

Urban Heat Islands and the Design of Future Cities

COMPREHENSION • VOCABULARY • DISCUSSION

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Reading Passage

Read the passage carefully. Each paragraph is labelled with a letter for easy reference.

- A** Urban heat islands (UHIs) are metropolitan areas that experience significantly higher temperatures than their rural surroundings. This phenomenon is primarily caused by human activities and the built environment. As cities expand, they replace natural landscapes with concrete, asphalt, and buildings, which absorb and retain heat. For instance, a study conducted in Phoenix, Arizona, revealed that urban areas can be up to 10 degrees Fahrenheit warmer than nearby rural areas during the summer months. This temperature difference exacerbates energy consumption, elevates emissions of air pollutants, and can lead to serious health issues among urban populations, such as heat-related illnesses and respiratory problems. The urban heat island effect can also contribute to increased energy costs as air conditioning use rises in response to higher temperatures.
- B** To mitigate the effects of UHIs, city planners and architects are increasingly incorporating green infrastructure into urban designs. This includes the creation of parks, green roofs, and the planting of trees along streets and in public spaces. For example, New York City's MillionTreesNYC initiative aimed to plant one million trees by 2017, which not only provides shade and cooling but also enhances biodiversity, improves air quality, and offers recreational spaces for residents. Additionally, these trees play a vital role in reducing stormwater runoff and providing habitats for urban wildlife. Furthermore, the use of reflective materials in building designs and road surfaces can significantly reduce heat absorption, helping to lower overall temperatures in urban areas. As cities face the challenges posed by climate change, integrating these sustainable practices into urban planning is essential for creating resilient, livable environments. The future of urban design hinges on how effectively we can balance development with environmental sustainability, ensuring cities remain vibrant and healthy places for all inhabitants. By prioritizing green spaces, innovative materials, and sustainable practices, urban areas can combat the adverse effects of heat islands while promoting a better quality of life for their residents. This holistic approach not only addresses immediate environmental concerns but also fosters community well-being and ecological balance.

Vocabulary Glossary

Key words and phrases from the passage. Study them before attempting the exercise below.

WORD / PHRASE	DEFINITION	EXAMPLE SENTENCE
metropolitan	related to a large city and its surrounding areas	<i>Metropolitan areas often have more public transport options than rural ones.</i>
phenomenon	something that happens or exists, often unusual or interesting	<i>The northern lights are a natural phenomenon seen in some parts of the world.</i>
exacerbates	makes a problem or bad situation worse	<i>Cold weather exacerbates her joint pain, so she prefers warm climates.</i>
mitigate	to make something less severe or harmful	<i>The new law aims to mitigate traffic congestion in the city.</i>
biodiversity	the variety of different types of life found in a certain area	<i>Rainforests are known for their high levels of biodiversity.</i>
reflective	able to send back light or heat	<i>She wore a reflective vest while cycling at night.</i>
resilient	able to recover quickly from difficulties or changes	<i>Children are often more resilient than adults when facing change.</i>
ecological	related to the relationships between living things and their environment	<i>Ecological studies help us understand how pollution affects wildlife.</i>

Vocabulary Exercise — Fill in the Blank

Use one word or phrase from the glossary above to complete each sentence. Each item is used only once. Answers are on the final page.

1. The city is planning to add more parks to _____ the impact of urban heat.
2. A _____ area usually includes suburbs and nearby towns.
3. Planting more trees can help maintain _____ in city environments.
4. Using _____ materials on buildings can help lower city temperatures.
5. The scientist studied the _____ of birds migrating earlier in spring.
6. A _____ community can adapt to changes in the environment more easily.

Comprehension Questions

These questions are different from the online practice test. Choose the best answer (A, B, C, or D). Answers and explanations are on the final page.

Question 1

What is one way green infrastructure can help urban areas?

- A. It increases the number of skyscrapers.
- B. It provides more parking spaces.
- C. It enhances biodiversity and air quality.
- D. It reduces the number of buses.

Question 2

Why is it important to use reflective materials in cities?

- A. To make buildings look more modern.
- B. To help reduce heat absorption.
- C. To attract more tourists.
- D. To increase energy consumption.

Question 3

How does the urban heat island effect impact energy costs?

- A. It lowers energy costs by reducing the need for heating.
- B. It has no impact on energy costs.
- C. It increases energy costs due to more air conditioning use.
- D. It stabilizes energy costs throughout the year.

Question 4

What role do trees play in combating urban heat islands?

- A. They increase the number of buildings.
- B. They provide shade and reduce stormwater runoff.
- C. They lower the number of cars.
- D. They make streets darker.

Question 5

What is the primary focus of future urban design according to the passage?

- A. Building more skyscrapers.
- B. Increasing the number of cars.
- C. Balancing development with environmental sustainability.
- D. Reducing the size of cities.

Discussion & Writing Prompts

Each prompt references a specific detail from the passage above. Use for classroom discussion or a short written response (150–200 words).

1. Paragraph A discusses how urban areas can be up to 10 degrees warmer than rural areas during summer. How might this temperature difference affect daily life in a city?

2. The passage mentions New York City's MillionTreesNYC initiative. What are some challenges your city might face if it tried a similar tree-planting initiative?

3. According to the passage, reflective materials can help reduce heat in cities. Do you think using such materials is feasible in all climates, or are there limitations?

Answer Key

COMPREHENSION QUESTIONS

Q1 C

Q2 B

Q3 C

Q4 B

Q5 C

VOCABULARY EXERCISE

FIB1 mitigate

FIB2 metropolitan

FIB3 biodiversity

FIB4 reflective

FIB5 phenomenon

FIB6 resilient

Comprehension Question Explanations

Why the correct answer is right — and why each wrong option is incorrect.

1. What is one way green infrastructure can help urban areas?

✓ C — It enhances biodiversity and air quality.

Green infrastructure enhances biodiversity and air quality, as mentioned in the passage.

✗ A — It increases the number of skyscrapers.

The passage does not mention green infrastructure increasing skyscrapers.

✗ B — It provides more parking spaces.

The passage does not link green infrastructure to parking spaces.

✗ D — It reduces the number of buses.

The passage does not mention reducing the number of buses.

2. Why is it important to use reflective materials in cities?

✓ B — To help reduce heat absorption.

Reflective materials help reduce heat absorption, lowering temperatures.

✗ A — To make buildings look more modern.

The passage does not discuss aesthetics as a reason for reflective materials.

✗ C — To attract more tourists.

The passage does not suggest they attract tourists.

✗ D — To increase energy consumption.

Reflective materials aim to reduce, not increase, energy consumption.

3. How does the urban heat island effect impact energy costs?

✓ C — It increases energy costs due to more air conditioning use.

The passage states that higher temperatures lead to increased air conditioning use, raising energy costs.

✗ A — It lowers energy costs by reducing the need for heating.

The passage indicates increased air conditioning, not reduced heating.

✗ B — It has no impact on energy costs.

The passage clearly states an impact on energy costs.

✗ D — It stabilizes energy costs throughout the year.

The passage does not suggest energy costs are stabilized.

4. What role do trees play in combating urban heat islands?

✓ B — They provide shade and reduce stormwater runoff.

Trees provide shade and reduce stormwater runoff, as described in the passage.

✗ A — They increase the number of buildings.

Trees do not increase the number of buildings.

✗ C — They lower the number of cars.

Trees are not linked to reducing the number of cars.

✗ D — They make streets darker.

Trees do not make streets darker.

5. What is the primary focus of future urban design according to the passage?

✓ **C — Balancing development with environmental sustainability.**

The passage emphasizes balancing development with sustainability as key to future urban design.

✗ **A — Building more skyscrapers.**

Skyscrapers are not the primary focus mentioned.

✗ **B — Increasing the number of cars.**

Increasing cars is not a focus of future urban design.

✗ **D — Reducing the size of cities.**

The passage does not suggest reducing city sizes.

MORE C1 LEVEL READING PRACTICE

Sociology Trust Modern Societies — <https://www.esl-tests.com/reading/c1/sociology-trust-modern-societies>

Economics Global Art Market — <https://www.esl-tests.com/reading/c1/economics-global-art-market>

Digital Memory Technology Changing Human Recall — <https://www.esl-tests.com/reading/c1/digital-memory-technology-changing-human-recall>