

## How Man Affects the Weather: Guided Viewing Worksheet

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1: What is the difference between regional climate and microclimate?

-A regional climate refers to the general climate that is expected locally; a microclimate is the climate of a small area that is the actual condition that organisms are in.

2: Why is vegetation important in climate?

-They indicate variations in climate, they alter factors such as humidity and soil temperatures, and they maintain the temperature gradient to enable certain species to thrive.

3: What are impervious surfaces? How can impervious surface affect local climates?

-A surface area that is unable to absorb water into the soil mantle/ an area that causes water to run off the surface; Impervious surfaces can affect water quality from runoff and temperatures.

4: What is an urban environment?

-A highly populated environment occupied by buildings and structures used for residence, institution, and industry.

5: What is a suburban environment?

-Environments located on the outskirts of cities, have smaller populations

6: What is a rural environment?

-Environments that are far away from cities, usually areas like farmland, woodland forests, and prairies

7: What is an urban heat island? Explain.

-An urban area that becomes warmer than its surroundings, due to impermeable infrastructure and buildings that absorb heat.

8: Why do we care about urban heat islands? What do they do to urban environments?

-Urban heat islands cause more energy demand (AC) and air pollution from greenhouse gases. The increased temperature may also cause heat-related illness, and changed in water quality.

9: What can be done about the urban heat island effect?

-We can increase vegetation and trees, create green roofs, use cool or green pavements, and install cool or reflective roofs.

10: What are green roofs and what are their advantages?

-A roof that is or partially covered in vegetation and soil; green roofs may improve air and water quality, and they also act as an insulator that may reduce AC costs.

11: What is a cool pavement?

-Pavements that are made using materials that reflect or control temperature

12: What is a pervious pavement? What is the advantage?

-Pavement that is porous, enabling water and air to flow through; Can water vegetation, recharge groundwater, preserve water resources, reduce runoff, and improve runoff quality.

FRQ

A: Describe how the temperature of urban areas like Atlanta, Philadelphia, and Chicago differs from that of surrounding rural areas.

B: Identify and describe TWO differences between urban and surrounding rural areas that contribute to the temperature differences between them.

C: Urban areas typically have levels of air pollution that are significantly higher than those found in surrounding rural areas. Identify a characteristic of the urban microclimate that lead to higher levels of air pollution and describe how that characteristic contributes to this increase

D: Identify and describe TWO actions that local governments in urban areas could take to reduce air pollution.

A. Temperatures in population-dense areas such as Chicago differ from their surroundings because of the "heat island" effect, which is caused by heat-absorbing infrastructure, buildings, and lack of climate-stabilizing vegetation. These factors all contribute to rising temperature.

B. Two differences that contribute to the change in temperature include a lack of vegetation in cities (which maintains the temperature gradient in areas) and an abundance of impervious surfaces, which absorb heat and change the overall climate.

C. Urban areas that are subject to climate change and pollution are often affected by factory emissions from industrial processes. Greenhouse gas emissions such as methane and carbon dioxide pollute the city.

D. Local governments can solve air pollution problems in urban areas by producing and emphasizing the use of public transportation such as electric railcars and busses. The govt. may also plant vegetation to filter the harmful emissions from automobiles and factories.