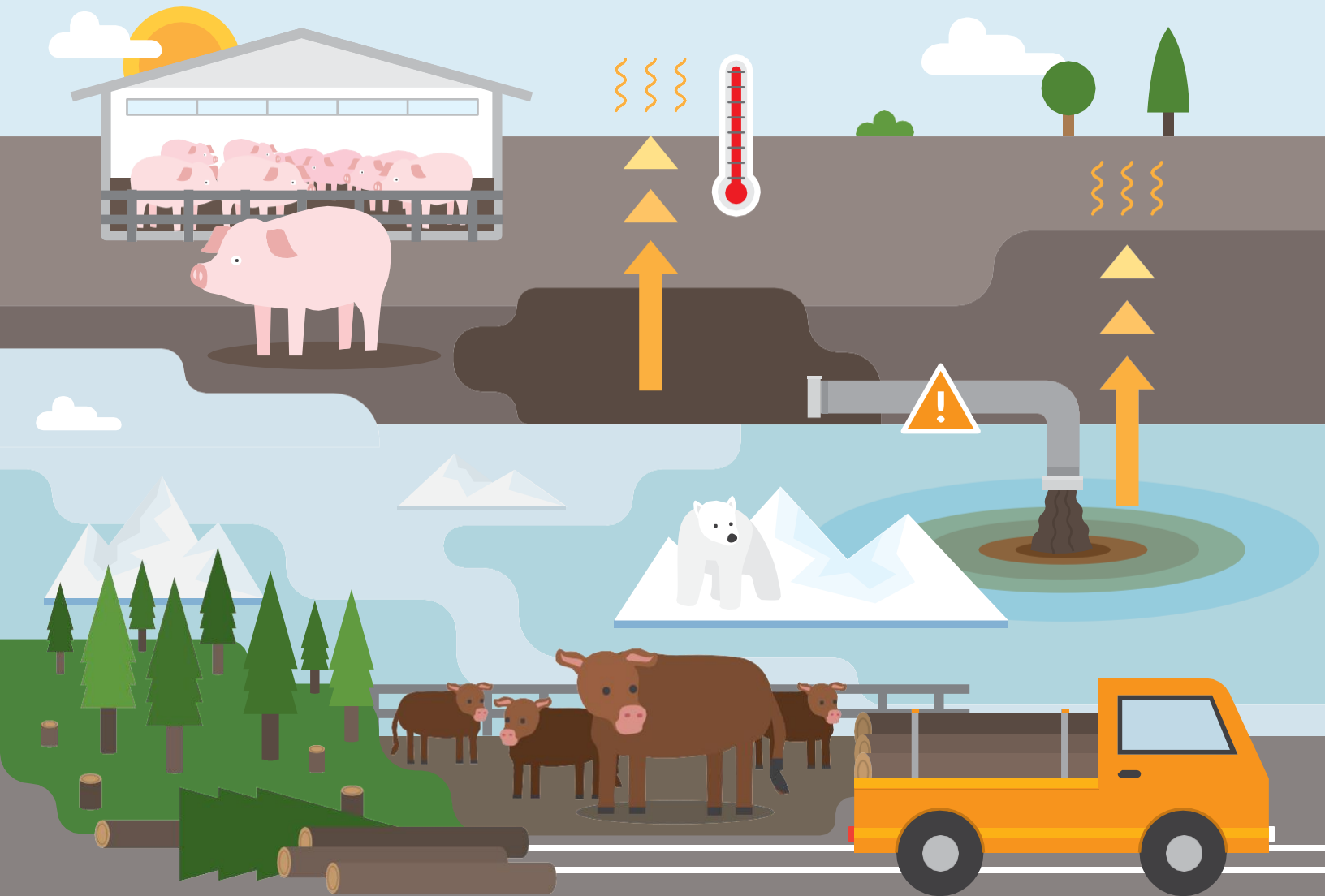


Animal Agriculture & the Environment: Creating a Computational Representation

“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 consequences that animal agriculture has on humans. Students will use these data to create an infographic, a format that uses computational representations 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 = 65 minutes

Section 1a = 30 minutes

Section 1b = 35 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)

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

*(If clicking a link does not work, please copy and paste the link into a web browser.)

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.

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations.

Disciplinary Core Ideas**ESS2.D: Weather and Climate**

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (*secondary*)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities.

Crosscutting Concepts**Systems and System Models**

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

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Activities: Section 1a

Engage: What is a hog farm? (30 minutes)

(If clicking a link does not work, please copy and paste the link into a web browser.)

Show students the video, "Hog farming has a massive poop problem" (16:36).
https://youtu.be/WsUNYlSiDH8?si=BjkUo2VxF-fpq_aM

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. What is a manure lagoon? How is waste dealt with when the lagoons become full?

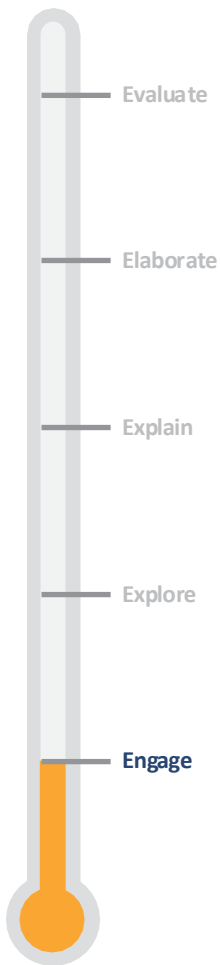
Manure lagoons are large pools filled with animal waste. These lagoons are the primary method used to manage waste on factory farms. This liquid waste is sprayed onto nearby fields when the lagoons become full.

2. What impacts do these farms have on the environment?

Answers may include: Greenhouse gas emissions; air pollution by releasing methane, carbon dioxide, ammonia, hydrogen sulfide, and dusts; polluting surface water and groundwater with nitrates, phosphorus, and bacteria, thus causing algae blooms and killing fish

3. What impacts do these farms have on humans? Which communities are disproportionately impacted?

Answers may include: Asthma; respiratory diseases; headaches; nausea; premature death; odors; life-threatening illnesses; contaminated water; nuisances, increased expenses. This disproportionately impacts communities of color and communities with low income.



Notes:

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

Questions to consider:

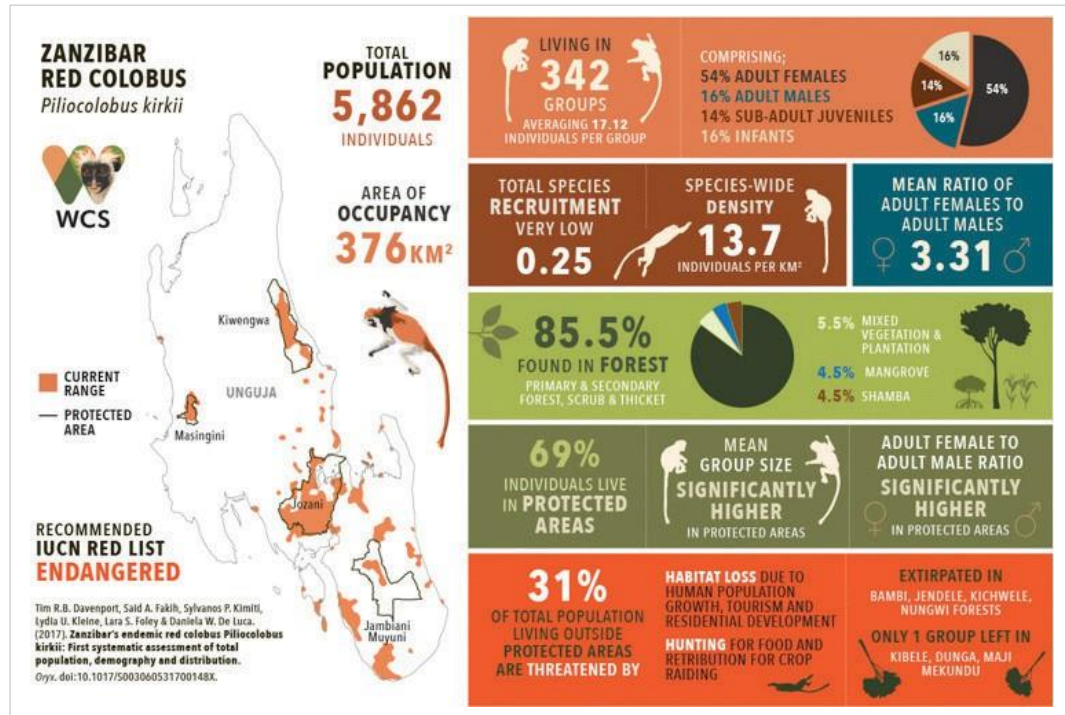
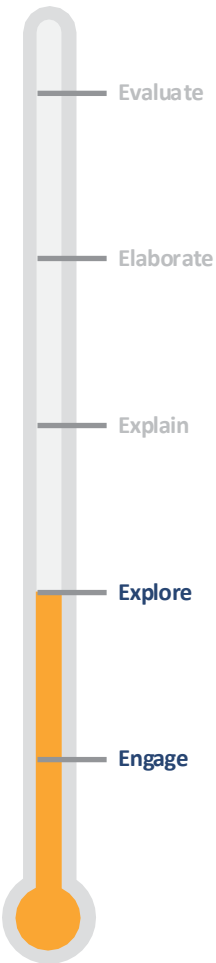
- What types of graphics did you observe?
- How did the graphics help explain the information being presented?

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.

Activities: Section 1b

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 and 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.

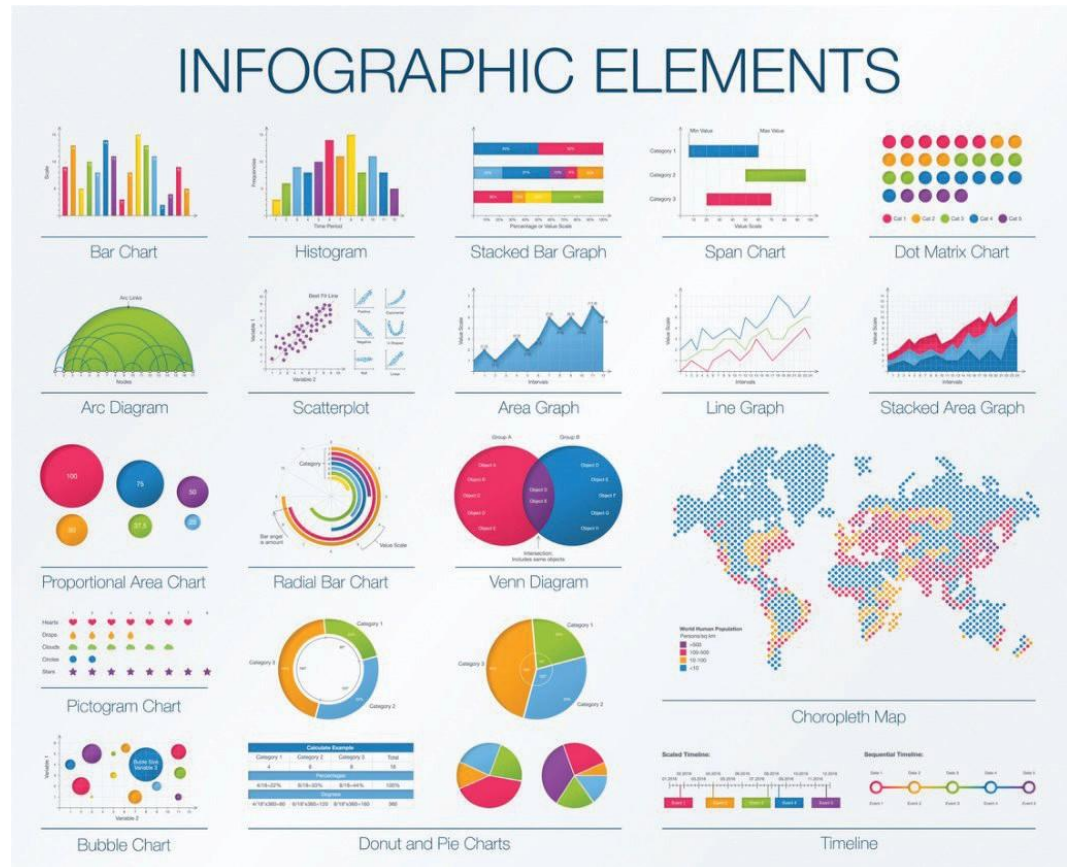
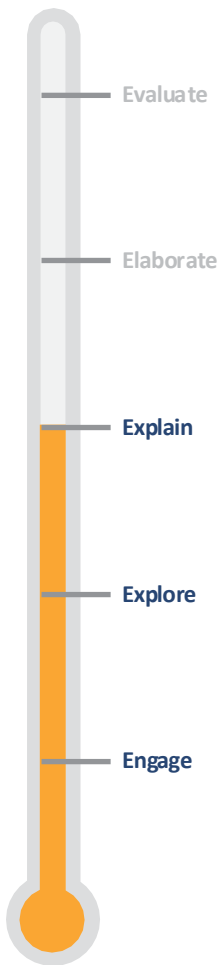
After discussing the Wildlife Conservation Society infographic, go over the infographic design tips on Slides 4-5 of the PowerPoint presentation. Slides 5-6 introduce students to some of the ways to graphically represent data.

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.

Explain: Graphically Representing Data (20 minutes)

(If clicking a link does not work, please copy and paste the link into a web browser.)

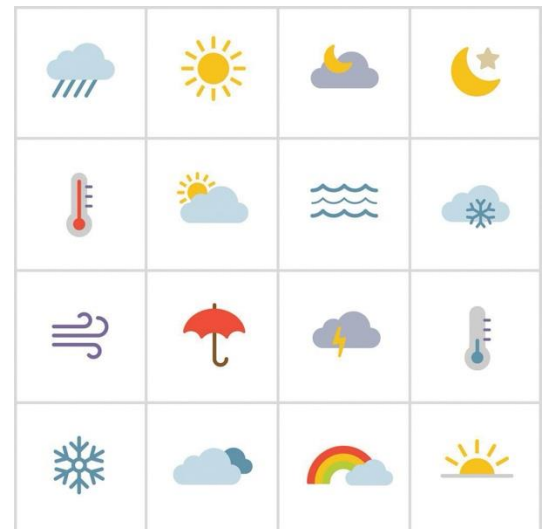
Before they begin their group work, students should familiarize themselves with the different ways data can be represented by reading through their handout, **Graphically Representing Data – Reference**. In addition, The Data Visualization Catalogue is a great resource for creating and learning about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

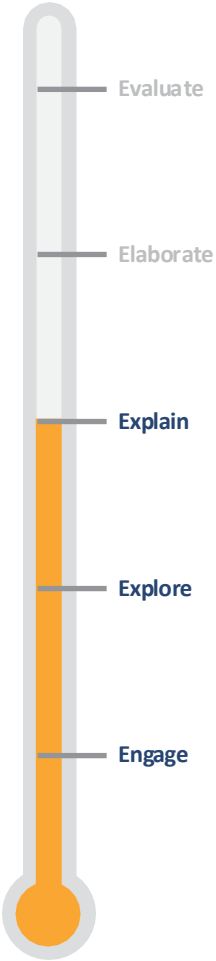


Notes:

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.creativeblog.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.





References: (If clicking a link does not work, please copy and paste the link into a web browser.)

Animal Production and Health Division, FAO. *Livestock policy brief: Cattle ranching and deforestation*. (n.d.). Food and Agriculture Organization of the United Nations. Retrieved March 11, 2026, from www.fao.org/3/a-a0262e.pdf

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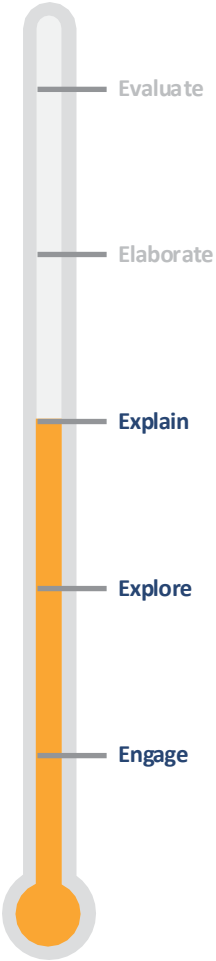
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Vox. (2022, January 4). *Hog farming has a massive poop problem* [Video]. YouTube. https://youtu.be/WsUNylsiDH8?si=BjkUo2VxF-fpg_aM

Water Footprint Network. *Water footprint of crop and animal products: a comparison*. (n.d.). Retrieved March 11, 2026, from <https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/>

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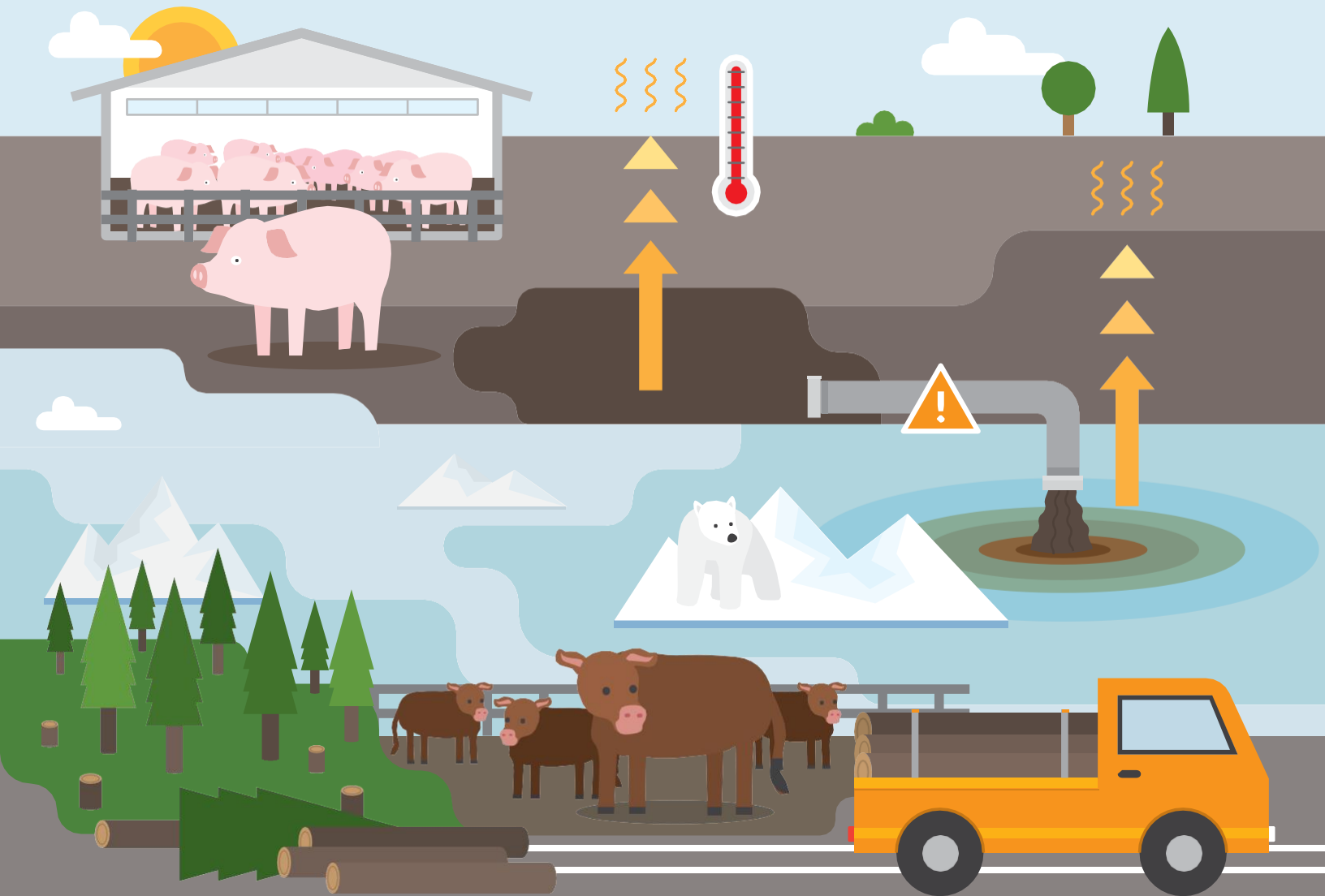
Notes:

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Animal Agriculture & the Environment: Creating a Computational Representation

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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 = 65 minutes

Section 1a = 30 minutes

Section 1b = 35 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)

Resources:

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

Student Learning Objectives:

Students will be able to...

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- 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.

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Using Mathematics and Computational Thinking
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Disciplinary Core Ideas**ESS2.D: Weather and Climate**

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (*secondary*)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities.

Crosscutting Concepts**Systems and System Models**

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

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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 |
|---|
| <ul style="list-style-type: none"> • Waste Management • Methane Production • Deforestation • Water Use • Antibiotics |

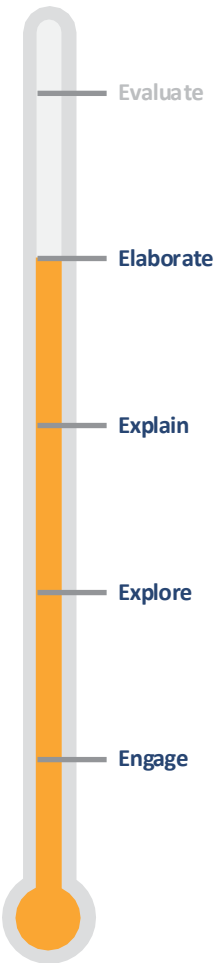
The topics and article links are provided on the handout, **Animal Agriculture and the Environment: Topics**. Distribute a copy of the handout to every student.

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.

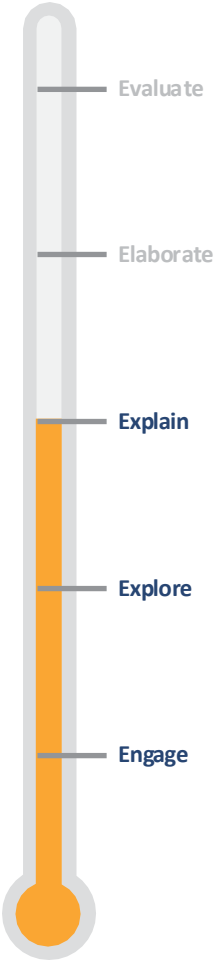
Some of the articles included are very long. Students are encouraged to skim each article first to locate significant information on their topic and then go back to read relevant sections more closely. Group members should read and annotate each article on their topic. In addition, students are asked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



Notes:



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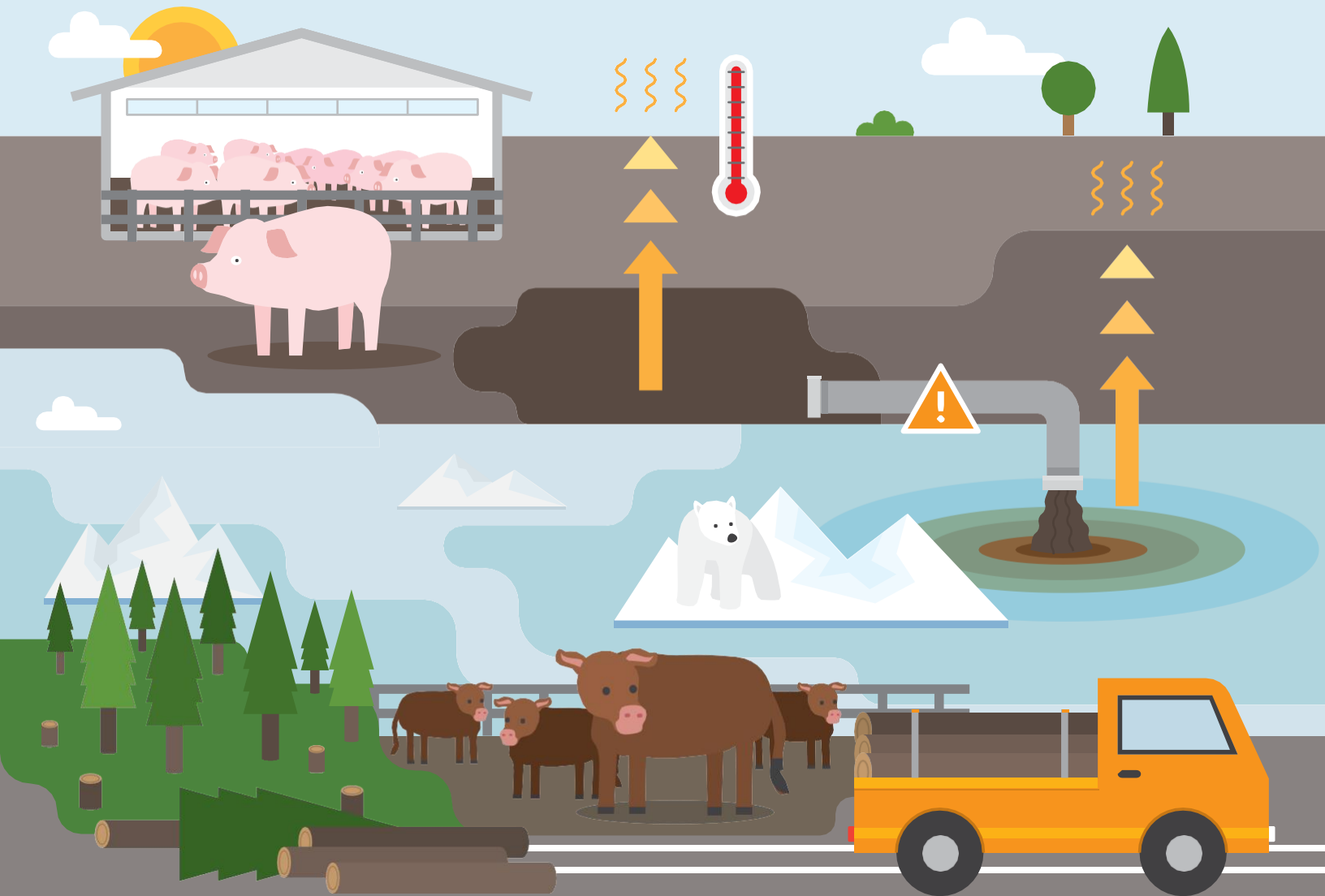
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Resources:

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

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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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?

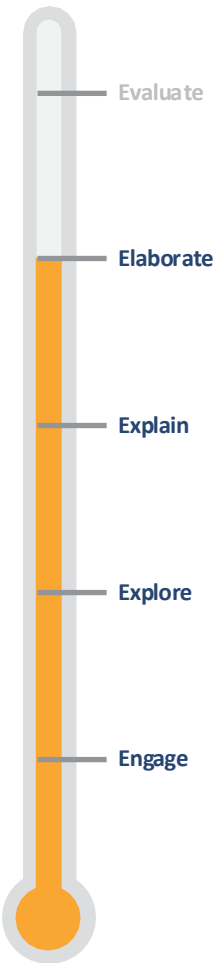
Come up with a claim related to your topic and the following questions:

- 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:

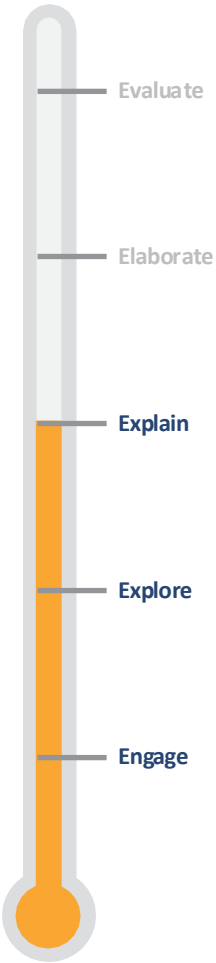
- A claim related to the questions:
 - What impact does the rise in animal agriculture and factory farming have on the environment?
 - What far-reaching consequences does this impact have on humans?
- Three different ways of sharing data that are appropriate for the data being represented AND that support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

(If clicking a link does not work, please copy and paste the link into a web browser.)

Notes:



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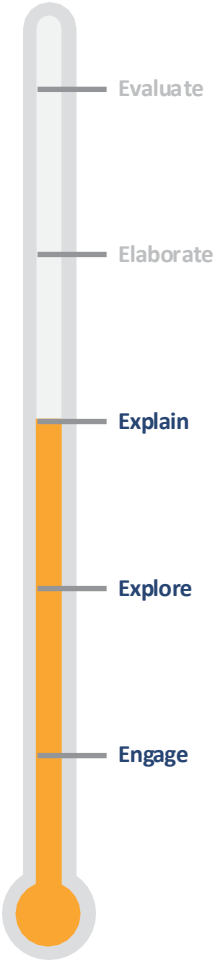
Notes:

Hoekstra, A.Y. (2012). The hidden water resource use behind meat and dairy. *Animal Frontiers*, 2(2), 3-8. <https://doi.org/10.2527/af.2012-0038>

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Vox. (2022, January 4). *Hog farming has a massive poop problem* [Video]. YouTube. https://youtu.be/WsUNylsiDH8?si=BjkUo2VxF-fpg_aM

Water Footprint Network. *Water footprint of crop and animal products: a comparison*. (n.d.). Retrieved March 11, 2026, from <https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/>

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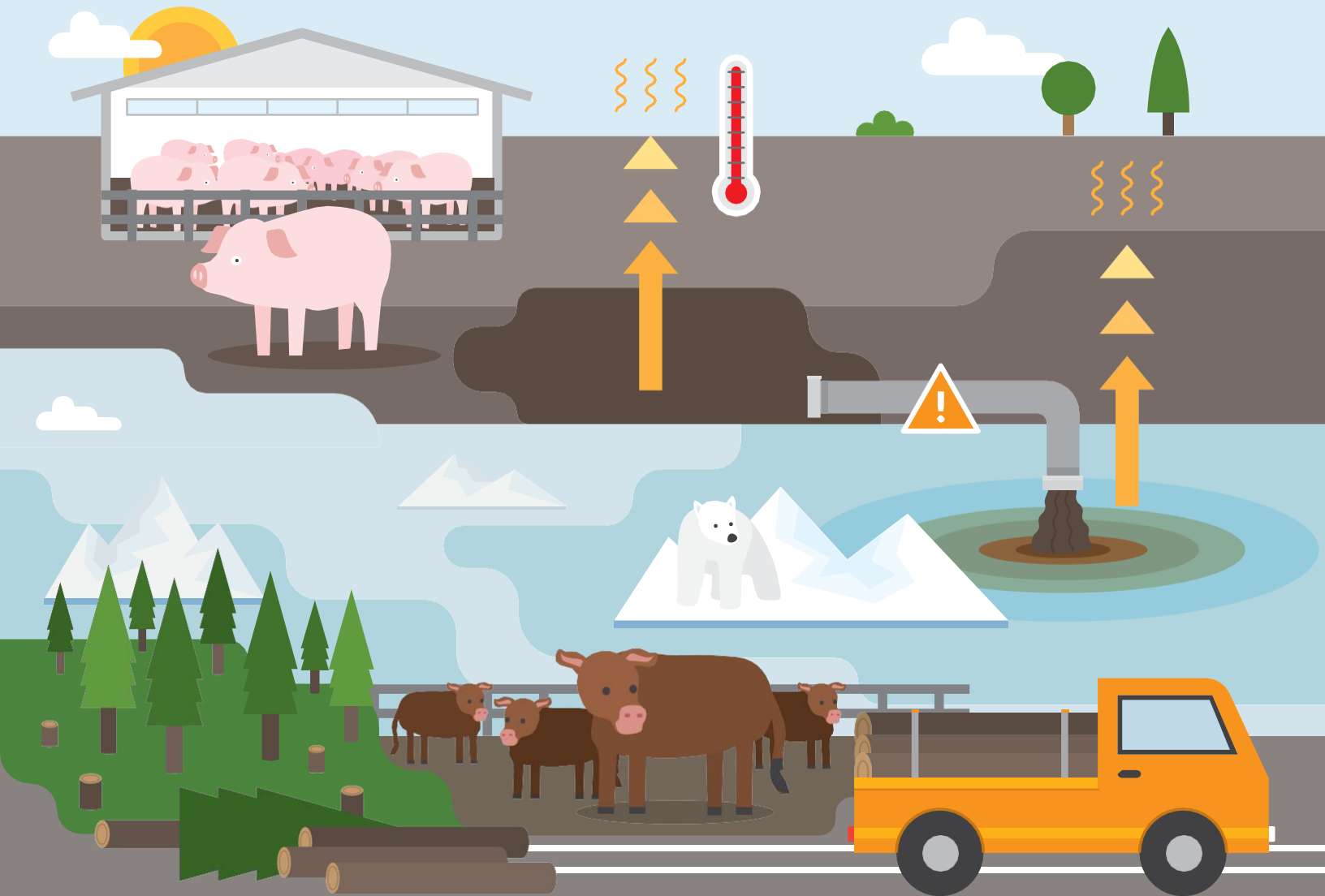
Notes:

Horizontal lines for taking notes.

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 consequences that animal agriculture has on humans. Students will use these data to create an infographic, a format that uses computational representations 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 = 65 minutes

Section 1a = 30 minutes

Section 1b = 35 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)

Resources:

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

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.

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations.

Disciplinary Core Ideas**ESS2.D: Weather and Climate**

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (*secondary*)

ESS3.D: Global Climate Change

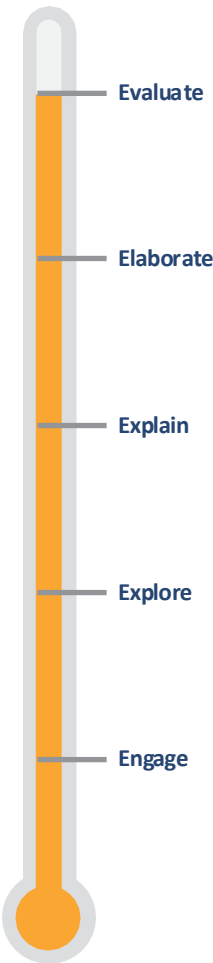
- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities.

Crosscutting Concepts**Systems and System Models**

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

*The above standards are a registered trademark of WestEd. Neither WestEd nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it.

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.

| Infographic Area | 1 | 2 | 3 | 4 |
|-----------------------------------|--|--|--|--|
| Theme | The theme is clear and relevant to the infographic. | The theme is clear and relevant to the infographic. | The theme is clear and relevant to the infographic. | The theme is clear and relevant to the infographic. |
| Content and Design | Content is relevant and presented in a clear and concise manner. | Content is relevant and presented in a clear and concise manner. | Content is relevant and presented in a clear and concise manner. | Content is relevant and presented in a clear and concise manner. |
| Clarity | The infographic is easy to read and understand. | The infographic is easy to read and understand. | The infographic is easy to read and understand. | The infographic is easy to read and understand. |
| Style 1: 1-2 (10 minutes) | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. |
| Style 2: 3-4 (10 minutes) | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. |
| Style 3: 5-6 (10 minutes) | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. |
| Style 4: 7-8 (10 minutes) | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. |
| Style 5: 9-10 (10 minutes) | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. | The infographic is visually appealing and easy to read. |
| Overall | Excellent infographic | Good infographic | Fair infographic | Poor infographic |

Final Activity: Sticky Note Exercise

Purpose: Identify the students' learning by using student reflections.

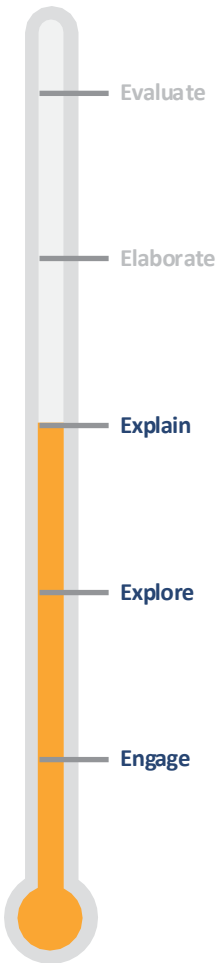
- 1. Requirements**
 - Time:** 10-15 minutes
 - Materials:** 1-2 sticky notes for each student
 - Setup:** 1-2 sticky notes for each student
- 2. Introduction**

Students will write 1-2 sentences on a sticky note about what they learned in this lesson. The sticky notes should be completed anonymously.
- 3. Individual Work Time (2 minutes)**
- 4. Posting Sticky Notes (2 minutes)**

Students should post their sticky notes on the board and walk around the room to read other students' sticky notes. They should leave their sticky notes on the board and walk around the room to read other students' sticky notes.
- 5. Thematic Group Discussion (10 minutes)**

Students should group together sticky notes with similar ideas. They should discuss the ideas and create a title for each group of sticky notes.

Conclude the lesson by having students write notes for their records. Having that note will help to help in the future. The goal is to help the sticky notes on a group board. Please email the address in Farm Sanctuary's Contact Us page for more information.



References: (If clicking a link does not work, please copy and paste the link into a web browser.)

Animal Production and Health Division, FAO. *Livestock policy brief: Cattle ranching and deforestation*. (n.d.). Food and Agriculture Organization of the United Nations. Retrieved March 11, 2026, from www.fao.org/3/a-a0262e.pdf

Eat for the planet. (n.d.) Retrieved March 11, 2026, from: <https://eftp.co/>

Economou, V. & Gousia, P. (2015). Agriculture and food animals as a source of antimicrobial-resistant bacteria. *Infection and Drug Resistance*, 2015(8), 49-61. <https://doi.org/10.2147/IDR.S55778>

Environmental Working Group. (2016, November 4). *Exposing fields of filth*. <https://www.ewg.org/research/exposing-fields-filth#.W5gl2vZFwZx>

Gerbens-Leenes, P.W., Mekonnen, M.M., & Hoekstra, A.Y. (2013). The water footprint of poultry, pork and beef: A comparative study in different countries and production systems. *Water Resources and Industry*, 1-2(25-36). <https://doi.org/10.1016/j.wri.2013.03.001>

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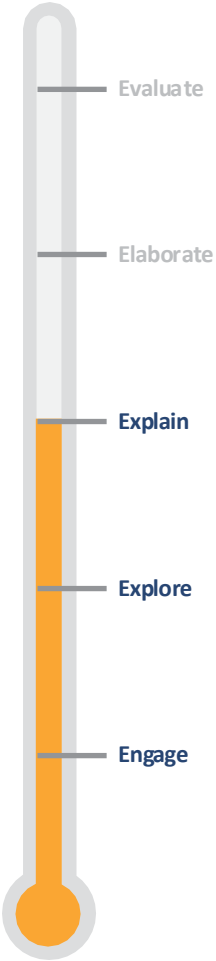
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National Oceanic and Atmospheric Administration. (2016, October 5). *Study finds fossil fuel methane emissions greater than previously estimated*. <https://www.noaa.gov/media-release/study-finds-fossil-fuel-methane-emissions-greater-than-previously-estimated>



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Vox. (2022, January 4). *Hog farming has a massive poop problem* [Video]. YouTube. https://youtu.be/WsUNylsiDH8?si=BjkUo2VxF-fpg_aM

Water Footprint Network. *Water footprint of crop and animal products: a comparison*. (n.d.). Retrieved March 11, 2026, from <https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/>

World Wildlife Fund. (2008, April). *Forest conversion*. https://wwfint.awsassets.panda.org/downloads/wwf_position_paper_on_forest_conversion.pdf

Notes:

Horizontal lines for taking notes.

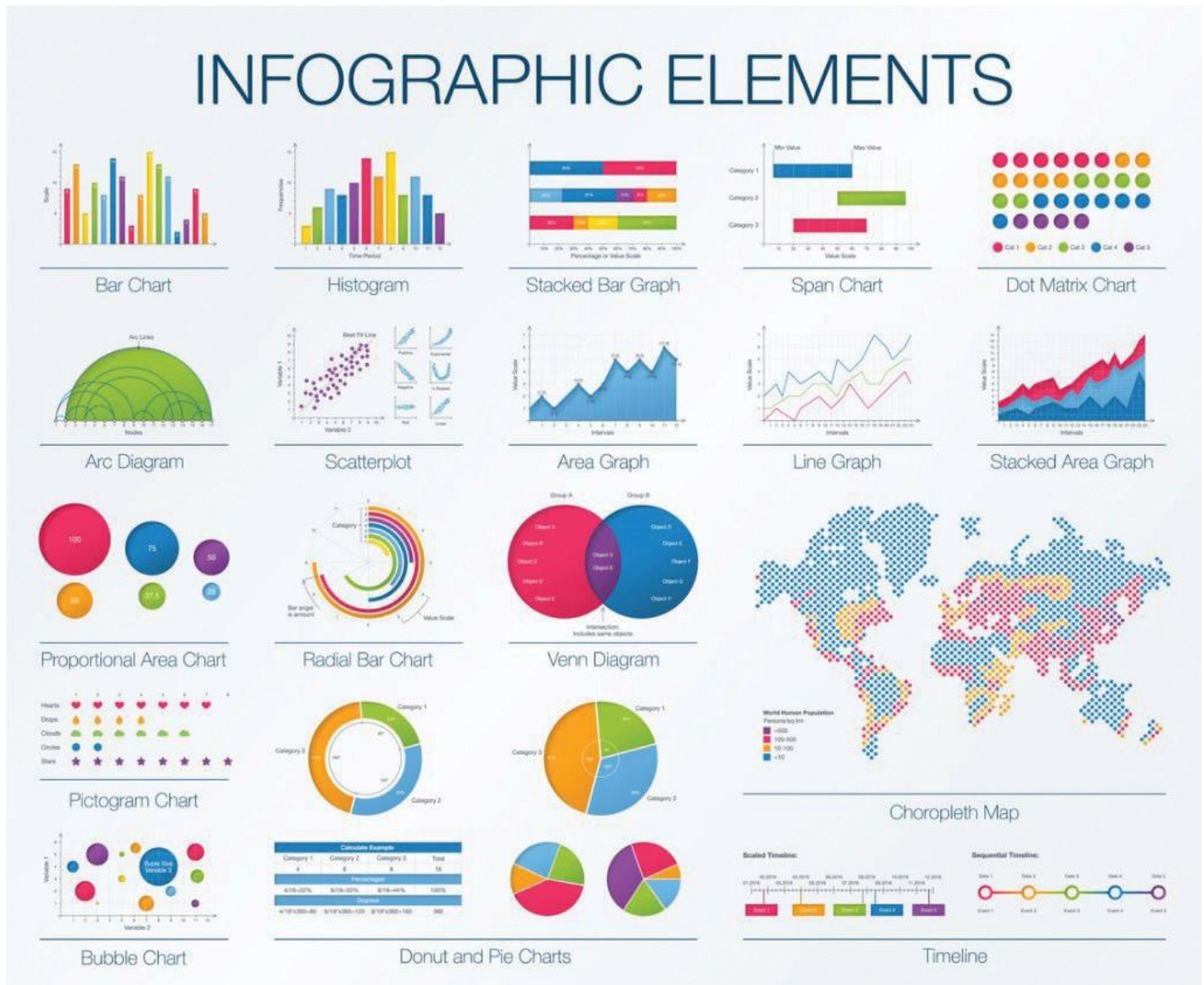
Graphically Representing Data – Reference

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>

(If clicking a link does not work, please copy and paste the link into a web browser.)

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

(If clicking a link does not work, please copy and paste the link into a web browser.)

Topic: Waste Management

Overview

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

Articles

Environmental Working Group. (2016, November 4). *Exposing fields of filth*. <https://www.ewg.org/research/exposing-fields-filth#.W5gl2vZFwZx>

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. *Science of The Total Environment*, 511, 676-683. <https://doi.org/10.1016/j.scitotenv.2014.12.062>

Hribar, C. (2010, November 29). *Understanding concentrated animal feeding operations and their impact on communities*. Centers for Disease Control and Prevention. <https://stacks.cdc.gov/view/cdc/59792>

Topic: Methane Production

Overview

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

Articles

Hribar, C. (2010, November 29). *Understanding concentrated animal feeding operations and their impact on communities*. Centers for Disease Control and Prevention. <https://stacks.cdc.gov/view/cdc/59792>

Pearce, F. (2016, October 25). *What is causing the recent rise in methane emissions?* Yale Environment 360. https://e360.yale.edu/features/methane_riddle_what_is_causing_the_rise_in_emissions

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(If clicking a link does not work, please copy and paste the link into a web browser.)

Topic: Deforestation

Overview

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

Articles

World Wildlife Fund. (2008, April). *Forest conversion*.

https://wwfint.lawsassets.panda.org/downloads/wwf_position_paper_on_forest_conversion.pdf

Animal Production and Health Division, FAO. *Livestock policy brief: Cattle ranching and deforestation*. (n.d.). Food and Agriculture Organization of the United Nations. Retrieved March 11, 2026, from www.fao.org/3/a-a0262e.pdf

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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.

<https://doi.org/10.2527/af.2012-0038>

Gerbens-Leenes, P.W., Mekonnen, M.M., & Hoekstra, A.Y. (2013). The water footprint of poultry, pork and beef: A comparative study in different countries and production systems. *Water Resources and Industry*, 1-2(25-36).

<https://doi.org/10.1016/j.wri.2013.03.001>

Water Footprint Network. *Water footprint of crop and animal products: a comparison*. (n.d.). Retrieved March 11, 2026, from

<https://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/>

(If clicking a link does not work, please copy and paste the link into a web browser.)

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. *Infection and Drug Resistance*, 2015(8), 49-61. <https://doi.org/10.2147/IDR.S55778>

Hribar, C. (2010, November 29). *Understanding concentrated animal feeding operations and their impact on communities*. Centers for Disease Control and Prevention. <https://stacks.cdc.gov/view/cdc/59792>

Moyer, M. W. (2016, December 1). *How drug-resistant bacteria travel from the farm to your table*. Scientific American. <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 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.

Contact

Please feel free to contact us with any questions, feedback, or ideas by emailing education@farmsanctuary.org.