

Streams and Steam

Answer Key

Rules of Play

1. Every player rolls the die. The highest number goes first.
2. Players follow from left to right.
3. All players begin with their coin on the start space.
4. Roll the die and move the coin the number of spaces indicated.
5. When a player lands on a space that is at the top of a stream, they “raft” down the stream (in the direction of the arrows) by moving their coin to the square at the bottom of the stream.
6. When a player lands on a space that is at the bottom of a column of steam, they rise up the column of steam by moving their coin up to the square at the top of the steam column (in the direction of the arrows).
7. The squares without pictures do not require any further action. Rest there until your next turn.
8. Two or more players may stop at the same square.
9. The first player to cross into the finish space wins the game. An exact roll of the die is not required.

Game Table

List all of the causes and effects that you and your group members land on when you go down a stream and/or up a column of steam while playing. Only write each pair of causes and effects once if it is landed on multiple times. For each cause and effect pair, choose one or more action types (from the Key of Action Types) that could be taken in response. Write the corresponding letter for your chosen action type(s). You may choose more than one action type.

Key of Action Types

- A. **Water Conservation:** use methods to decrease water use
- B. **Mitigating Climate Change:** use methods to reduce greenhouse gas emissions
- C. **Risk Management Planning:** follow procedures to avoid or minimize the impact of climate change

Cause	Effect	Action Type(s)
<u>Example:</u> <i>Increased evaporation</i>	<i>More severe drought in some areas</i>	<i>A, B, C</i>
Increased evapotranspiration	More water in the atmosphere	A, B
Increased ocean temperatures	More severe storms	B, C
Reduced precipitation and soil moisture in some areas	Reduced groundwater availability	A, B, C
More intense precipitation in some areas	Flooding in some areas	B, C
Decreased precipitation in spring	More severe drought in some areas	A, B, C
Increased temperatures	Decreased soil moisture because of evaporation	A, B
Increased evaporation	More water in the atmosphere	B
Melting glaciers and ice	Sea level rise	B, C
More water in atmosphere	More severe storms	B, C
Increased ocean temperatures	Sea level rise	B, C
In winter, more precipitation falls as snow	Less snow and reduced snowpack	A, B, C

Student answers will vary but may include any or all of these answers.

Conclusion

- Choose one of the effects from the game table. Explain how this change to the water cycle affects humans. **Student answers may include one of the following:**
 - More severe drought in some areas:** less water available for crops, livestock, and general public use
 - More water in the atmosphere:** will lead to increased precipitation and flooding in some areas, which could result in property damage and human health effects; also, water vapor is a greenhouse gas, so more water in the atmosphere further enhances the greenhouse effect and changes the climate
 - More severe storms:** property damage, human health effects, loss of life
 - Reduced groundwater availability:** less water available for crops, livestock, and general public use
 - Flooding in some areas:** property damage, human health effects, loss of life
 - Decreased soil moisture because of evaporation:** less water available for crops, increased soil erosion, which could result in fewer nutrients available for crops
 - Sea level rise:** erosion of beach sand and reduction of recreation opportunities and impact to the tourism economy, property damage, displacement of waterfront and island prop. owners, loss of life
 - Less snow and reduced snowpack:** less water stored in snow to supply watersheds (so less water available for crops, livestock, and general public use), reduction of recreational opportunities and impact to the tourism economy
- Choose three of the effects and actions from the game table. Fill out the table below and give a specific example of an action that could be taken to respond to each effect.

	Effect	Action Type	Example Action
	<u>Example:</u> <i>More severe drought in some areas</i>	<i>A. Water conservation</i>	<i>Xeriscaping (landscaping to minimize water use)</i>
1	More severe storms	C	Outline emergency plans for response in vulnerable areas
2	Flooding in some areas	B	Install energy efficient appliances to reduce greenhouse gas emissions and reduce likelihood of future flooding
3	Reduced groundwater availability	A	Install water efficient appliances at home

Student answers will vary but may include any or all of these answers.

- Using words and/or drawings, explain why we are observing the phenomenon we are investigating in this unit: *In New Mexico, temperatures are expected to rise, and precipitation patterns are expected to increase in variability. Burning fossil fuels for energy production releases greenhouse gases into the atmosphere. While greenhouse gases are natural in Earth's atmosphere, trapping in necessary warmth for life, adding more greenhouse gases results in increased global temperatures. Warmer temperatures increase evaporation of water from soil and plants and allow the atmosphere to hold more water, changing precipitation patterns. Additionally, increasing global temperatures explain increased regional temperatures.*