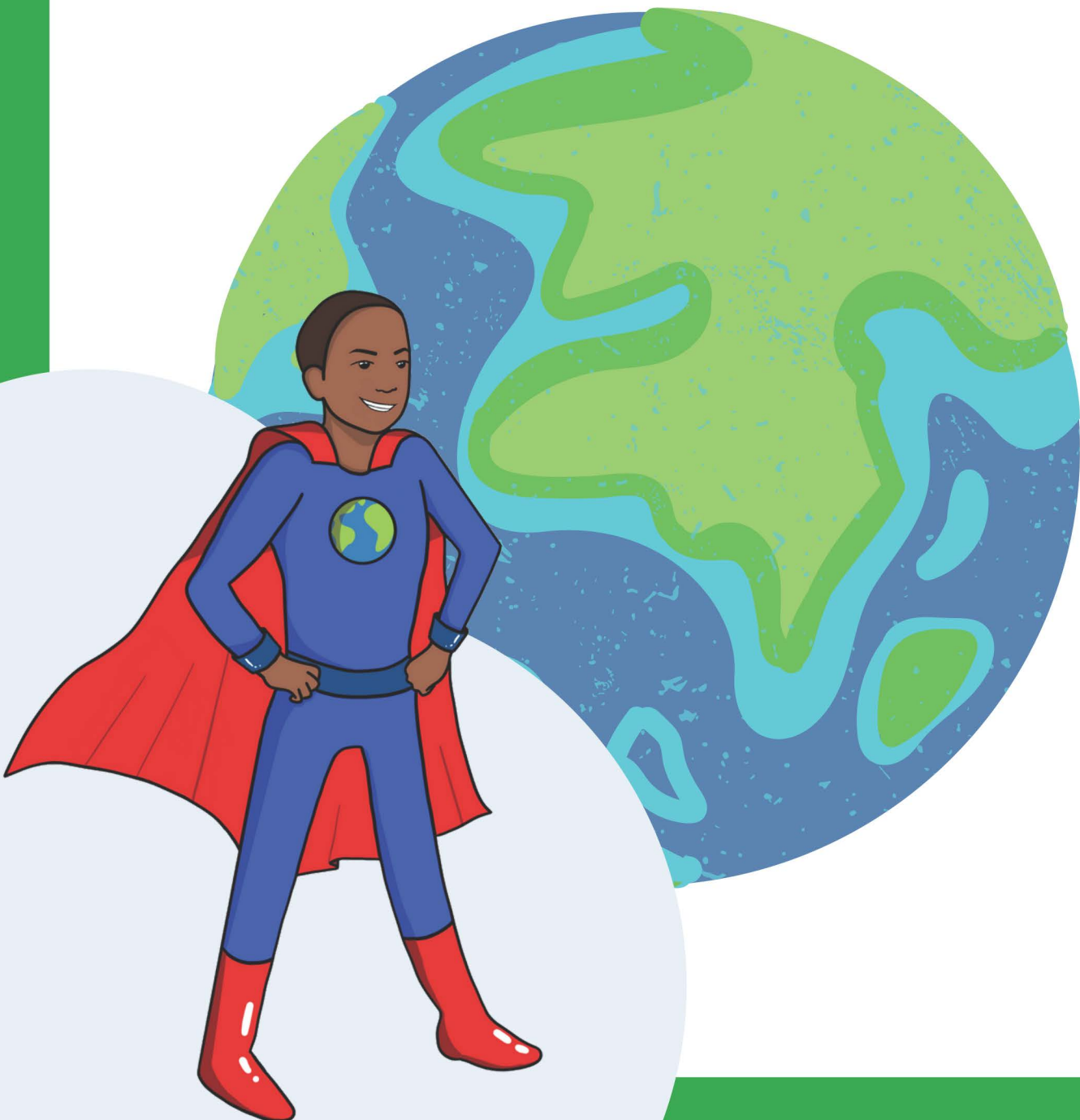


GUARDIANS OF THE FOOD GALAXY

LESSON 1



NAME: _____ DATE: _____

NOTICE AND WONDER

What I
Notice

Handwriting practice area for 'Notice' with 12 horizontal lines.

What I
Wonder

Handwriting practice area for 'Wonder' with 12 horizontal lines.

NAME: _____ DATE: _____

VIDEO GUIDE

Using the worksheet, answer the following questions.

1- What does climate mean?

2- What makes up the atmosphere?

3- What are greenhouse gases?

4- 2 questions I have are:

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Sea Ice at the Arctic Circle is Changing

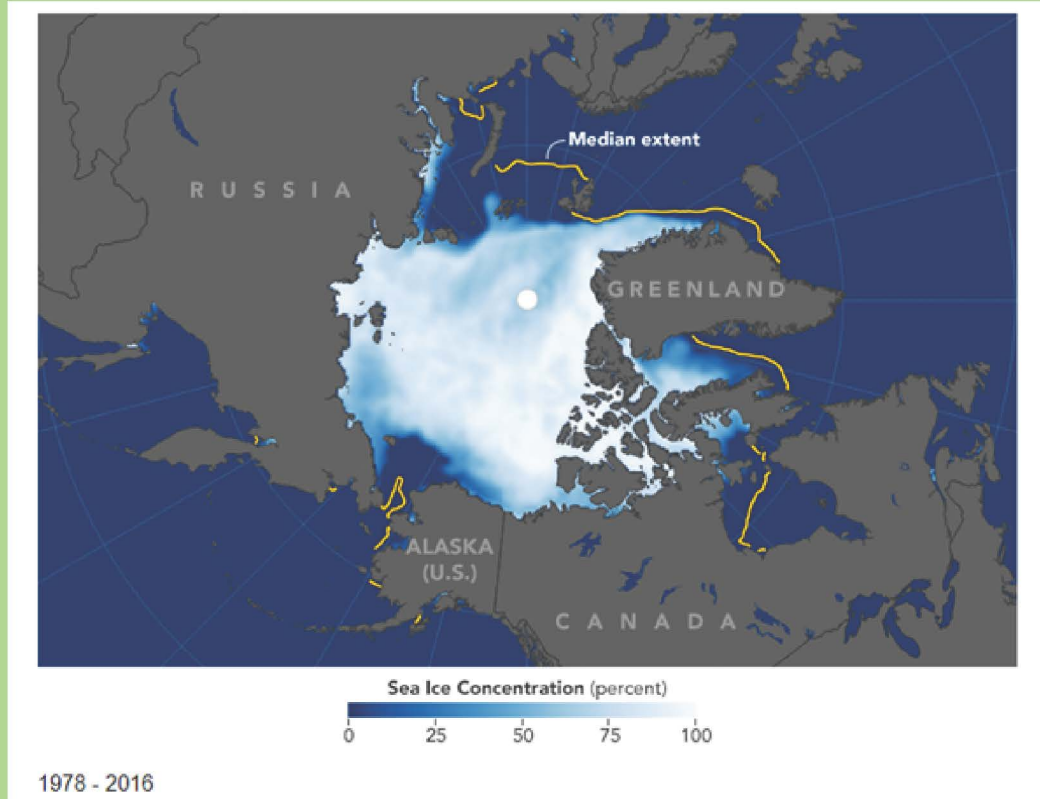


Figure 1a

NASA, 2016

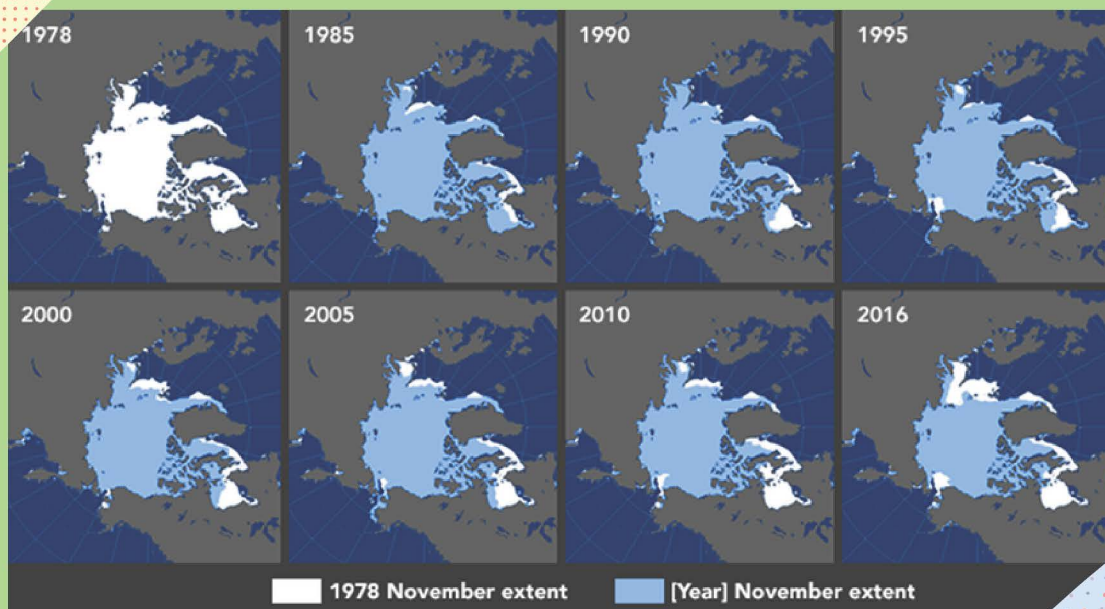


Figure 1b

NASA, 2016

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Using the figure, work with your group or a partner to answer the following questions.

1. What is the white color indicating in the images compared to the light blue or dark blue colors? Use Figure 1a to help you.

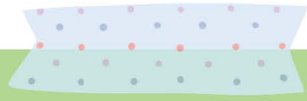
2. How did sea ice change between 1978 and 1985?

3. What do you think may have caused this change in the amount of sea ice?

4. How has the sea ice extent, or amount, changed between 2000 and 2016?

5. Write down a question or idea that comes to mind from this figure.

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate



Amount of Carbon Dioxide in Earth's Atmosphere

This is the **amount** of carbon dioxide in the air

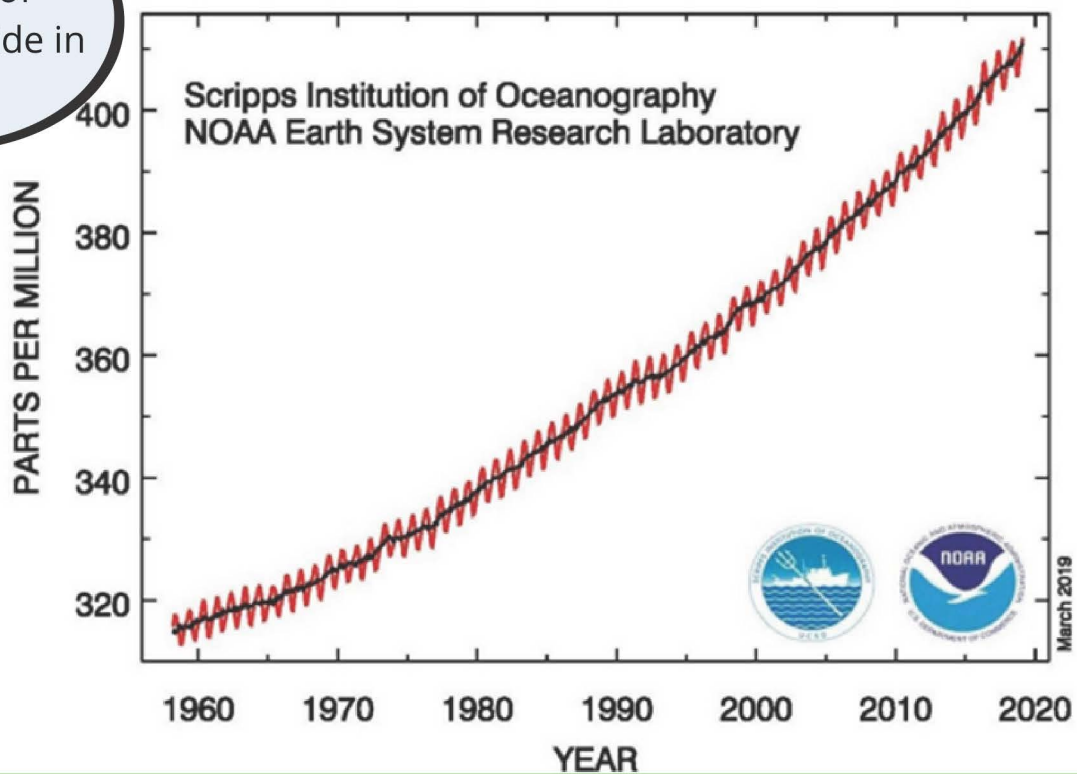


Figure 2

NOAA, 2019

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Using the figure, work with your group or a partner to answer the following questions.

1. What is the time period shown in this figure? How many years of data does that provide us with?

2. On the vertical line, the unit is Parts Per Million of Carbon Dioxide in Earth's Atmosphere. Use the data in the figure to determine how much the carbon dioxide in Earth's atmosphere increased from 1965 to 1980? _____ parts per million

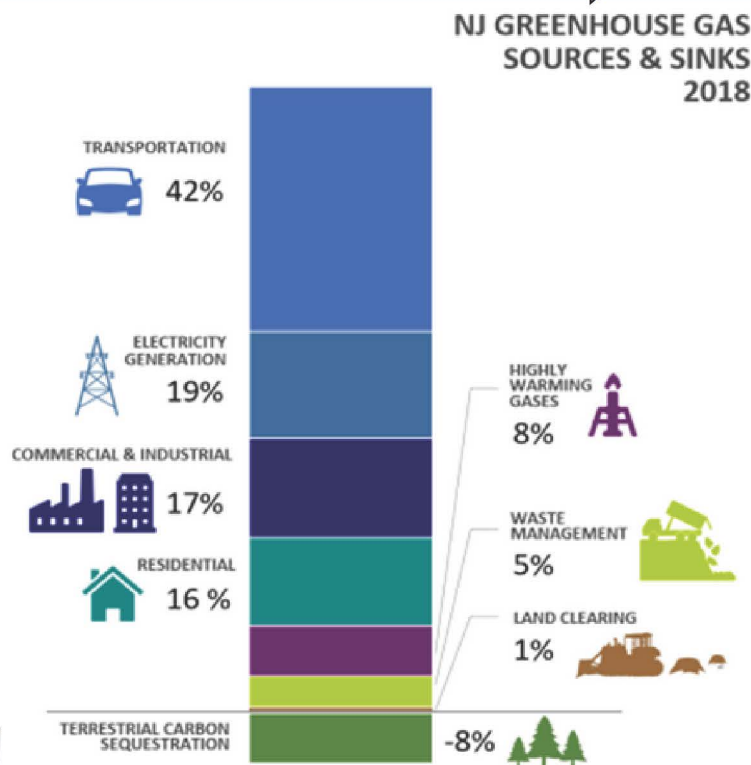
3. What do you think has caused the amount of carbon dioxide in Earth's atmosphere to continue increasing during the time period in this figure?

4. Write down a question or idea that comes to mind from this figure.

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Sources are activities that add GHGs to the atmosphere. **Sinks** are things that remove them.

NJ Greenhouse Gas Sources & Sinks



Terrestrial carbon sequestration is when carbon is removed from the atmosphere.

Figure 3.5. New Jersey Greenhouse Gas Sources and Sinks by Sector. This figure shows the distribution of Greenhouse Gas emission sources and sinks by sectoral distribution in 2018 (NJDEP 2019a).

Figure 3

NJDEP, 2019

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Using the figure, work with your group or a partner to answer the following questions.

1. What category of activities is contributing the highest percent of total greenhouse gas emissions in New Jersey? What is an example of an activity in that category?

2. Give an example of something that does not add to greenhouse gas emissions, but instead subtracts from it? What is the percentage of that activity in New Jersey for the year 2018? (Hint: it will have a - sign in front of it because it subtracts emissions.)

3. What kinds of activities do you think are creating emissions in the "Residential" category? Or the "Waste Management" Category?

4. Pick one of the categories and think of ways Government or Business Leaders can cut emissions in that category.

5. Write down a question or idea that comes to mind from this figure.

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

GHG Emissions Across the Supply Chain

Food: greenhouse gas emissions across the supply chain

Our World
in Data

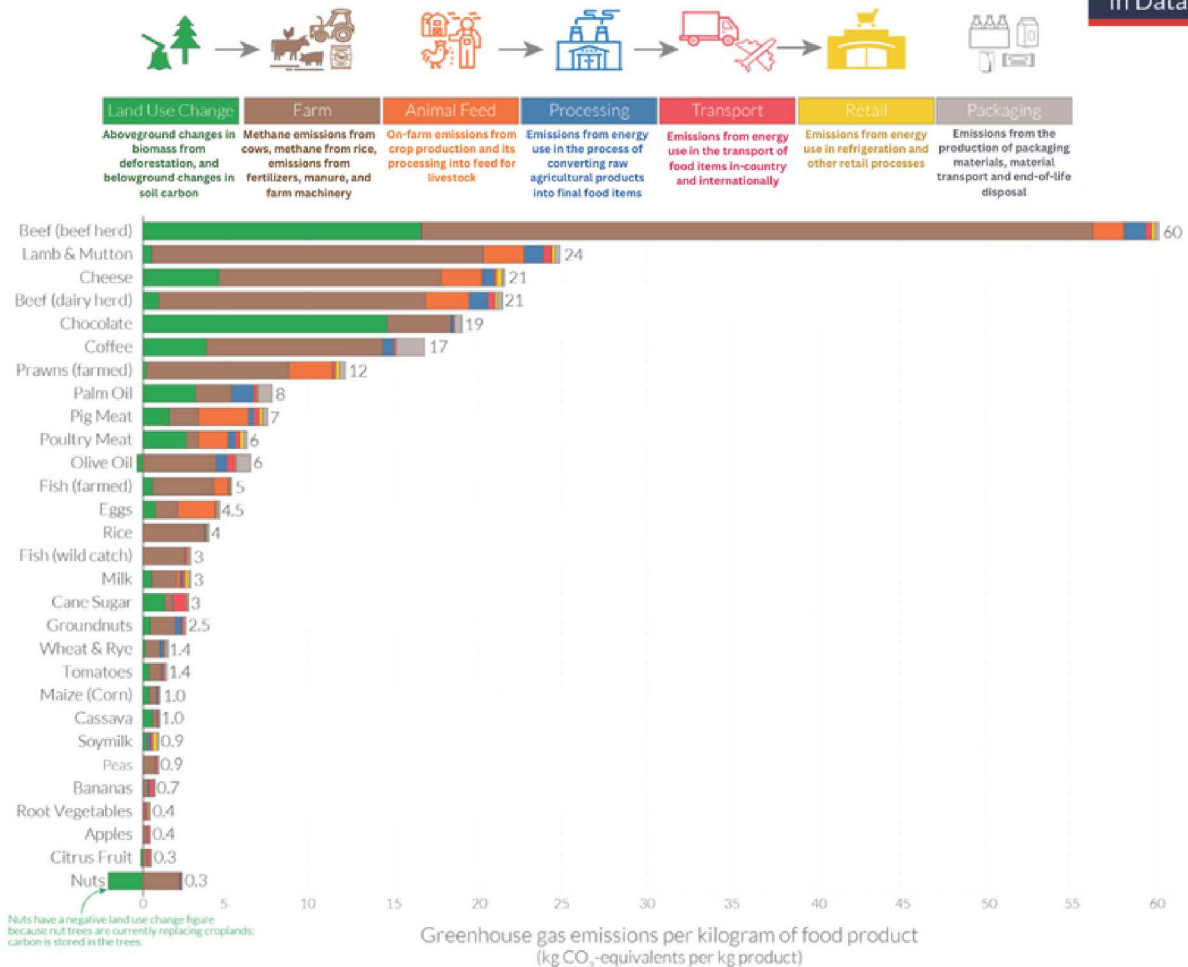


Figure 4

Our World In Data

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Using the figure, work with your group or a partner to answer the following questions.

1. Review each of the 7 parts of the food supply chain at the top and then do the following:

- List the different parts of the food supply chain:

- Give an example of an activity from 2 of the 7 parts (e.g., what is an example of something that happens with Land Use Change that has to do with food or farming?).

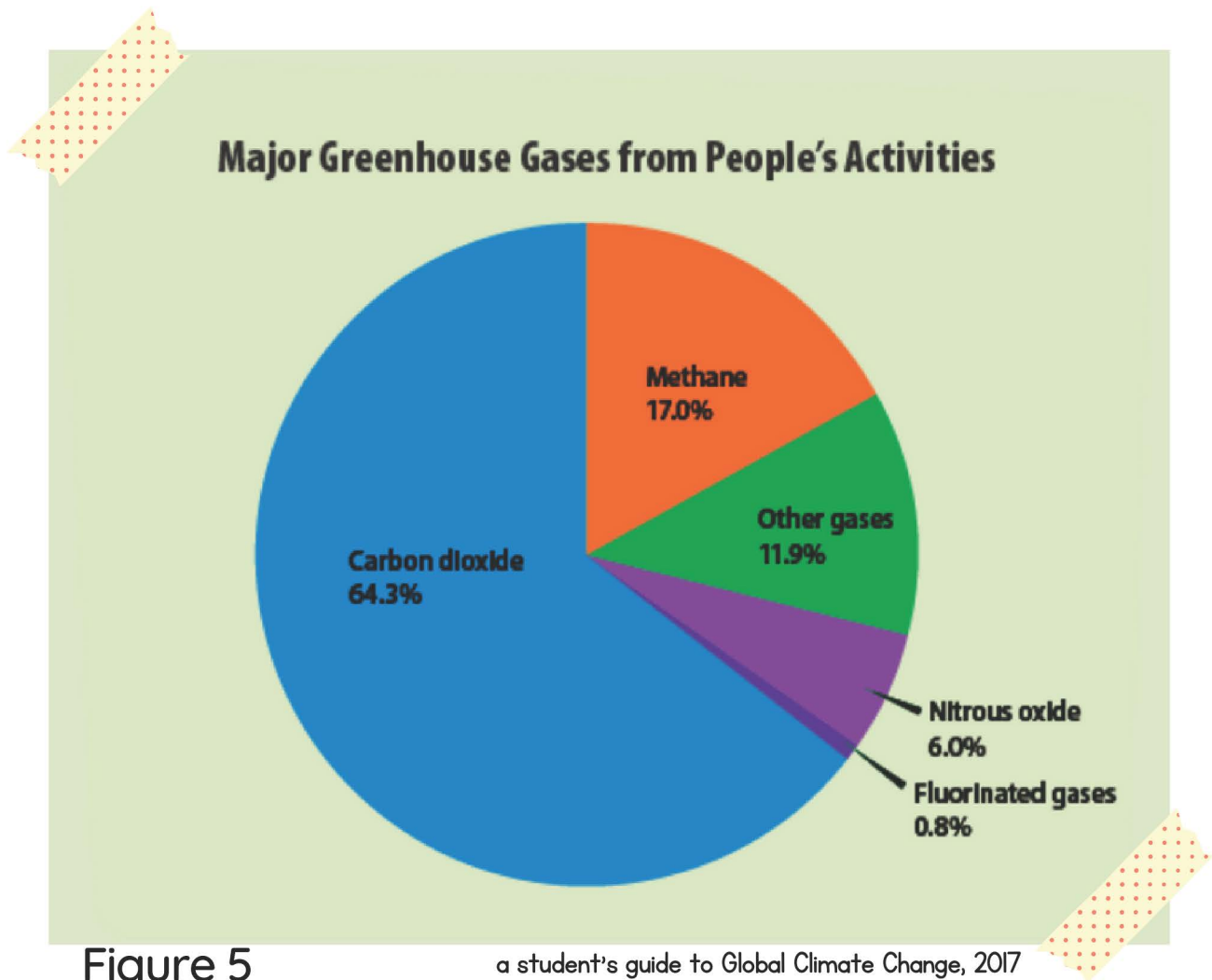
2. Now look at the horizontal bar graph. Identify one food that creates a lot of greenhouse gases in the “Packaging” part of the food supply chain.

3. Identify two foods that create a small amount of greenhouse gases compared to other foods.

4. Which food creates more greenhouse gases: Pig meat or eggs?

5. Write down one thing about this figure that surprised you.

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate



Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Using the figure, work with your group or a partner to answer the following questions.

1. Which of these greenhouse gases are familiar to you? Have you heard of them before? What do you know about them? Write down some words that come to mind about one or more of these gases.

2. Which greenhouse gas does human activity create the most of?

3. What are some human activities that generate (or result in) carbon dioxide emissions? Write down at least three of those activities below.

4. Do you know of anything that people do that generates methane gas? You may need to look this up on a .GOV or .ORG website to learn more.

5. Record the position (yes, or no, and why) of each member of your group on the following: Do you think that all types of greenhouse gases are equal in power, meaning, do they all trap the same amount of heat energy from the sun? Why or why not?

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Greenhouse Gas Emissions from Food Systems

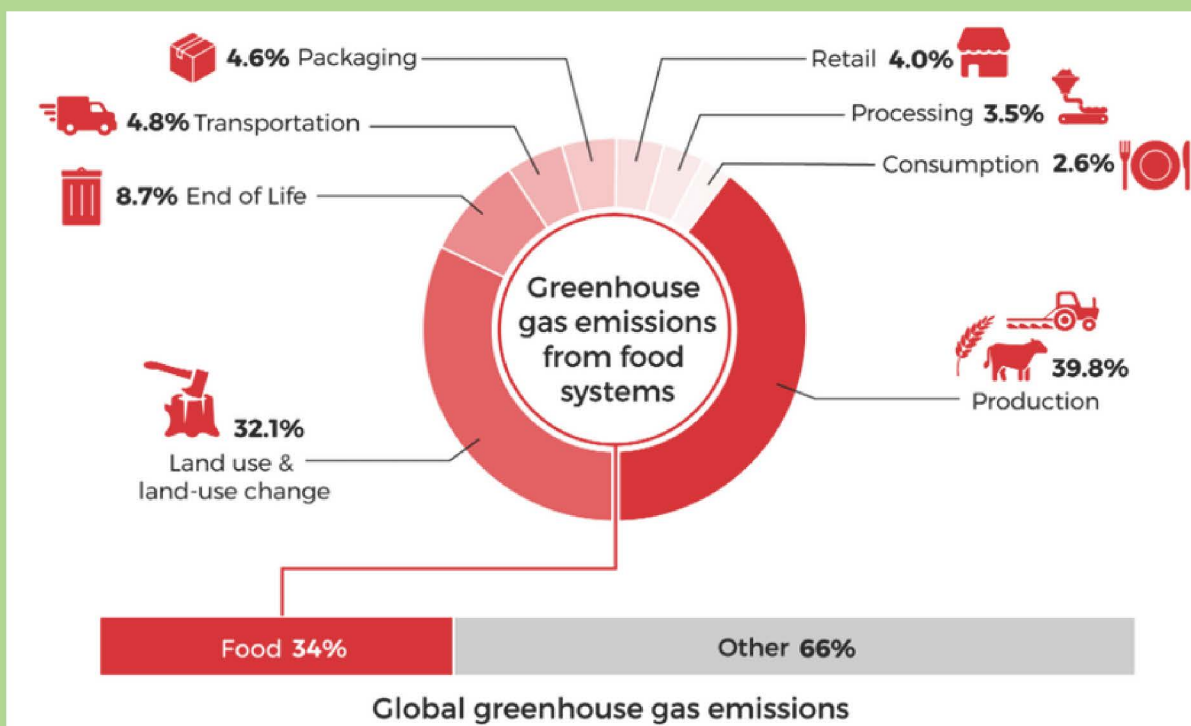


Figure 6

NJDEP, 2019

Essential Earth Knowledge: Atmosphere, Greenhouse Gases, and the Climate

Using the figure, work with your group or a partner to answer the following questions.

1. In the figure, what percentage of emissions come from changing of the land? What are some reasons why forests or grasslands might need to be cut down or cleared away to produce food? Write down your ideas on the lines below.

2. What are some things that people do with food at the “end of its life”? How many people in your group have heard of composting food waste? Where does food go when it is thrown in the trash?

3. Which part of this food and farming process generates the greatest amount of greenhouse gas emissions? Write down two examples of activities that might occur at this part of the process which generate greenhouse gases.

4. Which two parts of this process do you think are the most connected? Explain.
