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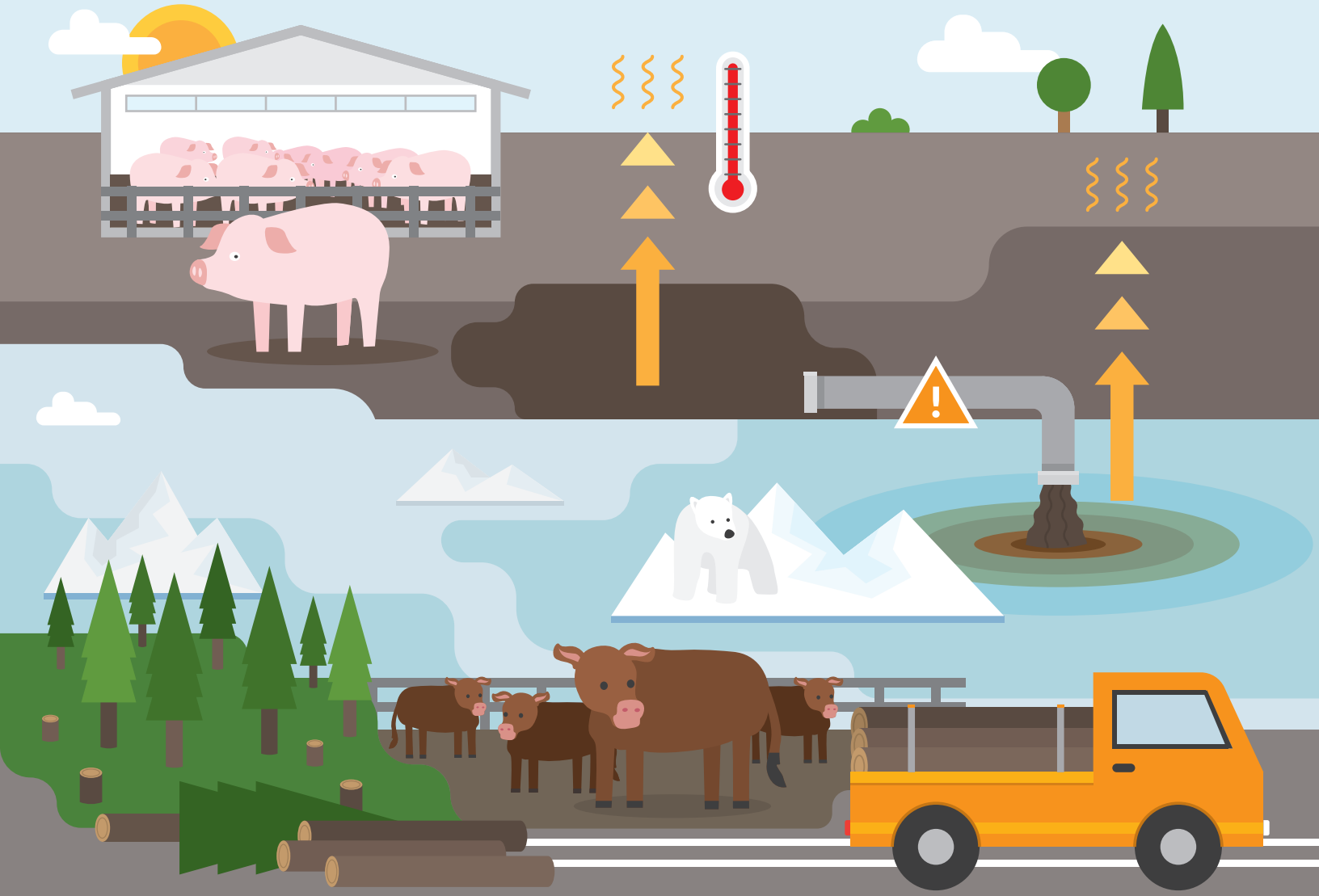
HS Environmental Science Lesson 2 - Section 1

Animal Agriculture & the Environment: Creating a Computational Representation

> *"The most important thing is to actually think about what you do. To become aware and actually think about the effect of what you do on the environment and on society."*
> **— Jane Goodall, Primatologist and Conservationist**



Overview

For this activity, students will learn how computational representations are used to simplify mathematical relationships. Students will research and gather data on the impact that the rise in industrialized farming has on the environment and the far-reaching consequence that animal agriculture has on humans. Students will use these data to create an infographic, a format that uses computational representations in order to visually explain a topic.

- Students will explore different types of infographics and methods for graphically representing data.
- Students will develop a claim based on their research of a topic related to animal agriculture and its effects on humans and the environment.
- Students will locate data that support their claim and express it graphically creating at least three computational representations (through pie charts, bar graphs, etc.).

Essential Questions:

- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

Resources:

- **PowerPoint Presentation:** What is an Infographic? https://www.dropbox.com/s/3svx259k5n7e3px/What%20is%20an%20infographic.ppt?dl=0
- **Student Handout:** Graphically Representing Data – Reference

Lesson Time:

Section 1 = 50 minutes
Section 2 = 50 minutes
Section 3 = 50 minutes
Section 4 = 50 minutes

Materials:

- Colored Pencils
- Poster Board (one for each group of 2-3 students)

Student Learning Objectives:

Students will be able to...

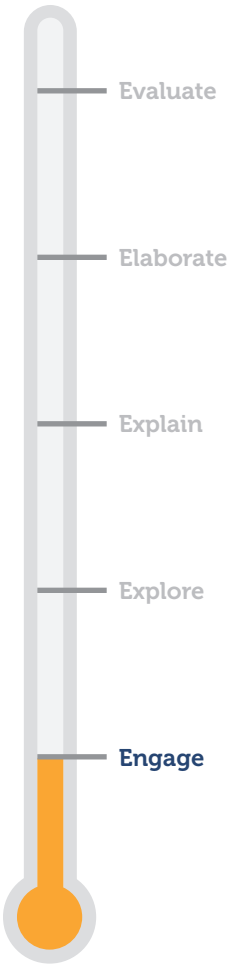
- Explore the use of infographics to visually explain a topic
- Identify and use multiple methods for representing data graphically
- Explore the environmental impact of animal agriculture
- Come up with a claim supported by three sets of data
- Develop computational representations of the data
- Create an infographic using data that supports their claim

Next Generation Science Standards

HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.

Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.



Activities: Section 1

Engage: What is a hog farm?
(15 minutes)

Show students the video, "Land of Lagoons" (3:40). https://vimeo.com/99595772

After watching the video, engage the class in a discussion about the content of the video. Possible answers to discussion questions are included.

Questions to consider:

1. How have hog (pig) farms changed over time?

In the last 50 years, the definition of a hog farm changed based on the number of agricultural products sold, thus leading to a rise in factory farms where thousands, instead of hundreds, of pigs are raised for food.

Smaller farms began to disappear and factory farms raising pigs became centralized in certain parts of the country, namely Iowa and North Carolina.

2. What is a manure lagoon?

Manure lagoons are large pools filled with animal waste. These lagoons are the primary method used to manage waste on factory farms.

3. What impact do these farms have on the environment?

Large amounts of animal waste create and therefore elevate greenhouse gas emissions, like carbon dioxide and methane. Greenhouse gases are the gases that contribute to global climate change. Students may list an increase in effects related to global climate change such as more frequent and extreme storms, loss of biodiversity, water pollution and depletion, loss of sea ice, etc.

4. What far-reaching consequences does this impact have on humans?

Students may list responses similar to the impact on the environment. In addition, they may list immediate health concerns for communities living near factory farms and manure lagoons.

Next, have students discuss how the information in the video is presented.

Questions to consider:

- What types of graphics did you observe?
- How did the graphics help explain the information being presented?

Following the discussion, tell the class that in this lesson they will be doing something similar to what they saw in the video—taking complex information and recreating it in a way that makes it easier to understand.

Notes:

Evaluate

Elaborate

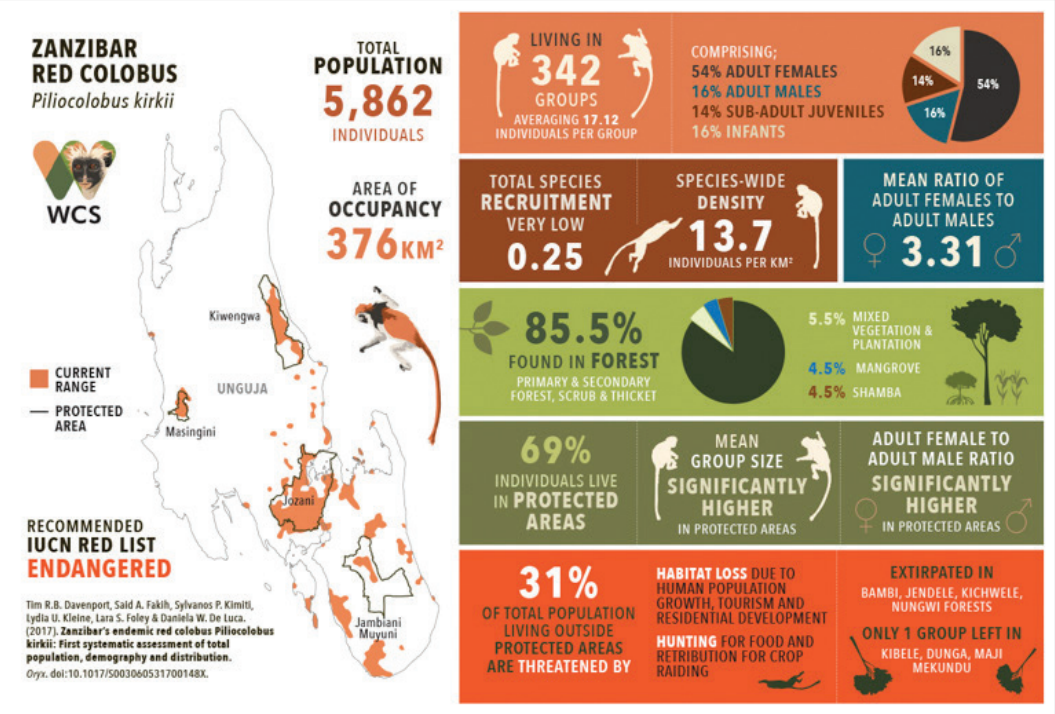
Explain

Explore

Engage

Explore: What is an infographic?
(15 minutes)

Begin the PowerPoint presentation, **What is an Infographic?** The link to the presentation can be found on page 2 of this section's lesson plan. The second slide defines infographic. Proceed by showing students the infographic on the Zanzibar Red Colobus Monkey created by the Wildlife Conservation Society of Tanzania nd conducting a verbal infographic analysis by class discussion.



Ask students to consider the following:

- What information is the infographic attempting to explain? What is the main idea?
- What makes an infographic different from an article you might read about the Zanzibar Red Colobus Monkey?
- What colors are used in the infographic? Are the colors important?
- How are these data represented? Do they use pie charts, bar graphs, timelines, etc.?
- How are images used to support the infographic's main idea?
- Are sources provided for the data? Are there citations present?
- Do you have any suggestions for improving this infographic? (Consider the layout, color scheme, content, research, etc.).

Optional Extension: You may extend the infographic analysis activity by choosing additional infographics from the Internet for students to explore either as a class or individually.

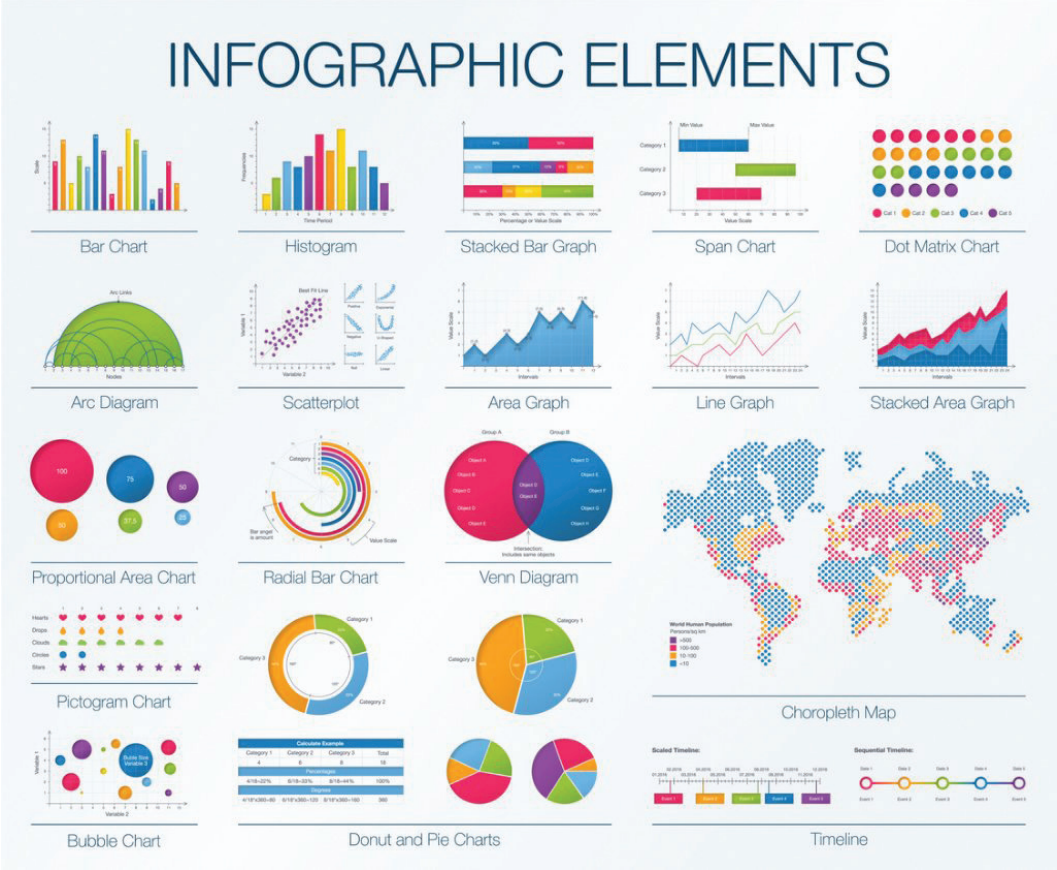
After discussing the Wildlife Conservation Society infographic, go over the infographic design tips on Slides 4-5 of the PowerPoint presentation. Slides 5-6 introduce students to some of the ways to graphically represent data.

Finally, tell students that they will be creating their own infographic on a topic related to animal agriculture and its impacts on the environment. They will work in groups to analyze information and create the infographic. At this point, provide students with the handout, **Graphically Representing Data – Reference**, which they may use as a reference when creating their own infographic.

Notes:

Explain: Graphically Representing Data
(20 minutes)

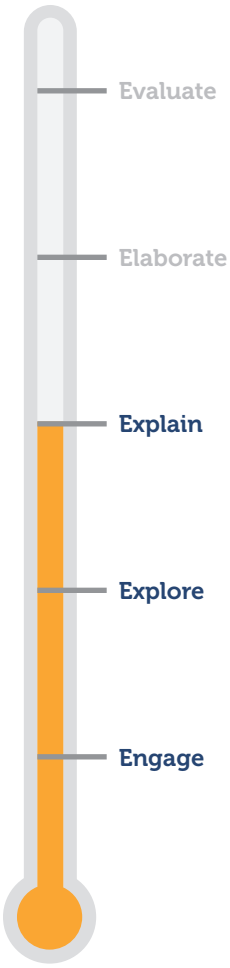
Before they begin their group work, students should familiarize themselves with the different ways data can be represented by reading through their handout, **Graphically Representing Data – Reference**. In addition, The Data Visualization Catalogue is a great resource for creating and learning about computational graphics: https://datavizcatalogue.com/index.html.



If students have Internet access during class time, they may create their infographic using free infographic design programs on the Internet, or they may combine the use of these free tools with their own handwritten design on a poster board. If students have Internet access, now is a good time to explore this list of free tools for creating infographics: https://www.creativebloq.com/infographic/tools-2131971. If there is no Internet access in the classroom, students can create their infographic entirely by hand on a poster board.

If there is time leftover, you may proceed to Section 2 of this lesson, assigning reseach topics to groups of 2-3 students.

Notes:



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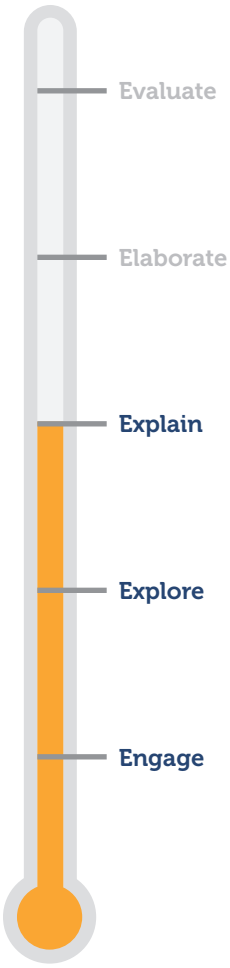

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HS Environmental Science Lesson 2 - Section 2

Animal Agriculture & the Environment: Creating a Computational Representation

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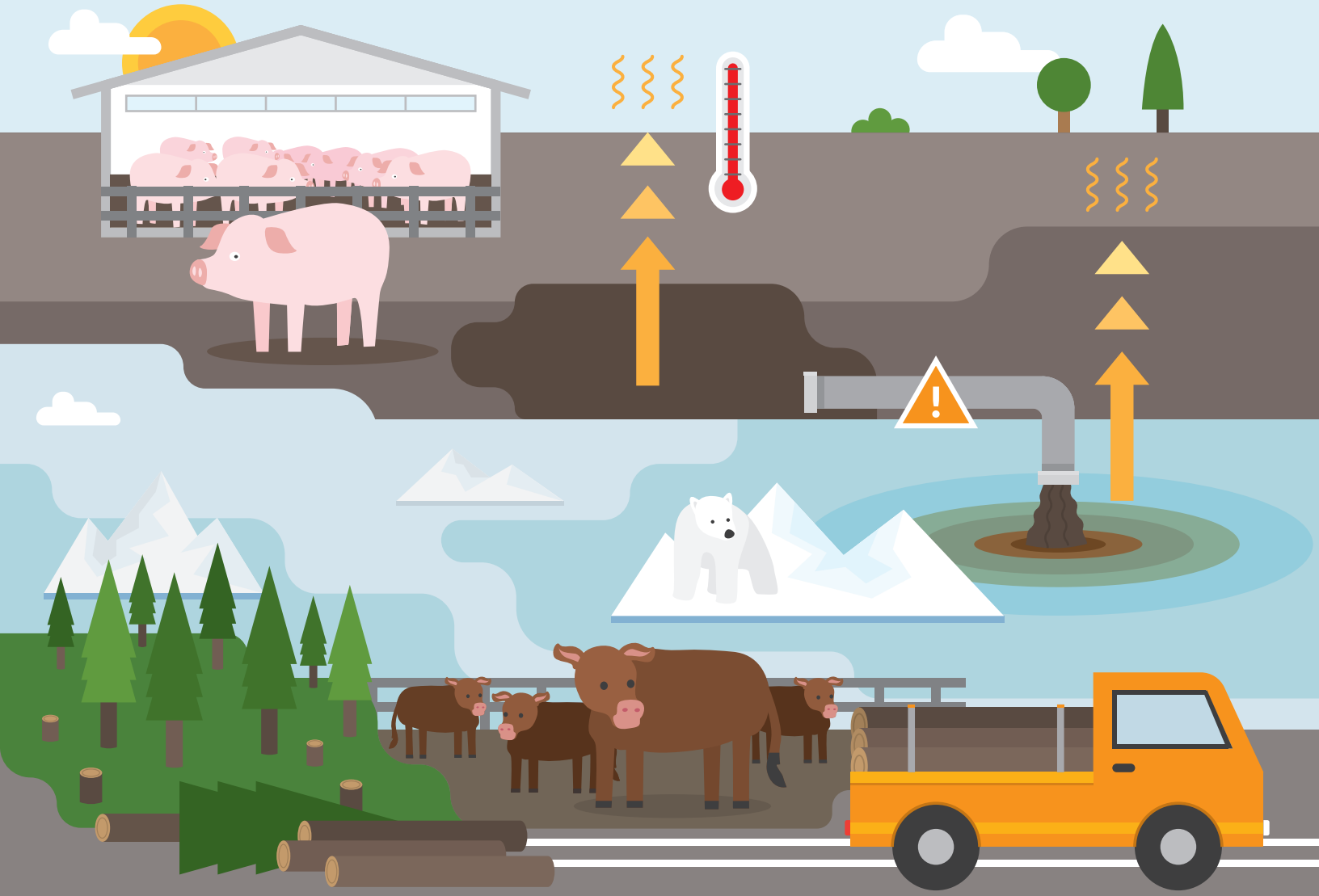
> **— Jane Goodall, Primatologist and Conservationist**



Overview

For this activity, students will learn how computational representations are used to simplify mathematical relationships. Students will research and gather data on the impact that the rise in industrialized farming has on the environment and the far-reaching consequence that animal agriculture has on humans. Students will use these data to create an infographic, a format that uses computational representations in order to visually explain a topic.

- Students will explore different types of infographics and methods for graphically representing data.
- Students will develop a claim based on their research of a topic related to animal agriculture and its effects on humans and the environment.
- Students will locate data that support their claim and express it graphically creating at least three computational representations (through pie charts, bar graphs, etc.).

Essential Questions:

- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

Lesson Time:

Section 1 = 50 minutes
Section 2 = 50 minutes
Section 3 = 50 minutes
Section 4 = 50 minutes

Student Learning Objectives:

Students will be able to...

- Explore the use of infographics to visually explain a topic
- Identify and use multiple methods for representing data graphically
- Explore the environmental impact of animal agriculture
- Come up with a claim supported by three sets of data
- Develop computational representations of the data
- Create an infographic using data that supports their claim

Resources:

- **Student Handout:** Animal Agriculture & the Environment – Creating an Infographic
- **Student Handout:** Animal Agriculture & the Environment – Topics
- **Student Handout:** Graphically Representing Data – Reference

Materials:

- Colored Pencils
- Poster Board (one for each group of 2-3 students)

Next Generation Science Standards

HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.

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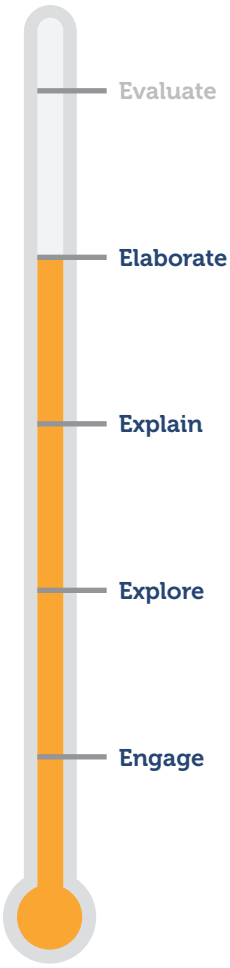

Activities: Section 2

Elaborate: Gathering Information
(50 minutes)

Students will work in groups of 2-3 to create their own infographic on an issue related to animal agriculture and the environment. Provide each student with the handout, **Animal Agriculture & the Environment - Creating an Infographic**. This handout details the steps that students will take to research a topic and create an infographic based on that topic.

You may assign topics to each group or have students pick topics from a basket to randomize the choices. There should be at least one group working on each of the five topics.

Topics
• Waste Management • Methane Production • Deforestation • Water Use • Antibiotics

The topics and article links are provided on the handout, **Animal Agriculture and the Environment: Topics**. Distribute a copy of the handout to every student.

Once topics have been assigned, students should begin the Individual Work portion of the assignment. Students will need access to a computer in order to read and research articles. If this is not possible in school, researching, reading, and annotating the articles can be assigned as homework.

Some of the articles included are very long. Students are encouraged to skim each article first to locate significant information on their topic and then go back to read relevant sections more closely. Group members should read and annotate each article on their topic. In addition, students are asked to conduct their own research by locating and reading two additional articles on their topic.

Once each of the group members has read all assigned articles on their topic and located and read two additional articles of their choice, the group members should come up with a claim related to these questions:

- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

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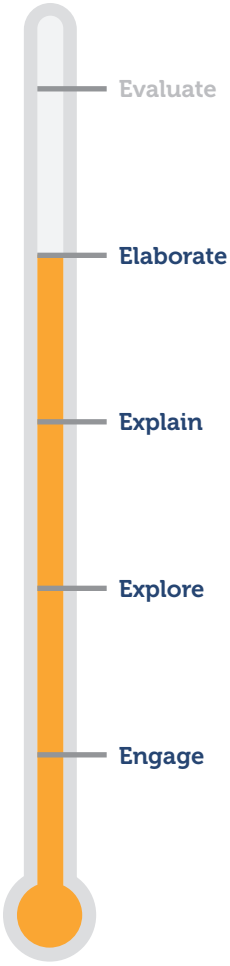

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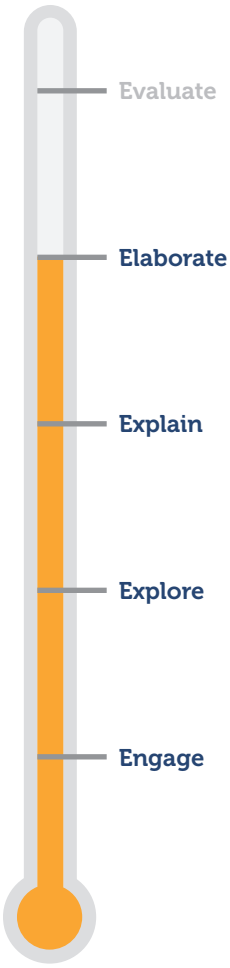

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HS Environmental Science Lesson 2 - Section 3

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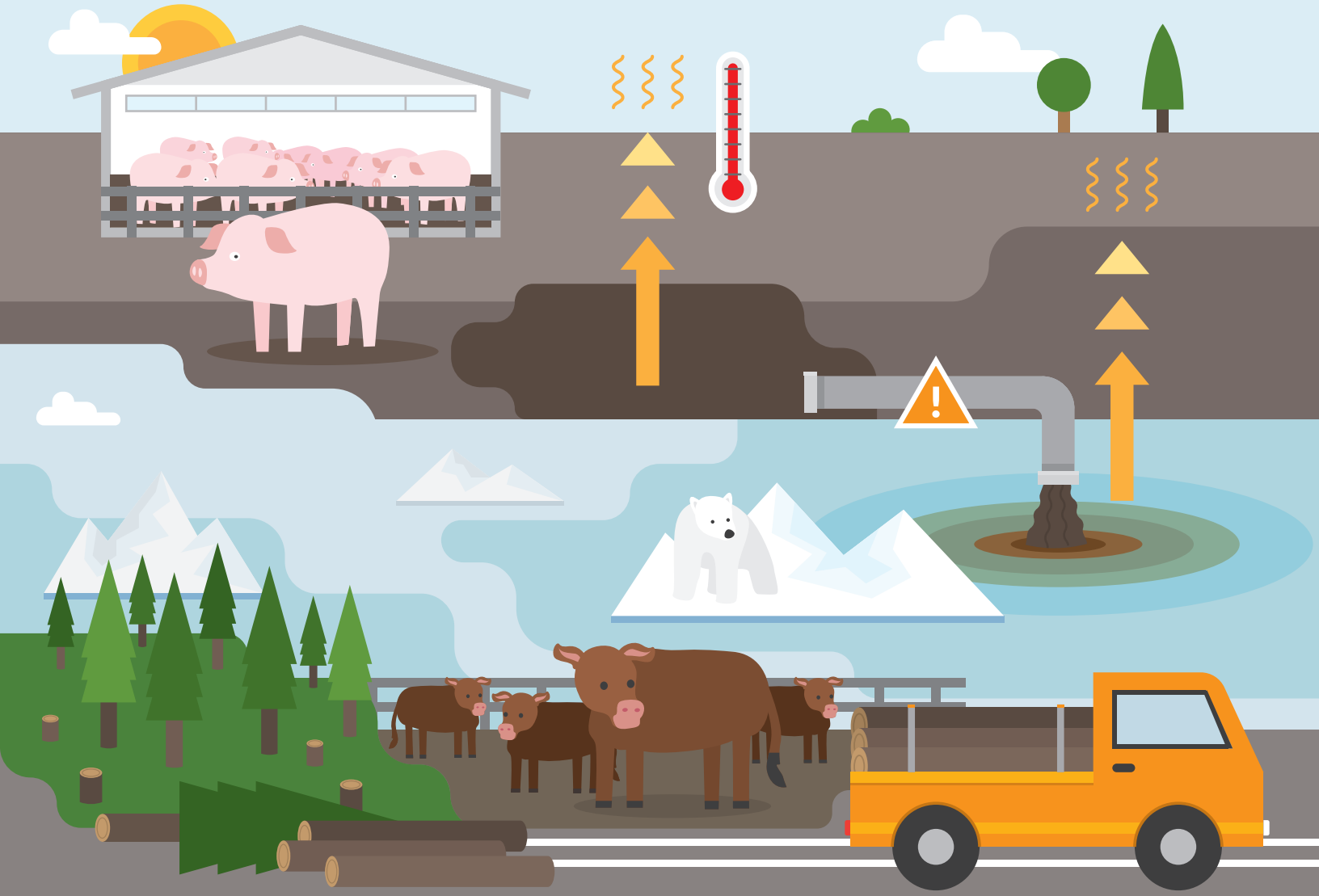

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Essential Questions:

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Lesson Time:

Section 1 = 50 minutes
Section 2 = 50 minutes
Section 3 = 50 minutes
Section 4 = 50 minutes

Student Learning Objectives:

Students will be able to...

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- Identify and use multiple methods for representing data graphically
- Explore the environmental impact of animal agriculture
- Come up with a claim supported by three sets of data
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Resources:

- **Student Handout:** Animal Agriculture & the Environment – Creating an Infographic
- **Student Handout:** Animal Agriculture & the Environment – Topics
- **Student Handout:** Graphically Representing Data – Reference
- **Student Handout:** Infographic Rubric

Materials:

- Colored Pencils
- Poster Board (one for each group of 2-3 students)

Next Generation Science Standards

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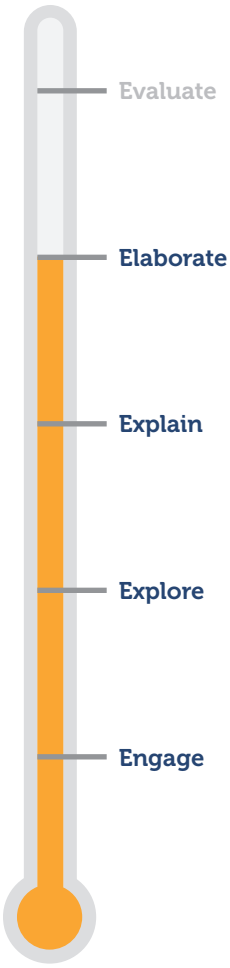

Activities: Section 3

Project Work: Creating the Infographic
(50 minutes)

Students should proceed where they left off with the Group Work portion of their handout, **Animal Agriculture & the Environment – Creating an Infographic**.

Students are asked to jot down answers to the following questions in order to help guide them in the creation of their group's infographic:

Select an environmental impact specific to your topic. What is the impact? What is causing it? What are some possible far-reaching consequences to humans?

Come up with a claim related to your topic and the following questions:
- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

Come up with a theme for your infographic. Briefly explain what colors, images, and icons you will use and why.

What data will you be using? Your data should support your claim and key issues.

How will you represent each data set? Refer to your handout, **Graphically Representing Data Reference** for ideas on representing data in a graphical way. Remember: choose at least three different ways to represent data. That means that each data set should not be represented as a bar graph.

The infographic must include the following:

- **A claim related to the questions:**
  - **What impact does the rise in animal agriculture and factory farming have on the environment?**
  - **What far-reaching consequences does this impact have on humans?**
- **Three different ways of sharing data that are appropriate for the data being represented AND that support the claim**
- **Citations for each piece of data**

Provide each group with a copy of the **Infographic Rubric** to ensure that they meet each requirement when designing their infographic.

At this point, you may provide poster paper and coloring materials to create physical infographics or students may use a word-processing program to create it digitally. If students have access to the Internet, they may use one of the free infographic creation programs online. A list of programs can be found here: https://www.creativebloq.com/infographic/tools-2131971.

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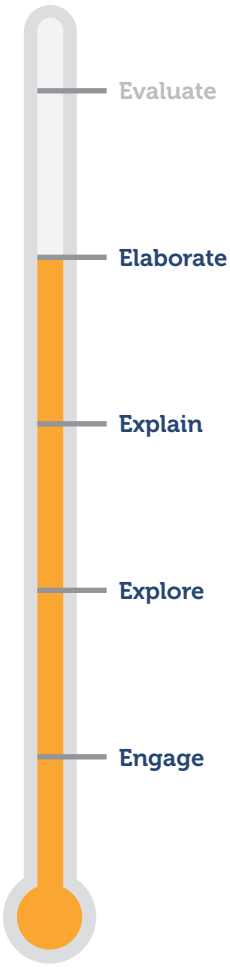

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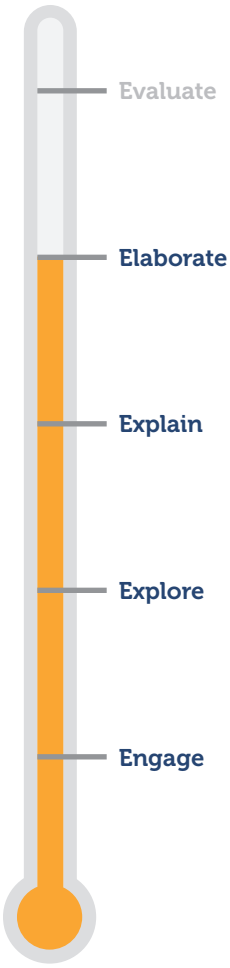

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Water footprint of crop and animal products: a comparison. (n.d.).
Retrieved from:
https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/

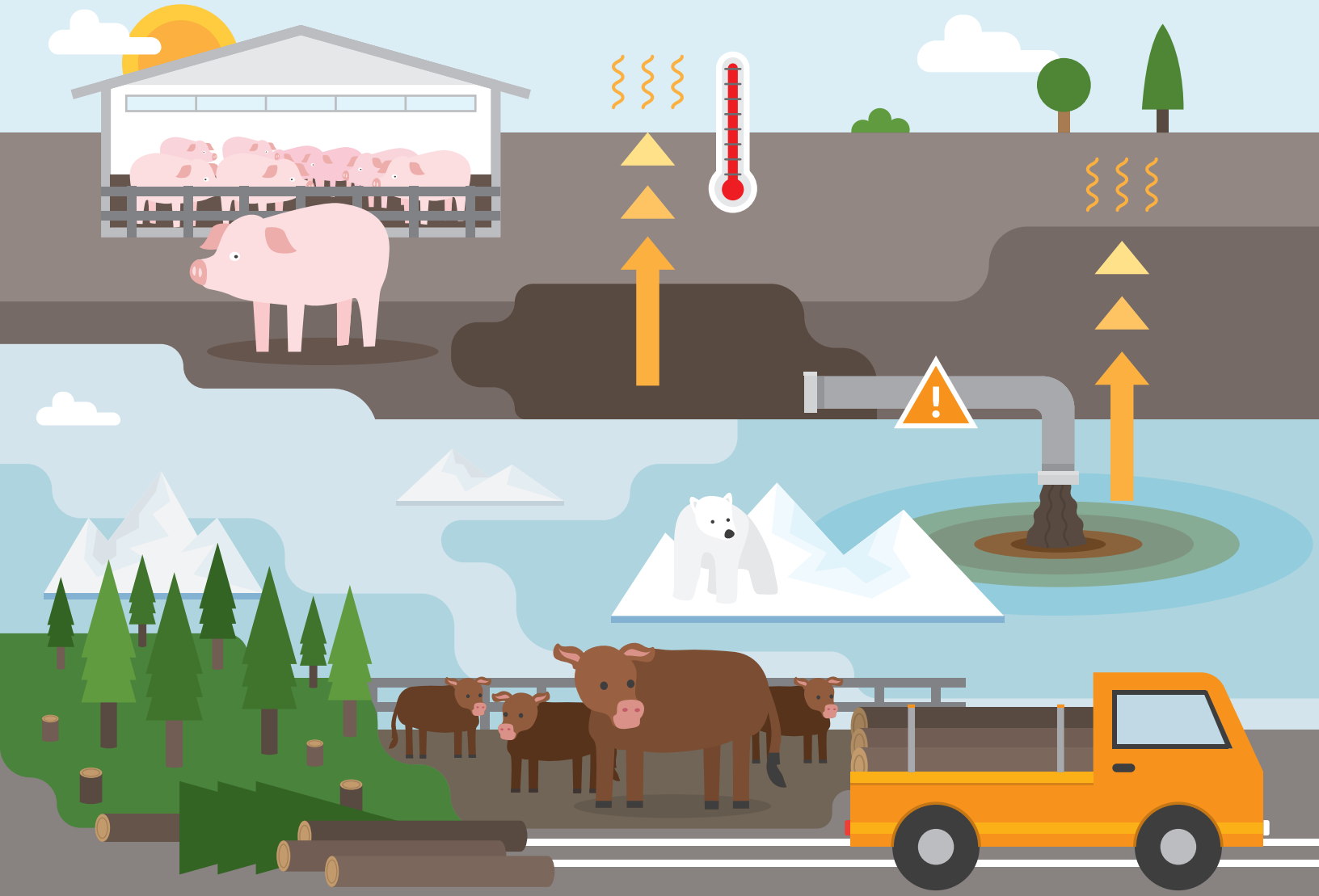
Notes:

farmsanctuary
rescue • education • advocacy

HS Environmental Science Lesson 2 - Section 4

Animal Agriculture & the Environment: Creating a Computational Representation

> *"The most important thing is to actually think about what you do. To become aware and actually think about the effect of what you do on the environment and on society."*
> **— Jane Goodall, Primatologist and Conservationist**



Overview

For this activity, students will learn how computational representations are used to simplify mathematical relationships. Students will research and gather data on the impact that the rise in industrialized farming has on the environment and the far-reaching consequence that animal agriculture has on humans. Students will use these data to create an infographic, a format that uses computational representations in order to visually explain a topic.

- Students will explore different types of infographics and methods for graphically representing data.
- Students will develop a claim based on their research of a topic related to animal agriculture and its effects on humans and the environment.
- Students will locate data that support their claim and express it graphically creating at least three computational representations (through pie charts, bar graphs, etc.).

Essential Questions:

- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

Resources:

- **Student Activity:** Sticky Note Exercise
- **Student Handout:** Infographic Rubric

Lesson Time:

Section 1 = 50 minutes
Section 2 = 50 minutes
Section 3 = 50 minutes
Section 4 = 50 minutes

Materials:

- Colored Pencils
- Poster Board (one for each group of 2-3 students)

Student Learning Objectives:

Students will be able to...

- Explore the use of infographics to visually explain a topic
- Identify and use multiple methods for representing data graphically
- Explore the environmental impact of animal agriculture
- Come up with a claim supported by three sets of data
- Develop computational representations of the data
- Create an infographic using data that supports their claim

Next Generation Science Standards

HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.

Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.

Activities: Section 4

Evaluate: Infographic Gallery Walk
(40 minutes)

To assess this project, students will provide peer assessment.

1. Provide five copies of the handout, **Infographic Rubric,** to each group. One rubric will be used to grade their own infographic, and four will be used to grade other classmates' projects. Students should grade infographics on all five topics.
2. Now, give each group time to grade their own infographic using one of the rubrics.
3. Next, instruct each group to have their infographic accessible for viewing in some way (propped up on a table, hung on the wall, or displayed on a computer).

4. Finally, give students 25 minutes to walk around the room, observing and reading the content of each of the infographics created. During this time, each group should choose four additional projects to grade, making sure to choose an infographic on each of the four remaining topics not researched for their own infographic. When a group finishes grading an infographic, they should leave the graded rubric facedown alongside the reviewed infographic.

Closure: Student Sticky Note Exercise
(5-10 minutes)

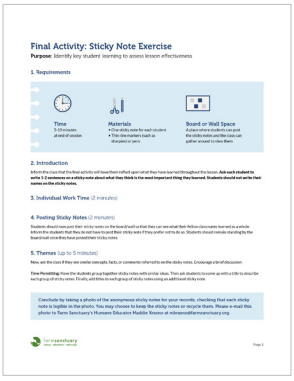
Please refer to **Student Activity: Sticky Note Exercise** for detailed instructions. Each student will write 1-2 sentences on a sticky note about what they consider to be the most important thing they learned in this lesson. The sticky notes should be completed anonymously. Students will then post their sticky notes on a board or wall and engage in a brief class discussion.

Time Permitting: Have the students group together sticky notes with similar ideas. Then ask students to come up with a title to describe each group of sticky notes. Finally, add titles to each group of sticky notes using an additional sticky note.

Conclude by taking a photo of the sticky notes, checking that each sticky note is legible in the photo. Please email the photo of the anonymous student sticky notes to Farm Sanctuary's Humane Educator Maddie Krasno at mkrasno@farmsanctuary.org.


Infographic Grading Rubric

Rubric Areas	2	1	0
Theme	The theme was clear and could be summarized in 1-2 sentences.	The theme was unclear or was not summarized.	There was no apparent theme to the infographic.
Colors and Images	Colors and images reinforced the theme in a clear and creative way.	The colors and images used reinforced the theme in a basic way.	The colors and images were not reflective of the theme.
Claim	The claim was clearly stated.	The claim was unclear.	There was no claim made.
Data Set 1	The way the data was represented was appropriate and accurate.	The way the data was represented was either not appropriate or not accurate.	Data was missing or not represented in an appropriate or accurate way.
Data Set 1 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Data Set 2	The way the data was represented was appropriate and accurate.	The way the data was represented was either not appropriate or not accurate.	Data was missing or not represented in an appropriate or accurate way.
Data Set 2 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Data Set 3	The way the data was represented was appropriate and accurate.	The way the data was represented was either not appropriate or not accurate.	Data was missing or not represented in an appropriate or accurate way.
Data Set 3 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Citations	Citations were present for all data used.	Citations were present for some of the data.	Citations were not present.
Total Score			___ / 20


Final Activity: Sticky Note Exercise

Purpose: Identify key student learning to assess lesson effectiveness

1. Requirements

Time
5-10 minutes at end of session

Materials
• One sticky note for each student
• Thin-tip marker (such as sharpies) or pens

Board or Wall Space
A place where students can post the sticky notes and the class can gather around to view them

2. Introduction

Inform the class that the final activity will have them reflect upon what they have learned throughout the lesson. **Ask each student to write 1-2 sentences on a sticky note about what they think is the most important thing they learned.** Students should not write their names on the sticky notes.

3. Individual Work Time (2 minutes)

4. Posting Sticky Notes (2 minutes)

Students should now post their sticky notes on the board/wall so that they can see what their fellow classmates learned as a whole. Inform the students that they do not have to post their sticky note if they prefer not to do so. Students should remain standing by the board/wall once they have posted their sticky notes.

5. Themes (up to 5 minutes)

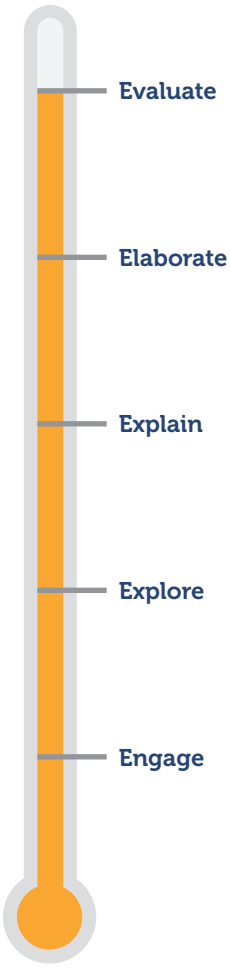
Now, ask the class if they see similar concepts, facts, or comments referred to on the sticky notes. Encourage a brief discussion.

Time Permitting: Have the students group together sticky notes with similar ideas. Then ask students to come up with a title to describe each group of sticky notes. Finally, add titles to each group of sticky notes using an additional sticky note.

Conclude by taking a photo of the anonymous sticky notes for your records, checking that each sticky note is legible in the photo. You may choose to keep the sticky notes or recycle them. Please e-mail this photo to Farm Sanctuary's Humane Educator Maddie Krasno at mkrasno@farmsanctuary.org.

Teacher Survey and Student Feedback

Teachers who have implemented one complete lesson plan from Farm Sanctuary's Sustainable Future Curriculum are eligible for a **$50 Amazon gift card** by completing our teacher survey and submitting a photo of the anonymous student sticky notes to Farm Sanctuary. Please e-mail Maddie Krasno at mkrasno@farmsanctuary.org for the survey and to submit the photograph of the student sticky notes.



Notes:

References:

Eat for the planet. (n.d.)
Retrieved from:
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Economou V. & Gousia P. (2015). Agriculture and food animals as a source of antimicrobial-resistant bacteria. Volume 2015:8 Pages 49—61.
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http://wwf.panda.org/about_our_earth/deforestation/deforestation_causes/forest_conversion/

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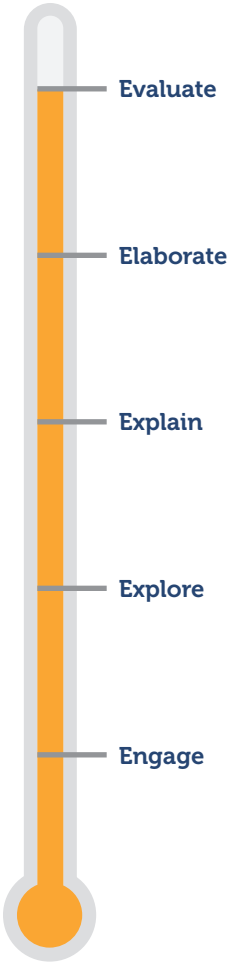

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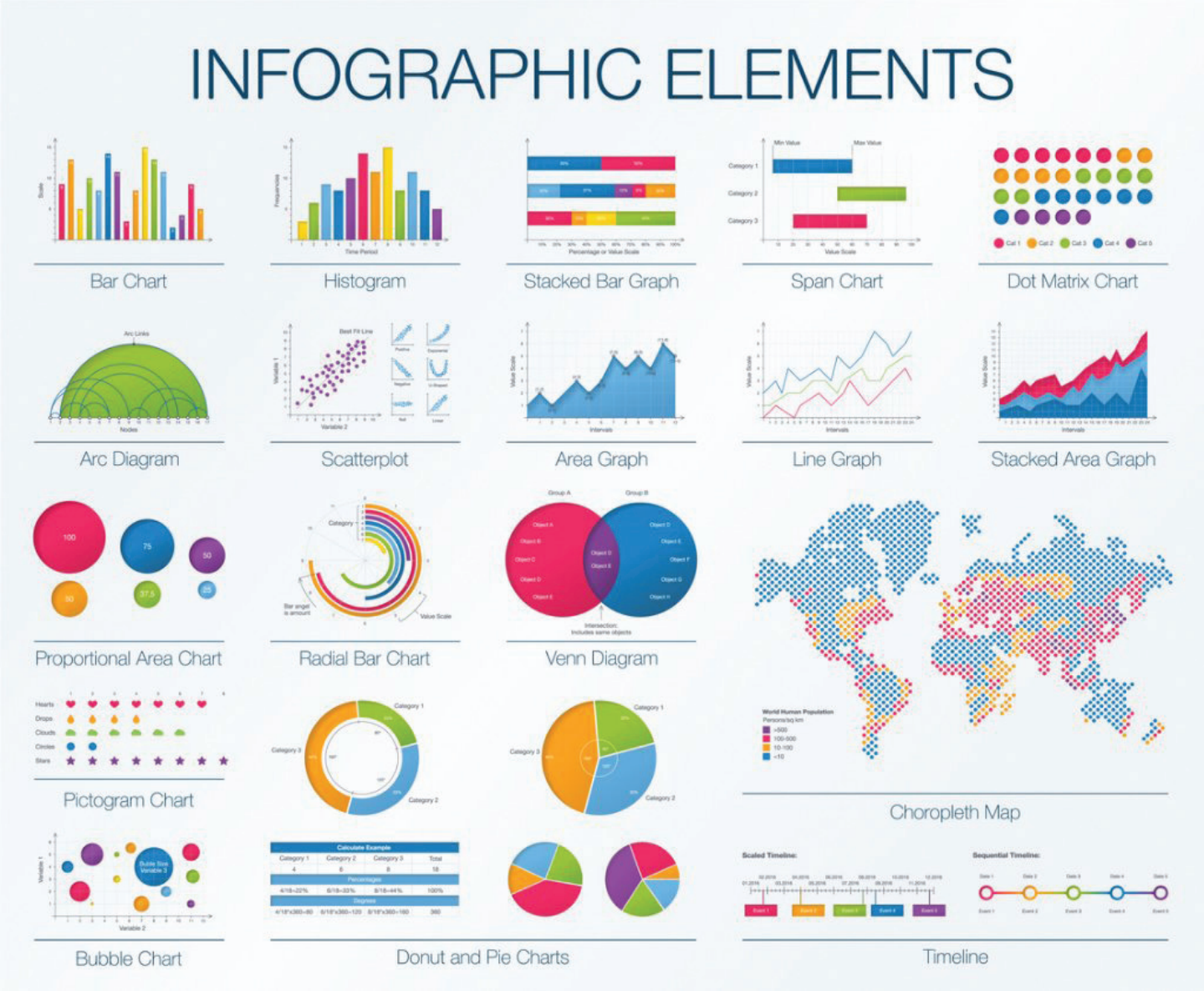
Water footprint of crop and animal products: a comparison. (n.d.).
Retrieved from:
https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/

Notes:

Graphically Representing Data – Reference

Infographic
A visual representation of data and information

Infographic Elements
Methods for representing data in an organized way (see graphic below)



Find more ways to visualize data and explanations for each of the infographic elements pictured above here:
https://datavizcatalogue.com/index.html

Below are several useful ways to represent data.

Bar Chart
A bar chart, also known as a bar graph, is a graphical display of data using horizontal or vertical bars of different heights. One axis of the chart shows which categories are being compared and the other axis shows the scale at which the categories are being measured.

Creative Boost: Instead of bars, what images could you use?

Histogram
A histogram is a graphical display of numerical data where each bar shows the frequency that a finding occurs.

Dot Matrix Chart
Dot matrix charts show data in the form of different colored dots. Each colored dot represents a specific category.

Scatterplot
A scatterplot is a collection of data points on two variables that are represented on either axis. Scatterplots enable you to see if a relationship or correlation between two variables exists.

Creative Boost: What other shape(s) could the points on a scatterplot be that fit your infographic's theme?

Line Graph
A line graph depicts quantitative values over a specific time-period, typically showing how trends change over time.

Choropleth Map
A choropleth map shows geographical areas that are colored or patterned in relation to a data variable. For example, different colors on a map may represent the varying population density of humans in a region.

Pictogram Chart
A pictogram chart uses icons to represent the subject of one's data in a more intriguing way. **Icons** are small, simplistic images that should enhance and not distract from the purpose of an infographic. A data set on weather patterns, for example, may use icons such as those represented in the series to the right.

Pie Chart

A pie chart is a circular graphic where each part of the circle represents a percentage of the whole. Data should add up to 100%.

Creative Boost: A pie chart does not need to be a circle. Consider shapes that reflect the subject of your infographic, such as a globe to represent a worldwide statistic.

Donut Chart

A donut chart is like a pie chart but with the area in the center cut out. Data should add up to 100%.

Creative Boost: Is there text or an image you would like to display in the center of a donut chart?

Timeline

A timeline is a method for depicting historical events or a list of events in chronological order.

Percentages

Percent means “for every 100” or “out of 100.” The % symbol is a quick way to express a fraction of something with a denominator of 100.

Animal Agriculture & the Environment: Creating an Infographic

Name: _____

Date: _____

Background Information:

For this activity, your group will be assigned a topic related to animal agriculture. You will research and read several articles on this topic. Together, your group needs to come up with a claim related to these questions:

- What impact does the rise in animal agriculture and factory farming have on the environment?
- What far-reaching consequences does this impact have on humans?

Your group must identify at least three different sets of data from the articles that support your claim. Be sure to use data from at least three different sources. You should choose data within the articles that you can express graphically (refer to your handout, **Graphically Representing Data – Reference**). Your group will then create an infographic depicting the data sets that support your claim.

Individual Work: Researching the Infographic

1. Read the provided articles on your topic. Some articles are very long. A good approach to locating significant information on your topic is to begin by skimming the text and then going back to read relevant sections more closely. Highlight and/or take notes for each article.

2. Locate and read at least two additional articles on your topic, being sure to highlight and/or take notes on each of your selected articles. When deciding which articles to include in your research, keep in mind that reliable research is:

   - **Relevant (up-to-date):** When was the source published? Was the information published in the last 5 years or 20 years ago? Was the publication recent enough to still provide timely information? If the research was published many years ago, is there good reason to include those findings still today?
   - **Verifiable:** Where was the source published? Is it a personal blog, scholarly or peer-reviewed research, or a news article from the New York Times? Is the website and/or organization credible? Who is the author? Is the author or organization considered an expert on the topic?
   - **Bias:** It is important to understand who conducted and funded the research and note what biases exist. Is the article's purpose to be informative or to persuade you to feel a certain way?

3. Describe your topic and its key environmental issues in 1-2 sentences.

Group Work: Brainstorming the Infographic

Before you move on to Step 4, each group member should share with the rest of the group their response to Step 3. Make sure each group member understands the topic and its key environmental issues before proceeding to Step 4.

For Steps 4-7, jot down notes that will guide you in the creation of your group's infographic.

4. Select an environmental impact specific to your topic. What is the impact? What is causing it? What are some possible far-reaching consequences to humans?

5. Using your responses to Step 4, come up with a claim related to the questions:

   - What impact does the rise in animal agriculture and factory farming have on the environment?
   - What far-reaching consequences does this impact have on humans?

6. Using your responses to Step 4, come up with a theme for your Infographic. Briefly explain what colors, images, and icons you will use and why.

7. What data will you be using? Your data should support your claim and key issues.

1) _____

2) _____

3) _____

8. How will you represent each data set? Refer to your handout, **Graphically Representing Data Reference** for ideas on representing data in a graphical way. Remember: choose at least three different ways to represent data. That means that each data set should not be represented as a bar graph.

_____

_____

_____

_____

Group Work: Creating the Infographic

Create an infographic using your answers to the questions above.

Your infographic must have the following:

- **A claim related to the questions:**
  - **What impact does the rise in animal agriculture and factory farming have on the environment?**
  - **What far-reaching consequences does this impact have on humans?**
- **Three different ways of sharing data that are appropriate for the data being represented AND that support the claim**
- **Citations for each piece of data**

Refer to the **Infographic Rubric** to ensure that you meet each requirement when researching and designing your infographic.

Animal Agriculture & the Environment: Topics

Topic: Waste Management

Overview

Factory farms typically store animal waste in huge, open-air lagoons.

Articles

Exposing fields of filth. (2016, June 6).
Retrieved from: https://www.ewg.org/research/exposing-fields-filth#.W5gI2vZFwZx

Heaney, C. D., Myers, K., Wing, S., Hall, D., Baron, D., & Stewart, J. R. (2015). Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. *The Science of the total environment*, 511, 676-83.
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Hribar, C. (2010). Understanding concentrated animal feeding operations and their impact on communities.
Retrieved from: https://www.cdc.gov/nceh/ehs/Docs/Understanding_CAFOs_NALBOH.pdf

Topic: Methane Production

Overview

During digestion, ruminants like cows, sheep, and goats emit methane, a greenhouse gas.

Articles

Hribar, C. (2010). Understanding concentrated animal feeding operations and their impact on communities.
Retrieved from: https://www.cdc.gov/nceh/ehs/Docs/Understanding_CAFOs_NALBOH.pdf

Pearce, F. (2016, October 25). What is causing the recent rise in methane emissions?
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Study finds fossil fuel methane emissions greater than previously estimated. (2016, October 5).
Retrieved from: https://www.noaa.gov/media-release/study-finds-fossil-fuel-methane-emissions-greater-than-previously-estimated

Topic: Deforestation

Overview

The demand for space to feed and house farm animals is a major driver of deforestation.

Articles

Forest conversion. (n.d.).
Retrieved from: http://wwf.panda.org/about_our_earth/deforestation/deforestation_causes/forest_conversion/

Livestock policy brief: Cattle ranching and deforestation. (n.d).
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Retrieved from: http://www.fao.org/docrep/ARTICLE/WFC/XII/0568-B1.HTM

Topic: Water Use

Overview

Animal agriculture requires a significant amount of water in order to water the crops that farm animals eat, provide drinking water for billions of farm animals each year, and clean away the filth inside factory farms, transport trucks, and slaughterhouses.

Articles

Hoekstra, A.Y. (2012). The hidden water resource use behind meat and dairy, Animal Frontiers, 2(2): 3-8.
Retrieved from: http://waterfootprint.org/media/downloads/Hoekstra-2012-Water-Meat-Dairy_1.pdf

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Retrieved from: https://www.ewg.org/meateatersguide/interactive-graphic/water/

Water footprint of crop and animal products: a comparison. (n.d.).
Retrieved from: https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/

Topic: Antibiotics

Overview

Antibiotics are used on farm animals to prevent the spread of disease.

Articles

Economou V. & Gousia P. (2015). Agriculture and food animals as a source of antimicrobial-resistant bacteria. Volume 2015:8 Pages 49—61
Retrieved from: https://doi.org/10.2147/IDR.S55778

Hribar, C. (2010). Understanding concentrated animal feeding operations and their impact on communities
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Retrieved from: https://www.scientificamerican.com/article/how-drug-resistant-bacteria-travel-from-the-farm-to-your-table/

Infographic Grading Rubric

Title of Infographic: _____

Created by: _____

Rubric Areas	2	1	0
Theme	The theme was clear and could be summarized in 1-2 sentences.	The theme was unclear or was not summarized.	There was no apparent theme to the infographic.
Colors and Images	Colors and images reinforced the theme in a clear and creative way.	The colors and images used reinforced the theme in a basic way.	The colors and images were not reflective of the theme.
Claim	The claim was clearly stated.	The claim was unclear.	There was no claim made.
Data Set 1	The way the data were represented was appropriate and accurate.	The way the data were represented was either not appropriate or not accurate.	Data were missing or not represented in an appropriate or accurate way.
Data Set 1 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Data Set 2	The way the data were represented was appropriate and accurate.	The way the data were represented was either not appropriate or not accurate.	Data were missing or not represented in an appropriate or accurate way.
Data Set 2 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Data Set 3	The way the data were represented was appropriate and accurate.	The way the data were represented was either not appropriate or not accurate.	Data were missing or not represented in an appropriate or accurate way.
Data Set 3 - Claim support	The data clearly supported the claim.	The connection between the data and claim was not clear.	There was no connection between the data and the claim.
Citations	Citations were present for all data used.	Citations were present for some of the data.	Citations were not present.
Total Score:			___ / 20

Final Activity: Sticky Note Exercise

Purpose: Identify key student learning to assess lesson effectiveness

1. Requirements

Time

5-10 minutes
at end of session

Materials

- One sticky note for each student
- Thin-line markers (such as sharpies) or pens

Board or Wall Space

A place where students can post the sticky notes and the class can gather around to view them

2. Introduction

Inform the class that the final activity will have them reflect upon what they have learned throughout the lesson. **Ask each student to write 1-2 sentences on a sticky note about what they think is the most important thing they learned. Students should not write their names on the sticky notes.**

3. Individual Work Time (2 minutes)

4. Posting Sticky Notes (2 minutes)

Students should now post their sticky notes on the board/wall so that they can see what their fellow classmates learned as a whole. Inform the students that they do not have to post their sticky note if they prefer not to do so. Students should remain standing by the board/wall once they have posted their sticky notes.

5. Themes (up to 5 minutes)

Now, ask the class if they see similar concepts, facts, or comments referred to on the sticky notes. Encourage a brief discussion.

Time Permitting: Have the students group together sticky notes with similar ideas. Then ask students to come up with a title to describe each group of sticky notes. Finally, add titles to each group of sticky notes using an additional sticky note.

Conclude by taking a photo of the anonymous sticky notes for your records, checking that each sticky note is legible in the photo. You may choose to keep the sticky notes or recycle them. Please e-mail this photo to Farm Sanctuary's Humane Educator Maddie Krasno at mkrasno@farmsanctuary.org.