Expedition to the Midwest United States to Learn About Agriculture

Part 1. Introduction.

Narrator: Welcome to "America's Breadbasket." If you ate breakfast this morning, there's a good chance the grains in your toast, pancakes, or cereal came from the Midwest.

The Midwest has some of the best soil and weather conditions for growing all kinds of different crops, especially grain and corn. Farmers also raise a lot of animals here. As a result, agriculture is very important to the economy.

Part 2. The Climate Connection.

Narrator: And the climate is very important to agriculture. People are adding extra carbon dioxide and other greenhouse gases to the atmosphere, and this is causing the Earth's climate to change in ways that affect crops.

On average, temperatures are going up. Rainfall and snow patterns are changing. And heat waves, droughts, floods, and large storms are becoming stronger or happening more often.

Also, extra carbon dioxide in the atmosphere directly affects the way plants grow. These changes will influence agriculture in both positive and negative ways.

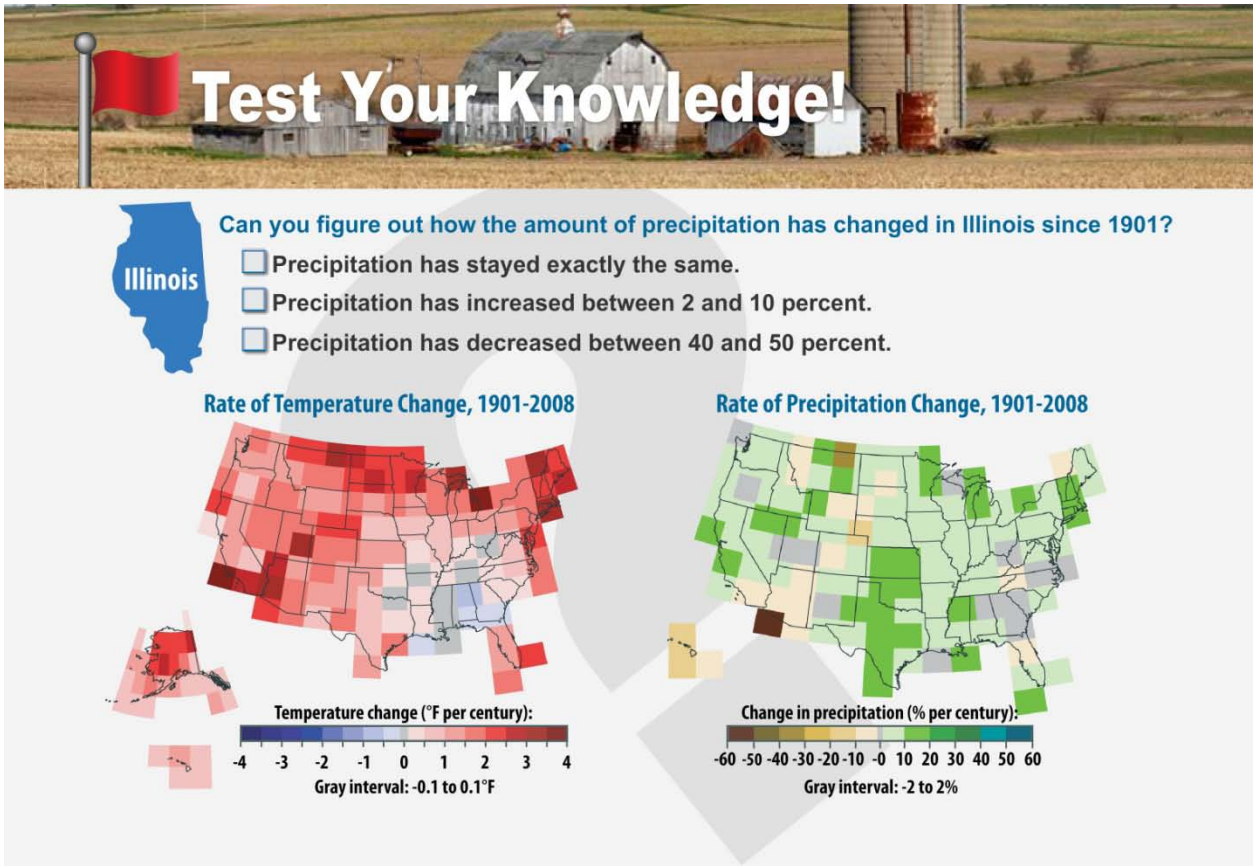
Part 3. Warmer Temperatures and Changing Rain Patterns.

Narrator: Climate change is causing most places to get warmer. In the Midwest, the winter is typically cold, and most crops grow between the last spring frost and the first fall frost. This is called the growing season.

As temperatures rise, the growing season could get longer. This means that farmers might be able to grow more crops or different kinds of crops. But some crops like corn and wheat can't grow well if the temperature gets too hot. These crops could become harder to grow, especially in places that are already warm.

Warmer temperatures are also leading to changes in precipitation, which is the amount of rain and snow an area receives. Some places will get more rain, others less. More rain generally helps crops grow. But if there's too much or too little rain, crops will suffer.

Part 4. Test Your Knowledge.



Narrator: Average temperatures and precipitation have changed in many parts of the United States. Can you use the map on the left to figure out how temperatures have changed in Illinois?

First, locate Illinois on the map. Illinois has a medium pink color, which means the average air temperature has increased by about 1 degree Fahrenheit since 1901. Now use the map on the right to figure out how the amount of precipitation in Illinois has changed since 1901.

The text on the screen asks: "Can you figure out how the amount of precipitation has changed in Illinois since 1901?" You have three choices:

A. Precipitation has stayed exactly the same.
B. Precipitation has increased between 2 and 10 percent.
C. Precipitation has decreased between 40 and 50 percent.

Answer: The correct answer is B. Precipitation has increased between 2 and 10 percent in Illinois.

Part 5. Droughts and Extreme Storms.

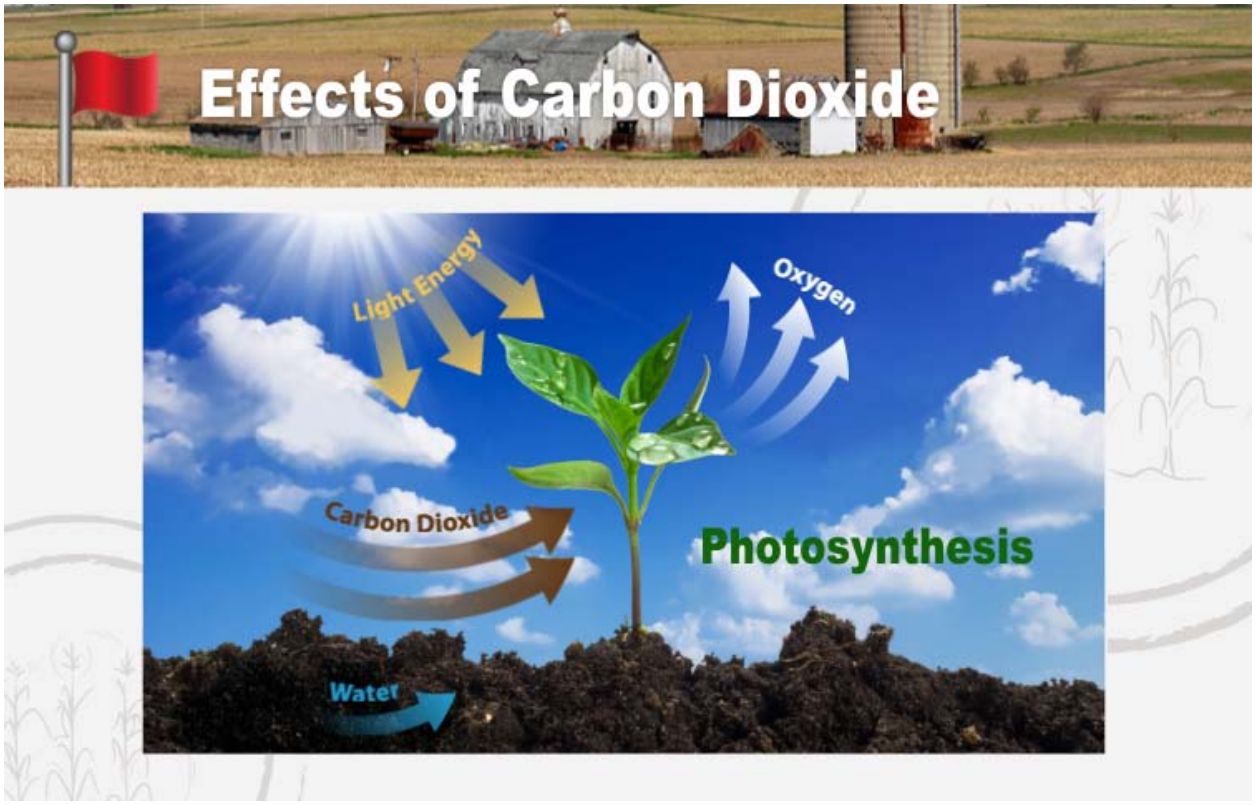
Narrator: As the climate changes, heat waves and droughts will happen more often in many places. Extreme heat and a lack of water can cause crops and animals to die.

Heavy storms and floods will also become more common. These events can damage crops, wash important nutrients out of the soil, or delay spring planting, giving crops less time to grow.

These changes could make it harder for farmers to earn a living, and could even affect the amount of food available overall.

Part 6. Effects of Carbon Dioxide.

Narrator: Climate change will increase levels of carbon dioxide in the atmosphere, which will make most plants grow faster. That's because plants make their own food from carbon dioxide, water, sunlight, and other nutrients through a process called photosynthesis.



With more carbon dioxide in the atmosphere, photosynthesis will happen more quickly. Faster-growing crops will be good for farmers. But weeds will grow faster too, which could make it tougher to grow healthy crops.

Part 7. Weeds and Pests.

Narrator: Also, as temperatures rise, many weeds could expand their range further north. These weeds can quickly use up water and nutrients, leaving less for crops. Some weeds can actually take over an area and displace the plants that live there, especially invasive weeds that are not native to the area.

For example, kudzu is an invasive weed that has already spread throughout the southeastern U.S. It's expected to spread northward as the climate gets warmer.

Insects and other pests that damage crops could also benefit from a changing climate. That's because warmer temperatures will allow them to survive through the winter in places that used to be too cold for them to live.

For example, farmers depend on a cold winter to kill the corn flea beetle, which carries a disease that's harmful to corn plants. After an especially warm winter from 1997 to 1998, some farmers lost up to 40 percent of their corn crops because of this beetle.

Part 8. Test Your Knowledge.

Narrator: Let's test your knowledge at the farmer's market of the future. The year is 2050, and the Earth's climate has changed just like scientists predicted. Lucky Louie seems to get all the good breaks on his farm, but everything's going wrong for Unlucky Mike. On the screen, watch for some of the ways the climate is changing. If you see a positive impact, drag it into Lucky Louie's basket. If you see a negative impact, drag it over to Unlucky Mike. Press the "Play" button to begin.

It's springtime. Because of climate change, the place where these farmers live gets more rain than it used to.

Two situations onscreen:

1. Your thirsty crops appreciate a little extra rain.
2. Your crops have been wiped out by floods brought on by another heavy rainstorm.

Answer: Situation 1 belongs to Lucky Louie. Situation 2 belongs to Unlucky Mike.

Narrator: Now it's summertime, and it's much hotter than it used to be.

Two situations onscreen:

1. You've been hit by a huge heat wave. Your tomatoes and grapes are wilting on their vines, and ten of your cows are sick.
2. You planted watermelons for the first time this year, and they love the heat.

Answer: Situation 1 belongs to Unlucky Mike. Situation 2 belongs to Lucky Louie.

Narrator: By the fall, you realize it's more than just temperature and precipitation. There's more carbon dioxide in the atmosphere, too.

Two situations onscreen:

1. Your soybeans are growing faster and you've been able to produce a little bit more this year.
2. Those pesky weeds are growing more quickly in your fields.

Answer: Situation 1 belongs to Lucky Louie. Situation 2 belongs to Unlucky Mike.

Narrator: The winter's not quite as cold as it used to be, either.

Two situations onscreen:

1. You planted winter wheat and it's doing great. A longer growing season means more money in your pocket!
2. Uh oh… the corn flea beetle is surviving the winter. It'll be ready to attack your corn in the spring.

Answer: Situation 1 belongs to Lucky Louie. Situation 2 belongs to Unlucky Mike.

Narrator: Good work. As you can see, climate change could help some farmers and hurt others. But the more the climate changes, the more the negatives will outweigh the positives.

Part 9. Preparing for Climate Change

Narrator: Farmers can take steps to cope with climate change. To prepare for drought, they can set up systems to collect rainwater and use more efficient irrigation techniques to water crops. Some farmers might want to plant different kinds of crops that grow better in hot conditions. And they may also be able to find better ways to control weeds and pests.

Part 10. What Have You Learned?

Narrator: Your tour of the Midwest is done! Next time you have a bowl of cereal, think about where it came from. What have you learned?

Onscreen text: Many aspects of climate change will affect agriculture.

Narrator: Many aspects of climate change will affect agriculture, including rising temperatures, changing precipitation patterns, and increasing levels of carbon dioxide in the atmosphere.

Onscreen text: Some effects will be positive; others negative. The negatives are expected to outweigh the positives over time.

Narrator: Climate change will affect agriculture in both positive and negative ways. For example, warmer temperatures could extend the growing season, but could also make it harder to grow certain

crops like corn and wheat. The more the climate changes, the more the negatives will outweigh the positives.

Onscreen text: There are many things that farmers can do to prepare for climate change.

Narrator: There are many things farmers can do to prepare for climate change, such as planting different crops and improving their irrigation systems.

Part 11. Congratulations!

Narrator: Congratulations! You've earned a passport stamp by learning how climate change affects agriculture.

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