Climate Change Clues

Trace how evidence connects human activities to climate effects.

8.11.B "use scientific evidence to describe how human activities, including the release of greenhouse gases, deforestation, and urbanization, can influence climate; and"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each human activity or land change, number each piece of scientific evidence, and draw a line from the activity to the climate effect that the evidence supports.

Signals of Human Influence

1. Human activities can change climate by altering Earth's energy balance. Carbon dioxide, methane, and other greenhouse gases absorb outgoing infrared energy, so more energy remains in the lower atmosphere. Burning coal, oil, and natural gas releases carbon dioxide. Measurements at Mauna Loa, Hawaii, show atmospheric CO_2 rose from about 315 parts per million in 1958 to more than 420 parts per million in recent years. Global temperature records show that Earth has warmed during the same long-term period.

2. Forests influence climate because trees remove carbon dioxide from air during photosynthesis and store carbon in wood, roots, and soils. When forests are cleared or burned, stored carbon can enter the atmosphere, and fewer trees remain to remove carbon dioxide. Satellite images document rapid forest loss in some regions. Studies that compare cleared land with nearby intact forest find that cleared areas are often hotter and drier near the surface. This change can affect rainfall and regional climate.

3. Urbanization changes land surfaces and can add heat-trapping gases. Dark roads and roofs absorb more sunlight than many planted areas, while pavement prevents water from evaporating. Evaporation normally cools a surface. Temperature measurements commonly show that densely built neighborhoods stay warmer at night than nearby rural areas, an effect called an urban heat island. Cities also use energy for transportation, buildings, and industry. If that energy comes from fossil fuels, the released carbon dioxide can contribute to global climate change.

2 ANSWER WITH EVIDENCE

Use the passage

1. What measurement in the passage provides evidence that greenhouse gas levels have increased? Include the location and the two approximate values.

2. How does releasing greenhouse gases change Earth's energy balance, according to the passage?

3. What comparison did studies use to investigate the climate effects of deforestation, and what did they find?

4. Describe one local climate effect and one global climate effect that can result from urbanization.

3 YOUR TURN

Your own words

A growing town plans to replace 200 acres of forest with warehouses and parking lots. Write five sentences describing two ways this project could influence climate, naming one measurement scientists could collect for each effect and a comparison that would make the evidence stronger.

ANSWER KEY

Climate Change Clues

GRADE 8 · TEKS 8.11.B

PART 1 · READ AND MARK

Underline each human activity or land change, number each piece of scientific evidence, and draw a line from the activity to the climate effect that the evidence supports. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What measurement in the passage provides evidence that greenhouse gas levels have increased? Include the location and the two approximate values.	**Measurements at Mauna Loa, Hawaii, show atmospheric CO_2 rose from about 315 parts per million in 1958 to more than 420 parts per million in recent years.**
2	How does releasing greenhouse gases change Earth's energy balance, according to the passage?	**Greenhouse gases absorb outgoing infrared energy, so more energy remains in the lower atmosphere.**
3	What comparison did studies use to investigate the climate effects of deforestation, and what did they find?	**The studies compared cleared land with nearby intact forest. Cleared areas were often hotter and drier near the surface.**
4	Describe one local climate effect and one global climate effect that can result from urbanization.	**Locally, densely built neighborhoods can stay warmer at night than nearby rural areas because roads, roofs, and pavement change heating and cooling. Globally, fossil fuel use in cities releases carbon dioxide that can contribute to climate change.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Clearing the forest could release stored carbon and leave fewer trees to remove carbon dioxide. Scientists could measure atmospheric CO_2 near the site and compare its long-term trend with a similar forested area. Parking lots and roofs could create warmer local conditions by absorbing sunlight and reducing evaporative cooling. Scientists could measure nighttime air temperature at the warehouses and at a nearby rural site with similar weather. These comparisons would help separate changes linked to the development from normal day-to-day variation.

Accept scientifically accurate explanations that connect an activity to a climate effect and cite the passage evidence. For the open response, accept other valid measurements and comparison sites if both proposed effects and evidence plans are clear.