Powering the County

Compare energy data and weigh trade-offs.

HS-ENV2-4 "Analyze and interpret the data on the benefits and disadvantages of the different sources of energy including fossil fuels, nuclear energy, hydroelectric, wind, solar, geothermal and biofuels."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one benefit and circle one disadvantage for each energy source named in the passage. Put a star beside the coal and wind emission numbers in the table so you can compare them.

Power for a Hospital and Its Neighbors

1 A county is choosing electricity for a new hospital and nearby homes. The table compares life-cycle climate emissions, including fuel production, construction, and operation. Coal and natural gas, both fossil fuels, can supply power when needed, but burning them adds greenhouse gases and air pollution. The table shows that gas emits less per unit of electricity than coal.

APPROXIMATE MEDIAN LIFE-CYCLE EMISSIONS

Energy source	g CO_2-equivalent per kWh
Coal	820
Natural gas	490
Nuclear	12
Wind	11
Solar panels	48

2 Nuclear plants can provide steady power with low life-cycle emissions, but radioactive waste requires secure storage. Hydroelectric dams can produce low-emission electricity and adjust output quickly, yet they can block fish migration and flood habitats. Wind turbines and solar panels have low emissions in the table, but their output changes with wind and sunlight.

3 Geothermal plants use Earth's heat to supply steady electricity with low emissions, but suitable sites are limited. Biofuels made from crops or waste can be stored and burned when power is needed; growing fuel crops may compete with food production and land for wildlife. No single source avoids every cost, so planners must weigh emissions against reliability and impacts.

2 ANSWER WITH EVIDENCE

Use the passage

1. According to the table, how many more grams of CO_2-equivalent per kWh does coal emit than wind? What trade-off does the passage identify if the county switches from coal to wind?

2. Compare natural gas and coal using the table and passage. Which has lower life-cycle emissions, and what disadvantage do they share?

3. A hospital needs steady electricity at night when the wind is still. Which low-emission source in the passage could provide it, and what is one disadvantage of that source?

4. A county needs power it can store for later use. Compare biofuels and geothermal power using one benefit and one limitation of each.

3 YOUR TURN

Your own words

Recommend a two-source electricity mix for the hospital and homes. Use one number from the table for each source, explain how the sources work together, and name one drawback of each.

Powering the County

PART 1 · READ AND MARK

Underline one benefit and circle one disadvantage for each energy source named in the passage. Put a star beside the coal and wind emission numbers in the table so you can compare them. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	According to the table, how many more grams of CO_2-equivalent per kWh does coal emit than wind? What trade-off does the passage identify if the county switches from coal to wind?	**Coal emits 809 g CO_2-equivalent more per kWh. Wind has lower emissions, but its output changes with the wind, while coal can supply power when needed.**
2	Compare natural gas and coal using the table and passage. Which has lower life-cycle emissions, and what disadvantage do they share?	**Natural gas has lower emissions, 490 versus 820 g CO_2-equivalent per kWh. Burning either fuel adds greenhouse gases and air pollution.**
3	A hospital needs steady electricity at night when the wind is still. Which low-emission source in the passage could provide it, and what is one disadvantage of that source?	**Nuclear power provides steady, low-emission electricity, but its radioactive waste needs secure storage. Geothermal power is also valid; suitable sites are limited.**
4	A county needs power it can store for later use. Compare biofuels and geothermal power using one benefit and one limitation of each.	**Biofuels can be stored and burned when needed, but growing fuel crops may compete with food production or wildlife habitat. Geothermal supplies steady, low-emission power, but suitable sites are limited.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I recommend nuclear and solar power. Nuclear emits about 12 g CO_2-equivalent per kWh and supplies steady electricity, including at night. Solar emits about 48 g CO_2-equivalent per kWh and adds power when sunlight is available. Nuclear waste needs secure storage, while solar output falls after sunset.

For Part 3, accept any two sources shown in the table if the response accurately cites each emission value, explains how the sources work together, and identifies a passage-supported drawback for each.