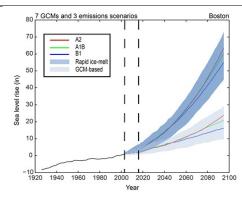**Name:** _____ **Date:** _____

Instructions:
- For each question below circle the letter you think is the best response to the question.
- Provide an explanation of your reasoning for your response in the space provided. Please also indicate any comments or concerns you might have about the question.

Question 1

Description of Situation

The graph represents sea level rise projections based on several different scientific models.

Question

Which of the following is the best description of the scientific models used to create the sea level rise projections in the above graph?

Select the *best* response.

Sea level rise projections are:

A. based on available data and predict future sea level with absolute certainty.

B. based on available data and may actually be lower or higher than predicted.

C. relatively uncertain because they are based on scientists' opinions, which can be wrong.

D. not useful because it is impossible to predict what will happen in the future.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 2

Description
of Situation

Sea level is projected to rise between 10 and 70 cm by the year 2100.

Question

Why is sea level rising?

Select the
best
response**.**

A. Not as much evaporation is taking place due to the hole in the ozone layer.
B. Increased rain and snowfall are adding to the amount of water in the seas.
C. Shifts in plate tectonics reorganizing the shape of the sea floor.
D. An increase in global temperatures is causing ice melt, increasing sea volume.
E. None of the responses are scientifically supported.

Why is this the best explanation?

Question 3

Description
of Situation

Global temperatures are rising and are projected to continue to rise.

Question

How does an increase in the global average temperatures lead to sea level rise?

Select the
best
response**.**

This will cause sea level to rise by:

A. causing more rain or snow, adding to the volume of water in the sea.
B. causing ice to melt which adds to the volume of water in the sea.
C. causing water molecules in the sea to expand and occupy a greater volume.
D. causing more water molecules in the sea to form and increase the volume.
E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 4

Description of Situation	The amount of greenhouse gases in the atmosphere is increasing.
Question	How is this related to sea level rise?
Select the *best* response.	***More greenhouse gases will lead to an increase in global temperature causing***:

  A. greenhouse gases to dissolve in sea water, increasing sea volume.
  B. ice melting and thermal expansion of sea water, increasing sea volume.
  C. the number and size of water molecules to increase, increasing sea volume.
  D. the atmospheric pressure above the seas to increase and push water towards land.
  E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 5

Description of Situation	Sea level is projected to rise several feet in the future.
Question	What are the most likely impacts to humans in a coastal community if sea level rises 4 feet (1.2 m)?
Select the *best* response.	***There will be***:

  A. an increase in home values farther inland because they will be closer to the beach.
  B. a loss of property, forcing people to find new homes further inland.
  C. few impacts since four feet is not a significant increase in sea level.
  D. no serious impact since a new coastline would be established.
  E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 6

Description
of Situation
Additional greenhouse gases in the atmosphere trap heat from the sun causing global temperatures to rise.

Question
What is one way an increase in the amount of greenhouse gases causes sea level rise?

Select the
best response.
Increases in global temperature, due to greenhouse gases, cause sea level rise by:

A. increasing the evaporation of water leading to more precipitation.

B. making water molecules become larger and more numerous.

C. melting ice on land which then flows into the ocean.

D. dissolving in the sea which causes water to occupy more space.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 7

Description
of Situation
The overall, or average, global sea level is rising. However, sea level can rise different amounts in different geographic areas.

Question
Why might sea level rise be in different in different geographic locations?

Select the
best response.
A. in some areas, such as polar regions, sea levels will be higher due to melting ice.

B. humans are putting more waste water into the seas in some areas causing them to rise.

C. varying amounts of rain and snowfall in different areas leads to different rises in sea level.

D. the land in some areas is sinking while it is rising in other geographic areas.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 8

Description of Situation   As temperatures increase, water molecules move faster.

Question   How does this relate to sea level rise?

Select the *best* response.   *As temperature increases water molecules*:

    A. are larger and this causes sea level to rise.

    B. occupy more space causing sea level to rise.

    C. increase in number causing sea level to rise.

    D. will collide more frequently causing sea level rise.

    E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 9

Description of Situation   Sea level is projected to rise several feet over the next hundred years.

Question   What are the most likely impacts to a coastal ecosystem if sea level were to rise four feet (1.2 m)?

Select the *best* response.   *Many plants and animals would*:

    A. benefit from the change and increase in numbers.

    B. move further inland and establish new ecosystems.

    C. quickly adapt to the changes caused by sea level rise.

    D. die off but some would be able to adapt or move inland.

    E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 10

Description of Situation

A solid ice sheet on land warms, melts, and becomes liquid water. It flows into the nearby sea.

Question

What causes sea level to change?

Select the *best* response.

The sea level will rise because:

A. chunks of ice already in the water melt and increase sea volume.
B. water from the melting ice sheet adds to water already in the sea.
C. the surrounding land will not be as tall after the ice melts.
D. the fresh water will change the density of the water in the sea.
E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 11

Description of Situation

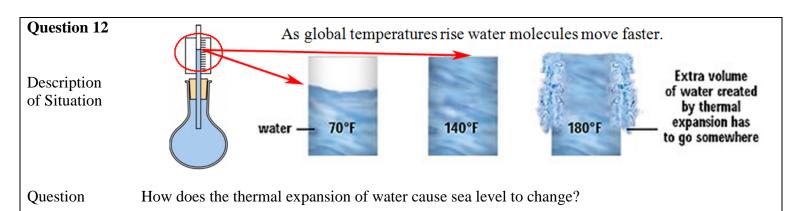The overall, or average, sea level is rising. However, sea level varies with tides, lunar cycles, and weather events.

Question

How would sea level rise affect a weather event, like a hurricane or tropical storm?

Select the *best* response.

A rise in sea level would:

A. only affect people living right next to the sea.
B. cause the effects of the storm to be felt further inland.
C. absorb and dissipate the energy from the hurricane or storm.
D. cause no changes in the nature of a hurricane or storm.
E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 12

Description
of Situation

As global temperatures rise water molecules move faster.

water — 70°F   140°F   180°F

Extra volume
of water created
by thermal
expansion has
to go somewhere

Question

How does the thermal expansion of water cause sea level to change?

Select the
best response.

The sea level will rise because an increased temperature will cause water molecules to:

A split apart and form additional water molecules.

B. spread out, which causes them to occupy more space.

C. become bigger, which causes them to occupy more space.

D. break down and be released into the atmosphere as new chemicals.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 13

Description
of Situation

Scientists have found a warming trend in average global temperatures on Earth.

Question

Which of the following is an impact of the global warming trend?

Global warming causes:

A. increased evaporation of oceans, contributing to sea level decline.

Select the
best response.

B. increased precipitation, which contributes to sea level rise.

C. increased ice melt, which contributes to sea level rise.

D. the oceans to become warmer but nothing else changes.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 14

Description of Situation

The picture is an aerial view of a coastal land area that is projected to experience significant sea level rise.

Question

As sea level rises, one impact on coastal areas, as shown in the picture above, could be:

Select the *best* response.

Some of the land will:

A. flood less during severe weather.

B. be completely covered by sea water.

C. receive more precipitation (rain and snow).

D. experience no change since nature will adapt.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 15

Description of Situation

The map below shows land areas affected by sea level rise. For this region, coastal land has been sinking at an average rate of 1.3 mm/yr.

The land shaded in light blue represents areas that will be impacted by 1 meter of sea level rise.

Question

Areas of the map that are shaded in light blue are more vulnerable to sea level rise because of factors such as:

Select the *best* response.

A. the expanding size of water molecules.

B. the increasing mass of water molecules.

C. increased precipitation and more erosion.

D. changes in the relative elevation of the land.

E. none of the responses are scientifically supported.

Why is this the best explanation?

Question 16

Description
of Situation

The picture is an aerial view of a coastal town.

Question

As sea level rises, one impact on coastal areas, as shown in the picture above, could be:

If sea level rise occurred in this area, what would be a likely consequence during storms?

Select the
best response.

A. Only areas on the coast would experience increased flooding.

B. Only area further inland would experience increased flooding.

C. Both coastal and inland areas would experience increased flooding

D. Storms do not affect sea level, so there would be no change.

E. None of the responses are scientifically supported.

Why is this the best explanation?

Question 17

Description
of Situation

Reducing the amount of carbon dioxide (CO_2) in the atmosphere is the most effective way to slow rising sea levels.

Question

What are specific actions that can be taken to reduce the amount of carbon dioxide in the atmosphere?

Write your response here: