sources, what other sources of energy are available? biomass, hydropower, wind, solar, geothermal, nuclear

What are the pros and cons of renewable energy sources? Renewable energy resources like wind, solar, and small-scale hydro produce low amounts of greenhouse gases.

These sources do not produce electricity consistently and they require large parcels of land. Renewable energy also cannot be easily stored without batteries.

List some of the major downsides of the following renewable energy sources:

Solar	Wind	Hydro
Must be in areas with lots of land & high sun year-round. Often not near consumers.	Inconsistent Kill migrating birds	Can adversely affect aquatic ecosystems

**Summary:** Energy is the ability to do work. Renewable energy sources can be replenished easily, while non-renewable sources cannot. Using renewable energy can be beneficial to the environment, though it can be challenging to produce, access and store this energy.



# 26 webquests for independent, student-centered learning!

**Live links to web-  
pages, articles,  
and videos for  
independent  
learning on any  
device!**



# Biomes

Answer the questions on the following page.

## What is a biome?

Not all scientists classify biomes in the same way.

## What is climate?

Weather is the daily fluctuation of temperature and precipitation. Climate is the weather in a particular location over a long period of time.

## What are the common biomes?

There are 9 common terrestrial (land) biomes.

## What is a climatogram?

A climatogram is a graph that displays the temperature and rainfall for a certain area. Each biome has its own climatogram. Average temperatures are displayed in a line graph while average rainfall is displayed in a bar graph. Find out how to make one—because you'll need to!

Month	J	F	M	A	M	J	J	A	S	O	N	D
Average Annual Temperature (°C)	10	12	15	18	22	25	28	30	28	25	22	18
Average Annual Precipitation (mm)	40	50	45	35	45	70	70	190	180	40	25	35

Page 1

## Biomes

**What is a biome?**

1. Define the term "biome".
2. A biome is defined by four characteristics:
  - 
  - 
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3. Are boundaries between biomes distinct or gradual? Explain.

**What is climate?**

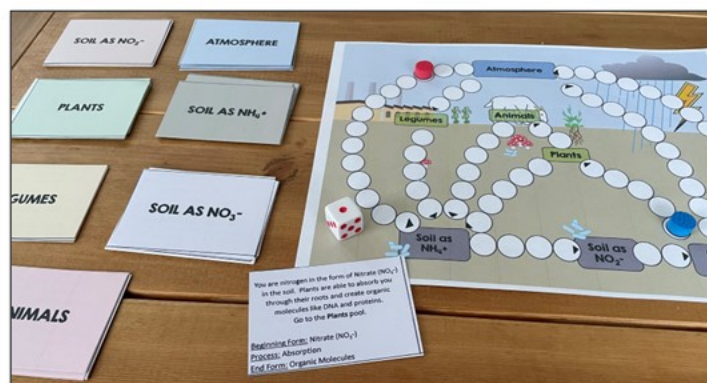
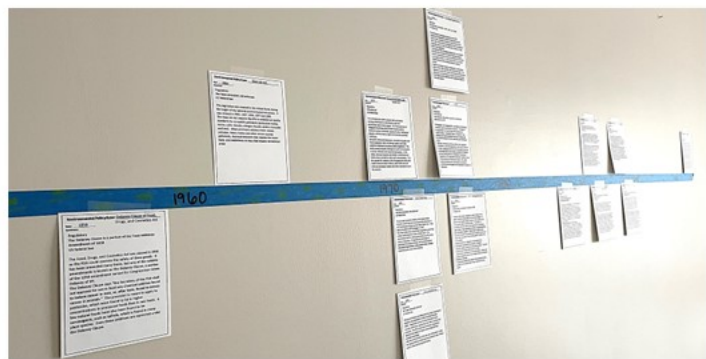
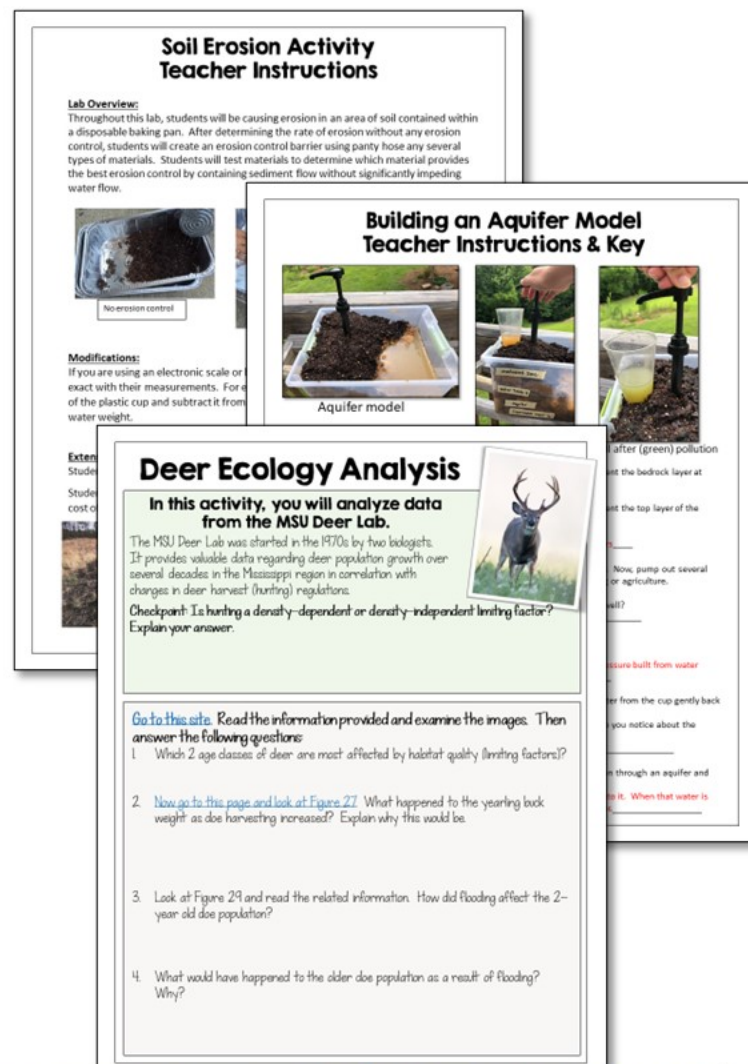
4. Describe the weather and climate in your location.
5. Name and briefly describe the 9 world biomes.
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# Corresponding Comprehension Questions

Page 2

# 63 Labs & Activities

- 21 Group or Independent Research Activities
- 8 Outdoor Labs
- 13 Group Projects
- 9 Whole-Class Activities
- 6 Partner Activities
- 6 Inquiry Labs





# Unit Planning:

- NGSS and State Standards
- Editable Pacing Guides
- Differentiation Guides for various abilities & learning environments

## Atmosphere Unit Guide

### 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](mailto: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 Atmosphere	HS-ESS2-2	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	4.4: Earth's Atmosphere
	HS-ESS2-4	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	9.1: Stratospheric Ozone Depletion
	HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	9.2: Reducing Ozone Depletion

### Weather & Wind


### 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 increase the depth of knowledge for honors students. **These can certainly be used for all students and can also be helpful for extra credit, homework, or sub days if you need them.** Because answers to these assignments are often less straightforward, I recommend grading for completion and then **discussing the answers** to make sure they are correct.

Assignment	Type of work	Skills addressed
Atmospheric Pressure	Math Extension	Critical thinking, greater depth of knowledge
Data Analysis: Solar Insolation	Interpretation of data & maps	Critical thinking, greater depth of knowledge
Data Analysis: Carbon Residence Time	Interpretation of data & Math Extension	Critical thinking, greater depth of knowledge

All honors assignments are designated by a  in the top right corner for easy identification.

### Differentiation

#### Student Ability

##### Advanced students

- **Honors options** are included in the student pages. These can be given to a whole advanced class or individual students, as needed.
- **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" tests that include **additional short answer questions**.

##### 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.
- **Use multiple methods of note-taking:**
  - Web-quest followed by PPT & Cornell notes will help to solidify student understanding rather than just one method. Doodle Notes can be used at the end of the topic as a student-led review. This allows students to have

### Geosphere Unit 3 Pacing Guide

© Suburban Science

50 min classes		Geosphere Unit 3 Pacing Guide		
	Day	Instruct	Assess	Homework
Energy Sources	1	<ul style="list-style-type: none"> <li>• Intro: Students read and complete <b>Energy Efficiency in Lighting</b></li> <li>• Unit 3 PPT (Section 1)</li> <li>• <b>Cornell Notes</b> (Energy)</li> </ul> (Option 2: Use Energy web-quest instead of PPT & Cornell Notes. Find web-quest links in "Differentiation Guide" within the "Unit Planning" folder or use PDF from Notes folder. Students will likely need to continue working on this during the next day.)	<ul style="list-style-type: none"> <li>• Informal discussion of answers on Energy Efficiency page</li> <li>• Informal questioning during PPT</li> <li>• Cornell notes summary</li> </ul>	
	2	<ul style="list-style-type: none"> <li>• Unit 3 PPT (Section 2)</li> <li>• <b>Cornell Notes</b> (Fossil Fuels)</li> <li>• Collect items for <b>Electricity Generation Lab</b>. Divide students into groups and begin the cardboard cutting instructions.</li> </ul> Materials: See teacher instructions on lab- very specific materials are required for this activity.	<ul style="list-style-type: none"> <li>• Informal questioning during PPT</li> <li>• Cornell notes summary</li> <li>• Check of progress and participation while students work on lab</li> </ul>	
	3	<ul style="list-style-type: none"> <li>• Students finish Part 1 of the Electricity Generation Lab and answer associated questions.</li> <li>• Students work on <b>Energy Generation Diagrams</b></li> </ul>	<ul style="list-style-type: none"> <li>• Informal check of student progress and understanding during lab work</li> <li>• Informal check of understanding based on accuracy of Energy Generation Diagrams</li> </ul>	
	4	<ul style="list-style-type: none"> <li>• Work on Part 2 of the Electricity Generation Lab. Materials: computers or devices with internet access, colored pencils or markers</li> </ul>	<ul style="list-style-type: none"> <li>• Informal check of student progress and understanding during lab work</li> <li>• Informal check of understanding based on accuracy of Energy Generation Diagrams</li> </ul>	All: Finish Energy Generation Diagrams, if necessary.
	5	<ul style="list-style-type: none"> <li>• Finish Part 2 of the Electricity Generation Lab.</li> <li>• Class discussion of answers to the discussion questions at the end of Part 2.</li> <li>• <b>Honors:</b> Complete <b>Light Bulb Efficiency</b></li> </ul>	<ul style="list-style-type: none"> <li>• Informal check of student progress and understanding during lab work and discussion</li> </ul>	<b>Honors:</b> Finish Light Bulb Efficiency, if necessary

Coincides with NGSS 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.

**Lesson planning is now quick & easy!**

# Two note-taking styles are included:

## Cornell Notes

**Urbanization**

What is urbanization?	Urbanization occurs when an area's <u>population</u> is concentrated in <u>cities</u> . More than <u>50%</u> of people live in urban areas.
How is land used?	Land use involves all human <u>activities</u> related to <u>land</u> . Land use plans are enforced by <u>zoning codes</u> . <u>Residential</u> land use makes up the vast majority of cities in the US. • What are some other types of land use? <u>Commercial, industrial &amp; mixed-use (combination)</u>
What is Euclidean zoning?	Euclidean zoning is a <u>separation</u> of land use by type into specific <u>areas</u> of a city. It was originally used to separate <u>residential</u> areas from <u>pollution</u> in industrial areas. What are some downsides of Euclidean zoning? <u>traffic congestion from commuting, air &amp; water pollution, production of emissions that cause climate change, segregation/discrimination based on residence</u>
How did agriculture lead towards the development of villages and specialized trades?	Farms allowed people to <u>raise</u> their food rather than <u>search</u> for it. Because food supply was <u>steady</u> for long periods of time when <u>irrigation</u> and soil <u>tilling</u> were used, people began to focus on <u>trades</u> instead of farming. As trade expanded, technologies that <u>facilitated trading</u> were developed, such as carts, <u>ships</u> , roads, and <u>ports</u> . In the ovals below, fill in the following terms in the order they developed: Specialized trades, hunting/gathering, farming
How have agricultural advancements led to further urbanization?	Better yields can be produced with <u>fewer</u> workers, so more people leave agricultural work for other <u>industries</u> .

**Summary:** Urbanization is when an area's population is concentrated in cities. There have been attempts to separate residential and industrial areas of cities, but this can cause various problems. The development of agriculture has contributed to people moving into urban areas and an increased focus on trades over farming.

## Doodle Notes™

**The development of cities**  
Draw a picture to show cities of the...

Land uses (commercial, industrial, residential, etc.) are enforced by zoning codes.

Euclidean zoning separated industrial areas from residential, but this eventually caused segregation & urban pollution.

How & why is land zoned?

**Benefits of urbanization**

- Greater availability of specialized jobs, education, infrastructure, efficient use of resources

**Consequences of urbanization**

- Air pollution leading to heat islands & climate change
- Traffic congestion, obesity, lack of community, greater fossil fuel consumption, increased transportation for goods, impervious surfaces, habitat fragmentation, noise & light pollution

**Land Use & Urbanization**

**SPRAWL**

- Increased desire for green space in suburbs
- Smart growth can remedy sprawl with more mixed-use zoning & mass transportation.

Cornell Notes match with PowerPoint slides  
and Doodle Notes™ are great for review!

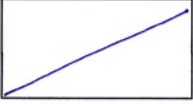
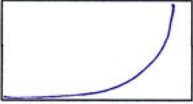
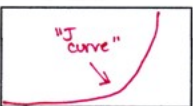


# 45 pages of Cornell Notes

Big concept questions

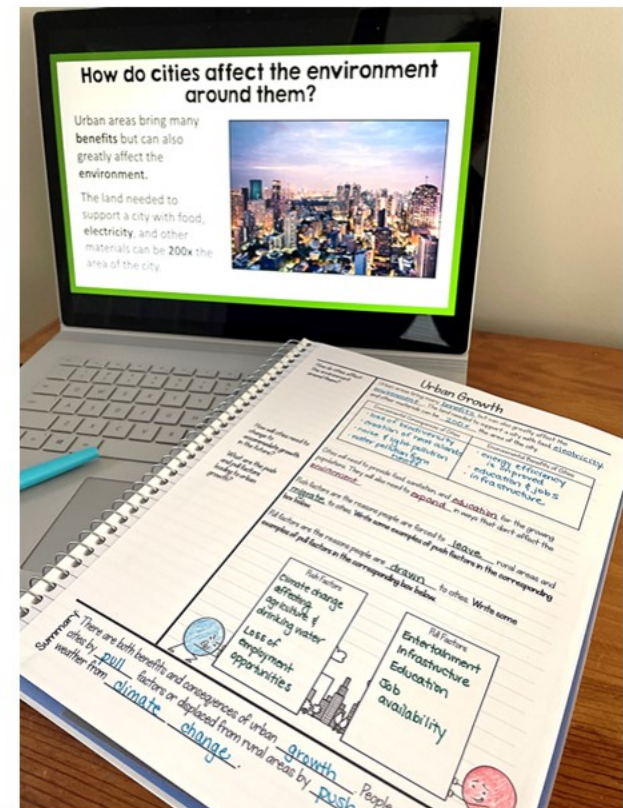
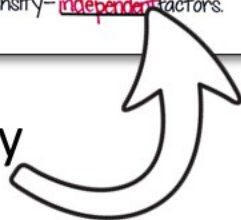


Every Cornell Notes page is **editable**.  
Add and delete text, questions, and summaries to meet the needs of your students.

Population Growth	
How are linear and exponential growth different?	<p>Linear growth (or <u>arithmetic growth</u>) shows a pattern increasing in a <u>constant amount</u>. → </p> <p>Exponential growth (or <u>geometric growth</u>) shows a pattern increasing at a <u>constant rate</u>. → </p> <p>Populations increase <u>exponentially</u> and can be graphed on a "<u>J</u>" curve. → </p> <p>The rate at which a species increases is its <u>biotic potential</u>, and this is based on its <u>habitat</u> requirements and <u>reproductive</u> rates.</p> <p>The environment keeps populations from increasing forever with limits called <u>limiting factors</u>. Limiting factors may cause organisms to <u>die</u> or <u>move</u> out of an area.</p> <p>Eventually, the population will <u>stabilize</u> at the <u>carrying capacity</u>.</p> <ul style="list-style-type: none"> <li>What is carrying capacity? → # of organisms the <u>environment can sustain/support over a long period of time</u></li> <li><u>Density-dependent</u> factors have an <u>increasing effect</u> as the <u>population increases</u>.</li> <li>Example: <u>predators, disease</u> (These are usually <u>biotic</u>)</li> <li><u>Density-independent</u> factors affect all populations, regardless of how large.</li> <li>Example: <u>drought, floods</u> (These are usually <u>abiotic</u>)</li> </ul>
How do populations increase?	
Why don't populations increase indefinitely?	
What types of limits regulate population size?	
Summary:	<p>Populations increase <u>exponentially</u> at a rate known as <u>biotic potential</u>. Populations don't increase indefinitely because of <u>limiting factors</u>. These factors cause populations to <u>stabilize</u> at the carrying capacity. There are two types of limits that regulate population size: <u>density-dependent</u> &amp; <u>density-independent</u> factors.</p>

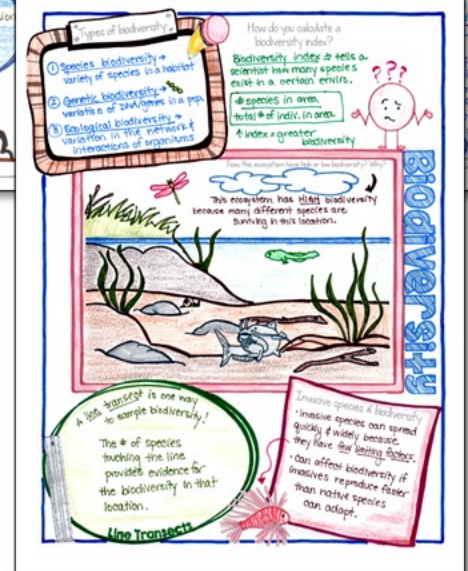
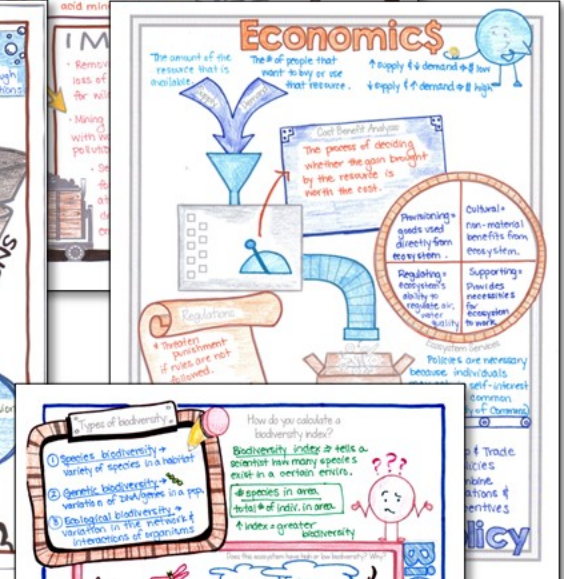
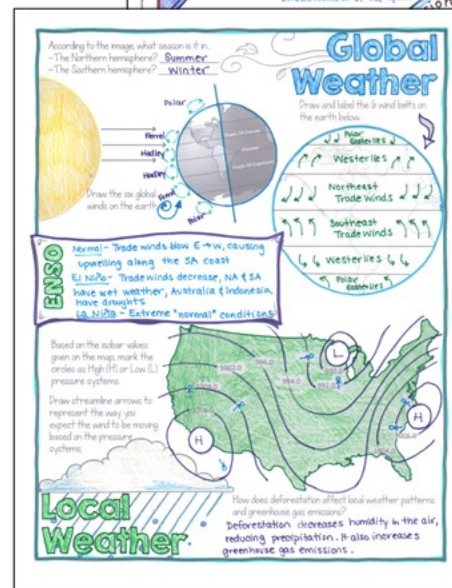
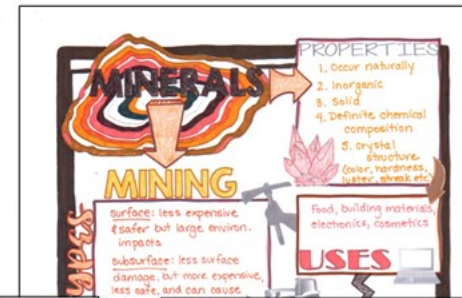
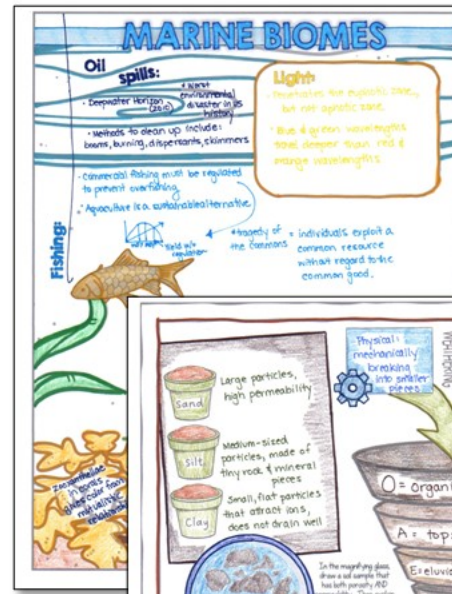
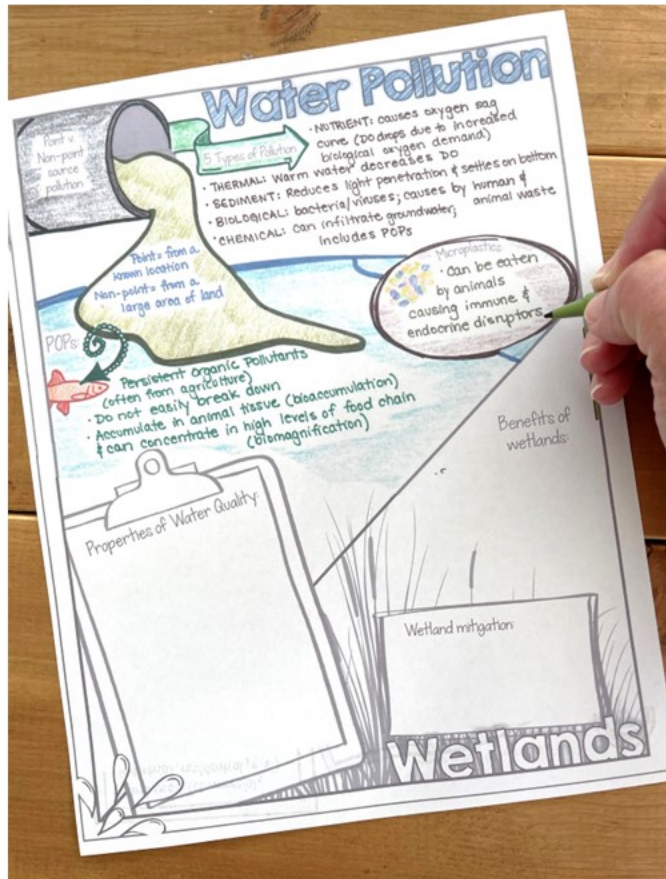
Sketch line graph shapes

Content summary for each page





# 25 pages of Doodle Notes



Doodle Notes™ increase student focus and memory-  
and they're great fun!  
A guide for using them in your classroom is included.



# 71 Extension Pages

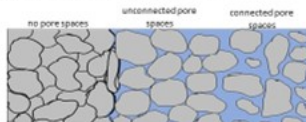
## 3 Types:

- Literacy Pages
- Calculations & Math Extensions
- Data Analysis

Great for  
homework or  
sub days!

### Digging Deeper: Porosity v. Permeability

**Groundwater** is water that is found underground. Sometimes when discussing groundwater, we think of large rivers and lakes of water under our feet. Although some groundwater exists in areas like this, most of it is found in the small spaces between particles of rocks and soil. Porosity and permeability are related properties of any rock or sediment. Both describe the openings within a rock or rock layer. **Porosity** is the rock's ability to hold fluid based on the amount of open space within the rock. **Permeability** is a measure of how easily fluid can flow within a rock or rock layer. A rock with many internal spaces may be porous, but those spaces must be connected in order for the rock to also be permeable.



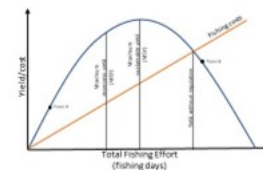
### Math Extension: Atmospheric Pressure

#### Conversion Factors:

10 mm = 1 cm  
2.54 cm = 1 inch  
29.92 inHg = 1 atmosphere  
1 mile = 1.6 km

1. Convert 44 mmHg to inHg.
2. Convert 72 inHg to atmospheres.

### Data Analysis: Maximum Sustainable Yield



The graph above displays the type of data that is used by officials to make regulations on fishing limits. The parabolic line represents the growth rate of any particular fish species and the diagonal line represents the constantly increasing costs for fishermen. The maximum economic yield (MEY) is the point at which one fishing company would make the maximum profits because it has the largest distance between the costs and the yield of fish. However, if all fishermen

### Digging Deeper: Speciation

#### Speciation

A **gene pool** is the combined genetic information for a particular population of organisms. Each species has a common gene pool, although they may be separated into populations in which these genes are not able to be shared. If the gene pool of two populations are separated and the genes are no longer able to be shared through reproduction, the populations may develop into new species. This is known as **speciation**. These new groups will adapt to their environments as separate units, which may cause natural selection to heighten their differences over time.



#### Isolating Mechanisms

Speciation may occur through a few ways including:

- Behavioral isolation- the two populations are incapable of interbreeding due to differences in courtship or reproductive behaviors
- Mechanical isolation- the reproductive organs of the two groups have become so different that they can no longer mate.
- Temporal isolation- the populations mate at different times or seasons
- Geographic isolation- the populations have been separated by geographic barriers (rivers, mountains, or roads) that prevent reproduction

#### Discussion Questions:

1. Look at the picture at the top. This is called a "wildlife overpass". What type of isolation are engineers and ecologists trying to prevent with this structure?
2. What is the disadvantage of isolating populations? (Hint: How does the gene pool change after isolation and why might this be a problem?)

### Math Review Pretest

Science and math constantly overlap. When interpreting results, it is important to have basic math skills so those results can be compiled into conclusions that others can easily understand.

These pages will provide you with some basic math problems so you can review the essential math skills necessary to succeed in a science course. Show your work on each question. After checking your answers with the teacher answer key, practice any concepts 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 503.62 meters long. 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 200m. 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 River is 3,767 kilometers 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)

Page 5

### Data Analysis: Solar Insolation

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly Average	Range
1. Los Angeles	5.28	5.53	5.89	5.97	5.88	5.04	4.82	4.54	4.74	5.13	4.83	4.97		
2. New York	5.85	5.33	5.38	4.6	4.22	4.22	4.29	4.86	5.65	5.9	5.81	5.7		
3. Chicago	2.01	3.09	4.25	5.12	5.18	4.90	5.53	5.12	4.38	3.58	2.41	1.78		
4. Miami	4.44	4.53	4.55	4.46	4.74	5.12	5.36	5.34	5.70	5.82	5.44	4.88		
5. Honolulu	5.25	6.28	5.38	4.38	3.98	2.97	3.03	3.83	4.64	5.49	5.85	6.28		

**Solar insolation** is a measurement of the average daily solar radiation for a certain area. Solar insolation is measured by average daily kilowatt hours received per square meter (kWh/M<sup>2</sup>). The chart above lists the solar insolation for several different cities for each month.

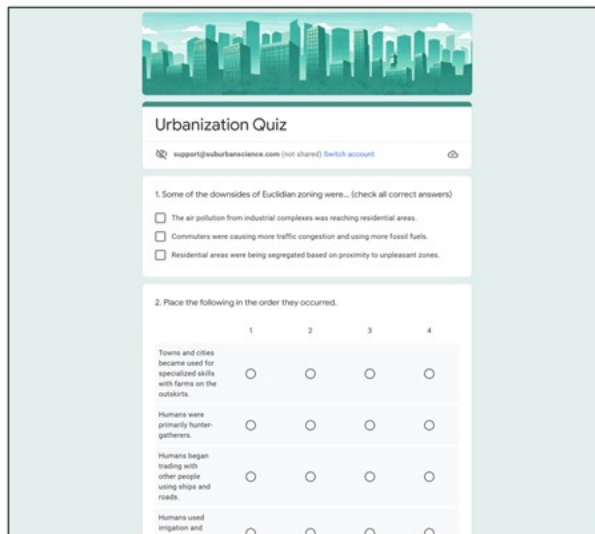
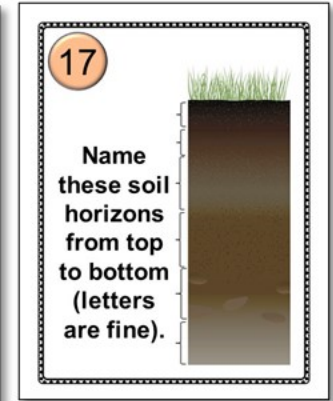
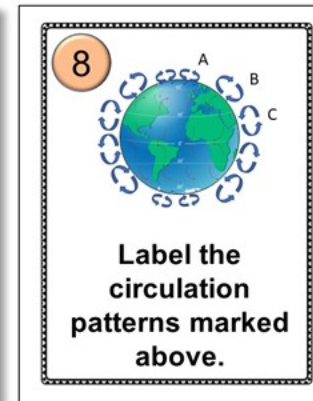
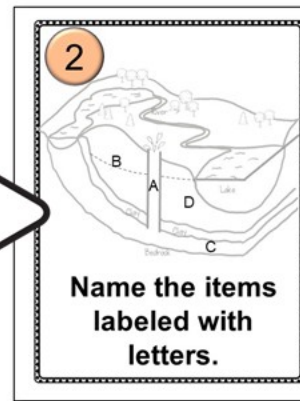
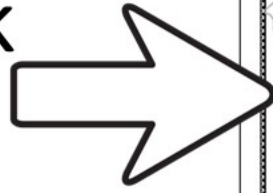
1. Calculate the yearly average for each location and write it in the "Yearly Average" column.
2. For each city, circle the month with the highest amount of solar insolation.
3. Calculate the range of solar insolation for each city. (Reminder: the range is calculated by subtracting the lowest and highest values.)
4. Use your answers to #2 and #3 to match the city's data to the correct location on the map below. Write the city number in each marker.



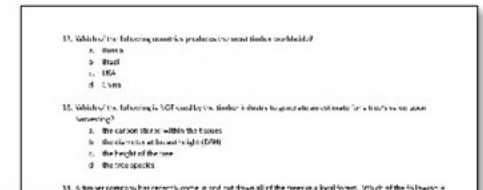
Greater depth of knowledge, critical thinking, & graph interpretation skills!

# Review & Assessment

Nearly 200  
Editable Task  
Cards for  
Class Review

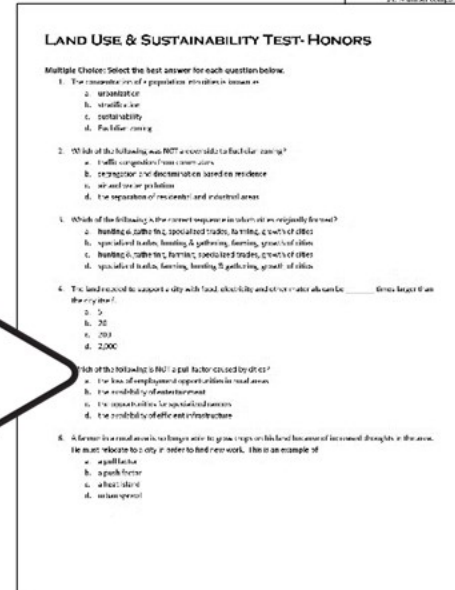
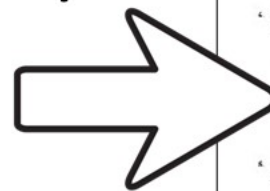


15 Google  
Forms Quizzes  
for easy  
grading!



9 Editable paper  
tests (both honors  
& regular versions)

- Multiple-choice
- Short Answer





**For more details  
about each unit,  
click on the  
individual units  
and select  
“Preview”.**

Questions? Contact me at  
[support@suburbanscience.com](mailto:support@suburbanscience.com).