Week 4 Virtual Binder Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per \_\_\_\_

Sjuts Office Hours: Tuesday-Friday 2:30-3:30 P.M. → <https://lps.zoom.us/j/188685904>

Smith Office Hours: Monday/Wednesday 12:30-1:30 P.M. and Friday 12:00-1:00 P.M → <https://lps.zoom.us/j/8246353539>

Objectives: Text Key Concepts

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| --- | --- | --- |
| 8. Compare and contrast the pros and cons of renewable and nonrenewable energy sources.  | (PS 10.4, 15.3)(GS 26.1- 26.2) | Coal, Oil, Natural Gas, Nuclear, Wind, Solar, Geothermal, Hydro (Dam/Tidal), Biomass, Nuclear vs chemical energy |
| 9. Develop a plan for both individuals and communities to conserve energy resources.  | GS 26.3  | Carbon footprint  |

Week 4 Virtual Binder Objective Work:

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| Objective 8: |
| Objective 9: |

Objective 8 Tasks:

* Skim the following sections in the book focusing on the key concepts and objective 8: Physical Science textbook 10.4, 15.3 and Geoscience textbook 26.1- 26.2.
* Human Impact Assignment

Part A: Carbon Footprint

1. What is a carbon footprint (ecological footprint)?
[Carbon Footprint Resource](http://css.umich.edu/factsheets/carbon-footprint-factsheet)
2. Complete the carbon footprint calculator. Insert screenshot of your results page. <http://www.footprintcalculator.org/>
3. What are some questions they asked? Why do you think they were on the assessment? Give 3 examples.

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Part B: Be the change!

1. List at least 3 changes you can make to reduce your carbon footprint.

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1. List at least 3 changes your community can make to reduce its footprint?

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1. What is carbon sequestration and why are universities studying it?

[UNL CSP](http://csp.unl.edu/public/)

[Carbon Sequestration Resource](https://pubs.usgs.gov/fs/2008/3097/)

1. Compare and contrast the pros and cons of renewable and nonrenewable resources. Give specific examples: fossil fuels, nuclear, wind, hydro, solar, geothermal, biomass. [Alternative Energy Resource](http://needtoknow.nas.edu/energy/)

Fossil Fuel Power Plant [Video](https://live.myvrspot.com/iframe?v=fZDQxM2I5ZmU0N2VhYWIxNDRmZDg5NWIyNTQ2YjhhN2I)

Wind Generator [Video](https://live.myvrspot.com/iframe?v=fNTA4NjlmYmNlZjU4ZGQ5MWYxNzcxODY5OGFkYzRiMTg)

Pumped Storage Hydroelectric System [Video](https://live.myvrspot.com/iframe?v=fMTQxYTFhOWJiYjcwMGZhOGZhODI5ZmRiMmQ3MDNmOWY)

Solar Panel [Video](https://live.myvrspot.com/iframe?v=fZTVjNmEyMzVlYTAxMDA4MDg3ZGNmNTA2OTc0NDcxYTY)

Nuclear Power Plant [Video](https://live.myvrspot.com/iframe?v=fMGI4YTVmYmI0MmVkNzk2NzI0NWRiZjk0MzI5NWM3ZGY)

Objective 9 Tasks:

* Read Ch 26.3 in the Geoscience textbook.
* Play Energy City Game

Link: <https://games4sustainability.org/gamepedia/energy-city/> You will need to allow adobe flash.

**Preview:** Once you get to the home page for Energy City, click on “Learn More!” to hear more about your mission! As you read through the overview of the game, answer the questions below. Once you have answered all questions, you can click Begin on the home screen.

1. What are “stakeholders”? Who are your stakeholders in this game? How do you think their perspectives will influence the choices you make in the game?

2. Drawing power always has a cost. Describe metrics that will cost you every time you supply power to your community.

3. Having a diverse portfolio for your energy needs is important. Describe some of the pros and cons of the different energy sources you will be exploring in this game.

**Round 1:** Start out by selecting either Beacon Hills or Carbondale Heights.

4. Tell us about the city you selected. What are the existing power plants? What are the energy details for the city?

5. Once you have completed the simulation tutorial, select your city’s “Energy Strategies”. What power plants fall under “Non-renewable”, “Inexhaustible”, and “Renewable”? Why do you think “Nuclear” is listed under “Non-renewable”?

**Congratulations! You are now ready to start powering your city.** Remember, all buildings must be started before you begin powering your city. Be sure to take your stakeholders requests into account and as you play the game keep track of the “cost” of each source of energy. As you go through the game, answer the following questions:

6. What are some of the biggest challenges with keeping your stakeholders happy? Does it ever feel like their wants are conflicting?

7. How long did you have to wait before you were able to use energy sources you implemented aside from the original sources for the city? What was the first energy source you brought online? Did it meet your city’s energy requirements in a significant way?

8. Examine your final graphs that kept track of your cost metrics and compare these graphs with your energy portfolio. What relationships did you see between the two?

9. People like to say you have to spend money to make money. Did you ever have to take a more significant hit on air quality or environmental impact for a long term good? Did it surprise you that some inexhaustible and renewable resources had an initial cost in terms of air quality or environmental impact?

10. As you invested in conservation strategies, how did that change your cost metrics in the long run? How did this affect your communities energy requirements?

**Reflection:** It can be easy to oversimplify a solution to a global energy need. Write a reflection on your experience (at least two paragraphs). What are some unexpected challenges you encountered that you hadn’t thought of? Were you able to keep all of your stakeholders happy? Did you ever come close to running out of your cost metrics? How important is it to get community support?

**10 Years Later….**

Hopefully you were able to successfully power your city for 10 years! Try a more challenging city now! Do you think you could power your city for 20 years?