NO PREP

Rising Seas and Coastal Flooding

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Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Rising Seas and Coastal Flooding

When we talk about climate change, one of the most pressing and visible effects is rising sea levels. The ocean is not only warming but also expanding and swelling onto land. For coastal communities, this means more frequent flooding, shrinking shorelines, and long-term threats to homes, businesses, and even entire cities. Rising seas are a slow-moving disaster, but their impacts are accelerating and reshaping human settlement patterns in ways we cannot ignore.

Causes of Rising Seas

There are two main drivers of sea level rise: melting ice and thermal expansion. As polar ice caps and glaciers melt, water that was once locked in ice flows into the ocean. At the same time, warm water expands, taking

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Flooding Risks and Coastal Impacts

Rising seas increase the risk of both chronic flooding and extreme storm surges. Coastal cities like Miami, New York, and Jakarta already experience "sunny day flooding," when high tides push seawater onto streets without any storm at all. Storms such as hurricanes and typhoons become far more destructive when they ride on higher seas, pushing storm surges deeper inland. In addition to property damage, these events erode beaches, damage wetlands, and contaminate freshwater supplies with saltwater intrusion.

Human Consequences

Sea level rise is not just a scientific concern — it is a human one. Entire neighborhoods and communities may need to relocate. Low-lying island nations like

the Maldives and Tuvalu face existential threats, as much of their land could become uninhabitable. The economic costs are staggering: billions of dollars in property damage, lost tourism, and the expense of building sea walls or elevating buildings. Socially, climate migration could increase, forcing people to move away from coasts and creating new challenges for governments around the world.

Adaptation Strategies

While reducing greenhouse gas emissions is the only way to slow long-term sea level rise, communities must also adapt to the changes already underway. Strategies include constructing seawalls, restoring coastal wetlands to absorb water, and designing buildings to withstand flooding. Some cities are experimenting with "managed retreat," a strategy where people relocate away from vulnerable areas. Education and planning are essential, as future generations will inherit a world where seas are higher and adaptation is no longer optional.

Key Information: Table: Causes and Effects of Rising Seas

Cause	Effect	Consequence
Melting ice sheets	More water enters oceans	Higher sea levels
Thermal expansion	Warm water takes up more space	Higher sea levels
Higher sea levels	Increased flooding	Property damage
Coastal flooding	Saltwater intrusion	Contaminated drinking water
Storm surges	More destructive hurricanes	Greater inland damage

Case Study: Miami's Flooding Challenges

Miami, Florida, has become one of the most well-known examples of a city under threat from rising seas. The city experiences frequent tidal flooding, especially in low-lying neighborhoods. Residents often see water bubbling up from storm drains on clear days, a phenomenon caused by high tides pushing seawater through underground channels. Miami has invested millions of dollars in pumps, raised roads, and sea walls, but scientists warn that these measures may only buy time. As seas continue to rise, experts predict that some parts of Miami could eventually be abandoned. This case highlights both the urgency of adaptation and the limits of engineering solutions in the face of global climate change.

1. What causes "sunny day flooding" in Miami?

_____

_____

2. Why might some parts of Miami eventually need to be abandoned?

_____

_____

Multiple Choice

1. Which process explains why warm water contributes to sea level rise?

    a) Condensation of water vapor over the ocean

    b) Thermal expansion

    c) Evaporation

    d) Precipitation

2. Which nations face existential threats due to sea level rise?

a) Brazil and Argentina

b) Maldives and Tuvalu

c) Canada and Russia

d) Japan and Korea

3. What is "managed retreat"?

a) Pumping excess water out of cities during major storms

b) Building seawalls along coastlines

c) Restoring wetlands to absorb floodwaters

d) Relocating people away from vulnerable areas

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Expanding of warm seawater	A) Saltwater intrusion
2. ___ Relocating communities away from risk	B) Storm surge
3. ___ Flooding from high tides without storms	C) Managed retreat
4. ___ Sudden flooding caused by storms	D) Thermal expansion
5. ___ Saltwater mixing with freshwater	E) Sunny day flooding

Fill-in-the-Blank

1. Sea level rise is caused by both melting ice and _____ expansion.

2. Low-lying island nations such as _____ face threats of submersion.

3. A strategy of moving communities away from coastal areas is called _____.

Short Answer

Answer each question in 2-4 complete sentences.

1. How does sea level rise make hurricanes more destructive?

2. What are some economic consequences of rising seas for coastal cities?

3. Name one adaptation strategy cities can use to cope with flooding.