The Power of Digital Storytelling

A Unique Way to Tell A Story

Environmental Graphiti® – The Power of Digital Storytelling
Toolkit Guide for Teachers created in collaboration with the UCI Science Project

Image 1. (cover slide)
Teacher Preview

Art can be an effective tool to communicate facts about climate change in a unique and powerful way.

Print 2 sets of the art images on pages 4, 6, 8 and 10 and the graph images on pages 32-35 prior to teaching the lesson. Consider having students work in groups of 4-5.

Additional links (if the provided links aren't functioning):

Environmental Graphiti website: https://www.environmentalgraphiti.org
UCI Science Project website: https://scienceproject.cfep.uci.edu

Image - page 4.
Teacher Preview

This slide is a preview of the four pieces of artwork from the Environmental Graphiti website that dramatizes the critical science of climate change that will be used in today's toolkit. Print out and display each poster at a station for small groups of students to actively engage in a gallery walk. Consider using more or different pieces of artwork found on the Environmental Graphiti website

Source - https://www.environmentalgraphiti.org/all-series/global-carbon-emissions-by-source

Image - Page 6.
Teacher Preview

This slide is a preview of the second piece of artwork from the Environmental Graphiti website that dramatizes the critical science of climate change that will be used in today's toolkit. Print out and display each poster at a station for small groups of students to actively engage in a gallery walk. Consider using more or different pieces of artwork found on the Environmental Graphiti website

Source - https://eg-v2.squarespace.com/all-series/changes-in-us-temperature-by-region

Image - Page 8.
Teacher Preview

This slide is a preview of the third piece of artwork from the Environmental Graphiti website that dramatizes the critical science of climate change that will be used in today's toolkit. Print out and display each poster at a station for small groups of students to actively engage in a gallery walk. Consider using more or different pieces of artwork found on the Environmental Graphiti website
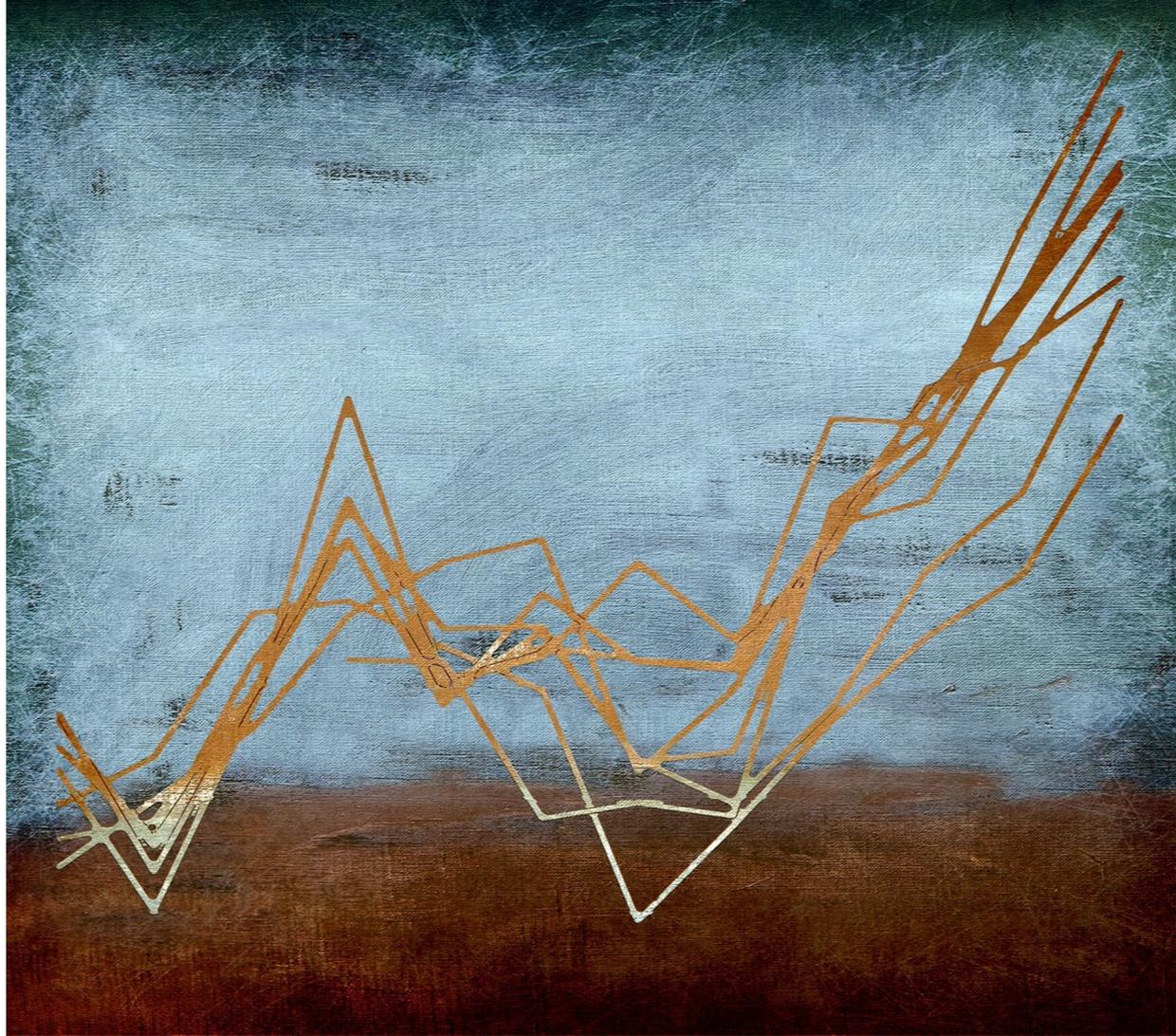
Source - https://eg-v2.squarespace.com/all-series/climate-refugees

Image - Page 10.
Teacher Preview

This slide is a preview of the fourth piece of artwork from the Environmental Graphiti website that dramatizes the critical science of climate change that will be used in today's toolkit. Print out and display each poster at a station for small groups of students to actively engage in a gallery walk. Consider using more or different pieces of artwork found on the Environmental Graphiti website.
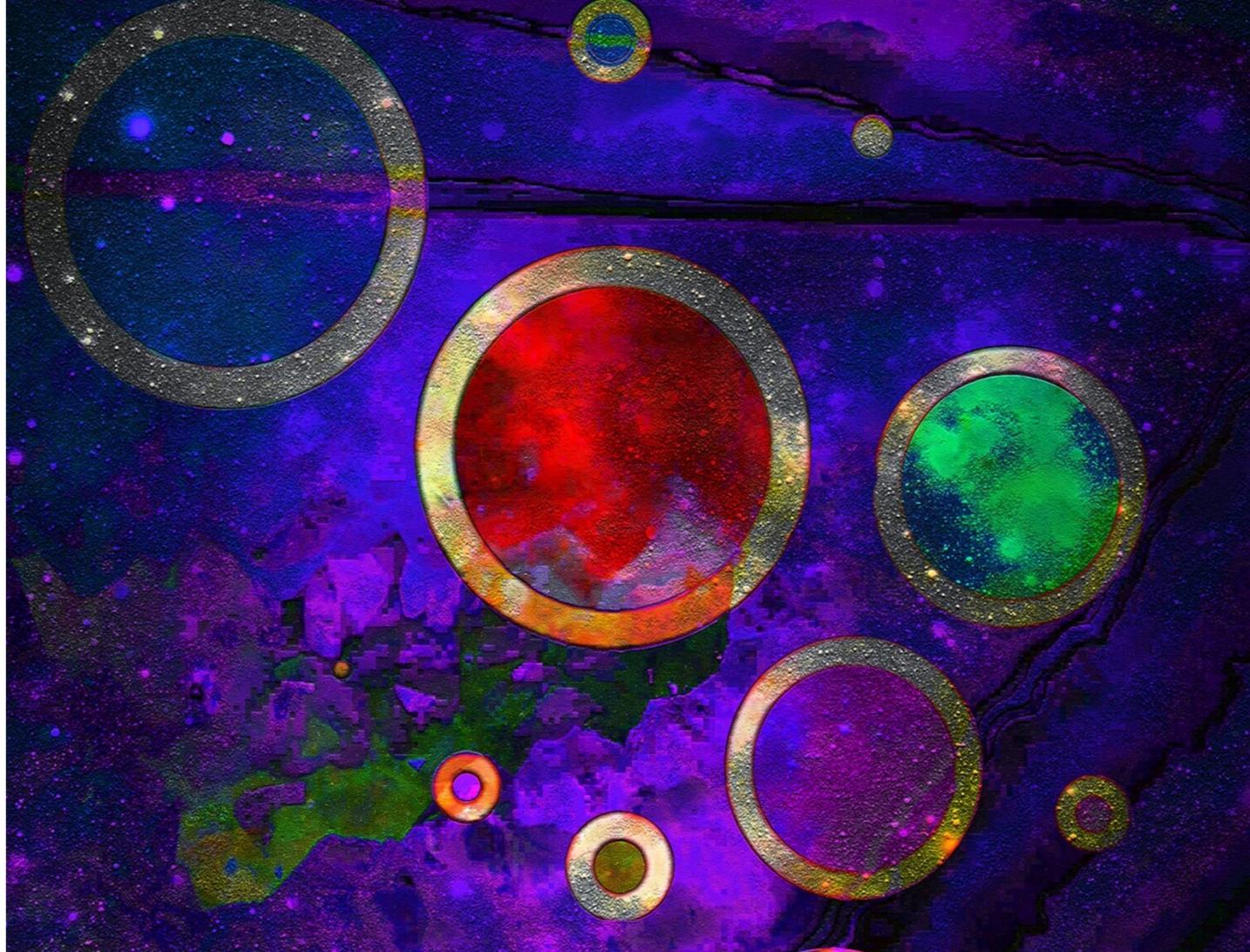
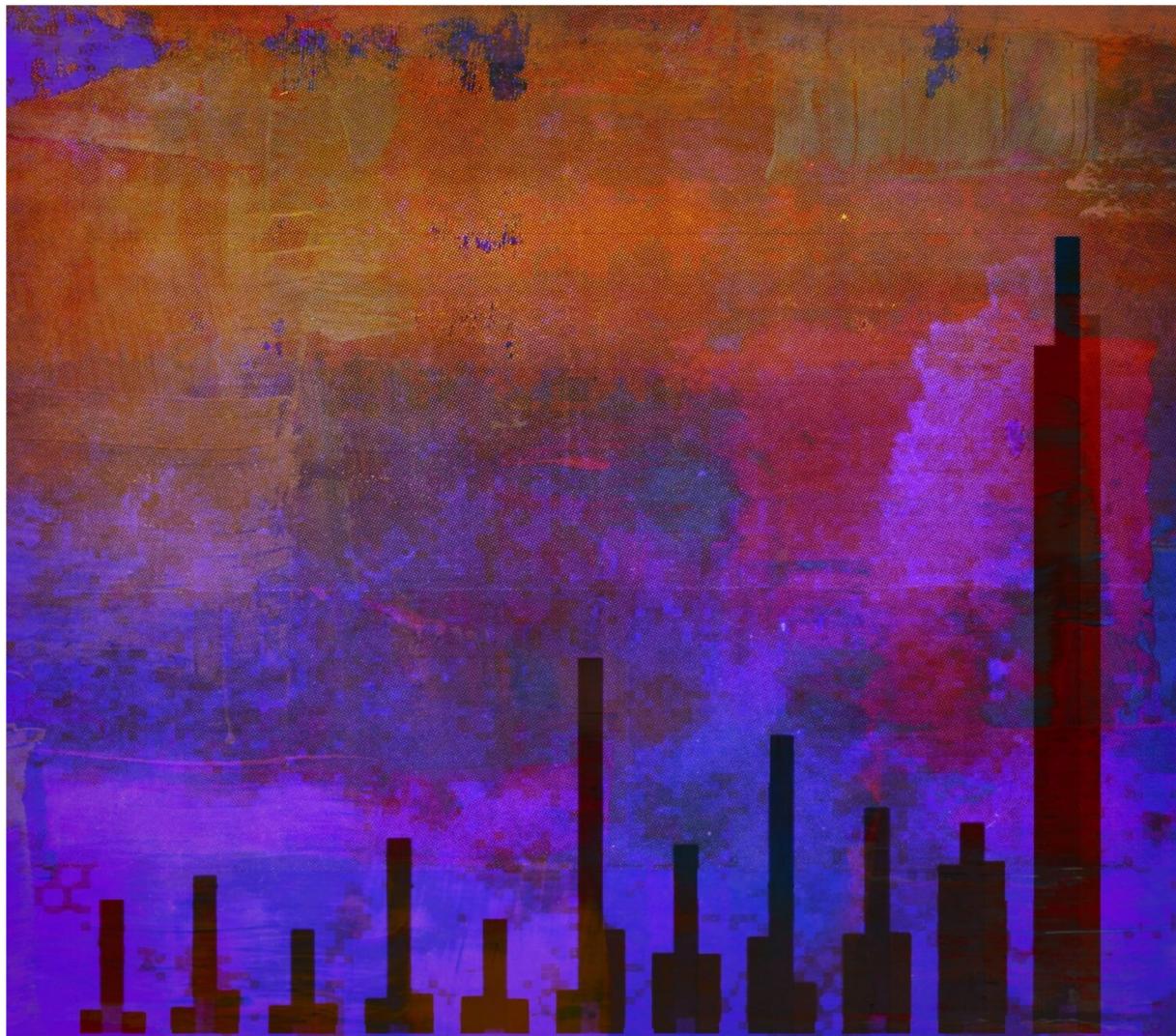Source - https://eg-v2.squarespace.com/all-series/animal-vs-plant-based-food-resource-impact

Image - Page 13.
Teacher Guidance

 Students will discuss their initial reactions with their peers in small groups in five-minute rotations from one poster to the next. After speaking with their group, they will write down their thoughts for one of the following on a post-it note/easel pad paper/white board for the following groups to read:

● How did the artwork make you feel?
● What did the artwork make you think about?
● What are your interpretations of the artwork?
● If this artwork could tell you its story, what would it say?
● Does this artwork make you wonder about anything?

Note - Please remind students to rotate every five minutes until they return back to their original poster. (There are 4 posters total.) Visit https://www.environmentalgraphiti.org
to select your own pieces of artwork from their various why, who, how, what themed galleries.

Image – Page 13 (continued)

Questions to Consider Posing:
- What's the message this artwork is trying to convey?
- What title would you give this artwork and why?
- What's going on in this artwork?
- What's your first reaction to this artwork?
- What/Who do you think this artwork was created for?
- If you could ask the artist a question, what would you ask him/her?
- How can you connect this artwork to your own life?
- What do you really like about this? What would you change and why?
- If this artwork could tell you its story, what would it say?

At the end of the round robin activity, have students read all the comments from their peers next to the poster and select one speaker to share some major points or patterns from the reactions. Have each group's speaker share with the whole class.

Image Source - 151C.+Biodiversity+Habitat+Loss+LO+RES.jpg

Gallery Walk Round 1

- How did the artwork make you feel?
- What did the artwork make you think about?
- What are your interpretations of the artwork?
- If this artwork could tell you its story, what would it say?
- Does this artwork make you wonder about anything?

Video - Page 15.

Teacher Guidance:

Play the video for students to reveal how the ***Environmental Graphiti*** artist Alisa Singer creates art using science. Singer was attracted by the inherently aesthetic design elements of scientific charts and graphs and intrigued by the idea of using art to give them dramatic effect.

[Where to Start with Science Art](#)

Please note that when creating each piece, the artist tries to make the work stand independently from an aesthetic perspective, rather than trying to connect it to the subject matter of the underlying source graph. This creates an element of surprise which engages viewers' interest when they discover that the art is not abstract but, rather, based on climate science.

Image - Page 17.
Teacher Guidance:
Hand out the graph (pages 32-35) that corresponds to each artwork. Have students discuss their interpretations of the data and rotate every five minutes from one poster to the next. After speaking with their group, they will write down their thoughts for one of the following questions on a post-it note/easel pad paper/white board for the following groups to read:
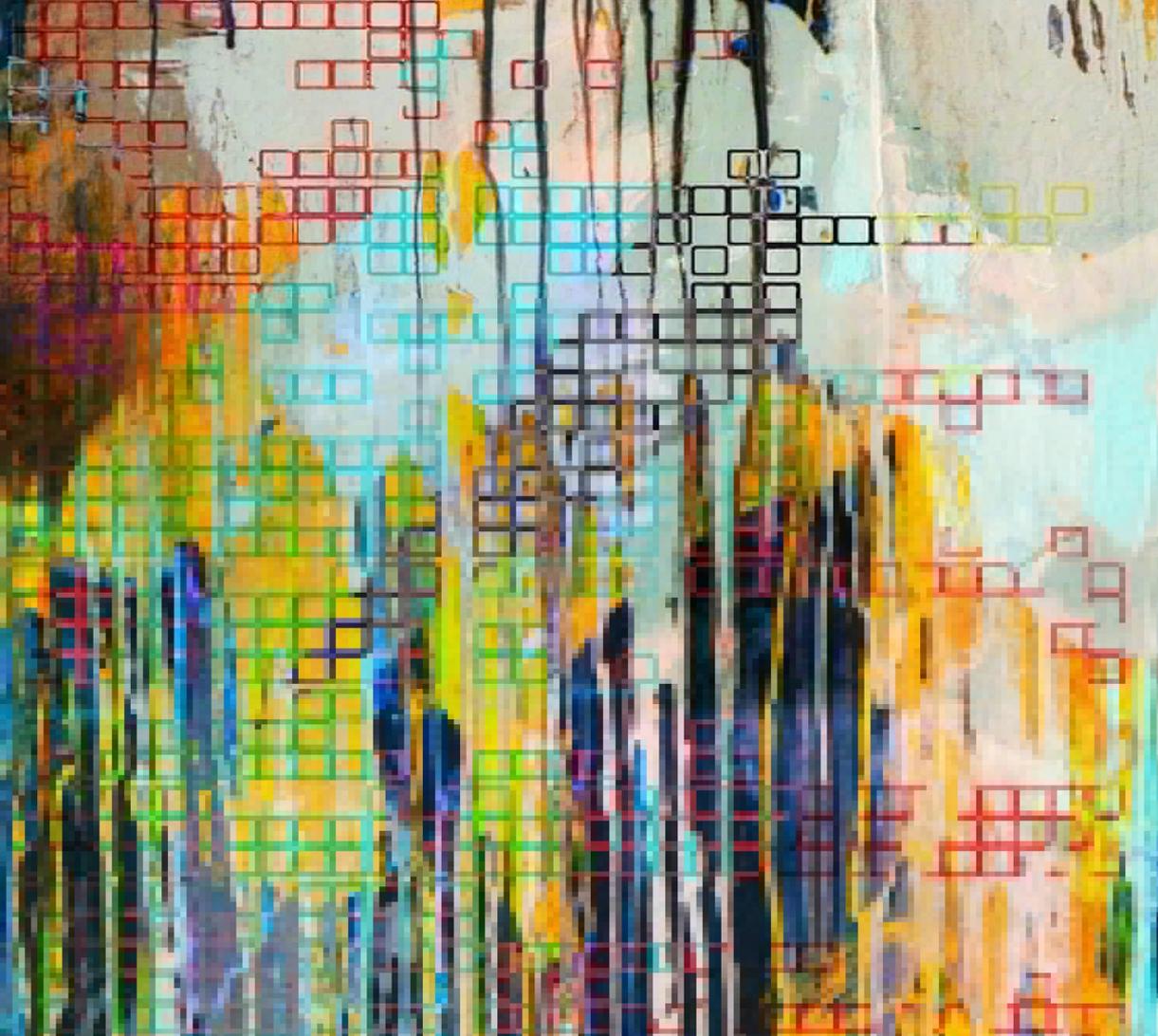
● How would you summarize the data on the graph?
● What is the figure trying to tell you?
● What data has been left out?
● What will you predict will occur?
● What questions do you have about the data?

The teacher reminds the student to rotate every five minutes until they return back to their original poster. (There are 4 posters total.) Visit https://www.environmentalgraphiti.org
to select your own pieces of artwork from the various galleries of why, who, how, and what to meet the needs of the students in your classroom.

Image Source - 149C.+North+American+Risk+Assessment+LO+RES.jpg

Gallery Walk Round 2

- How would you summarize the data on the graph?
- What is the figure trying to tell you?
- What data has been left out?
- Based on the data, what will you predict will occur?
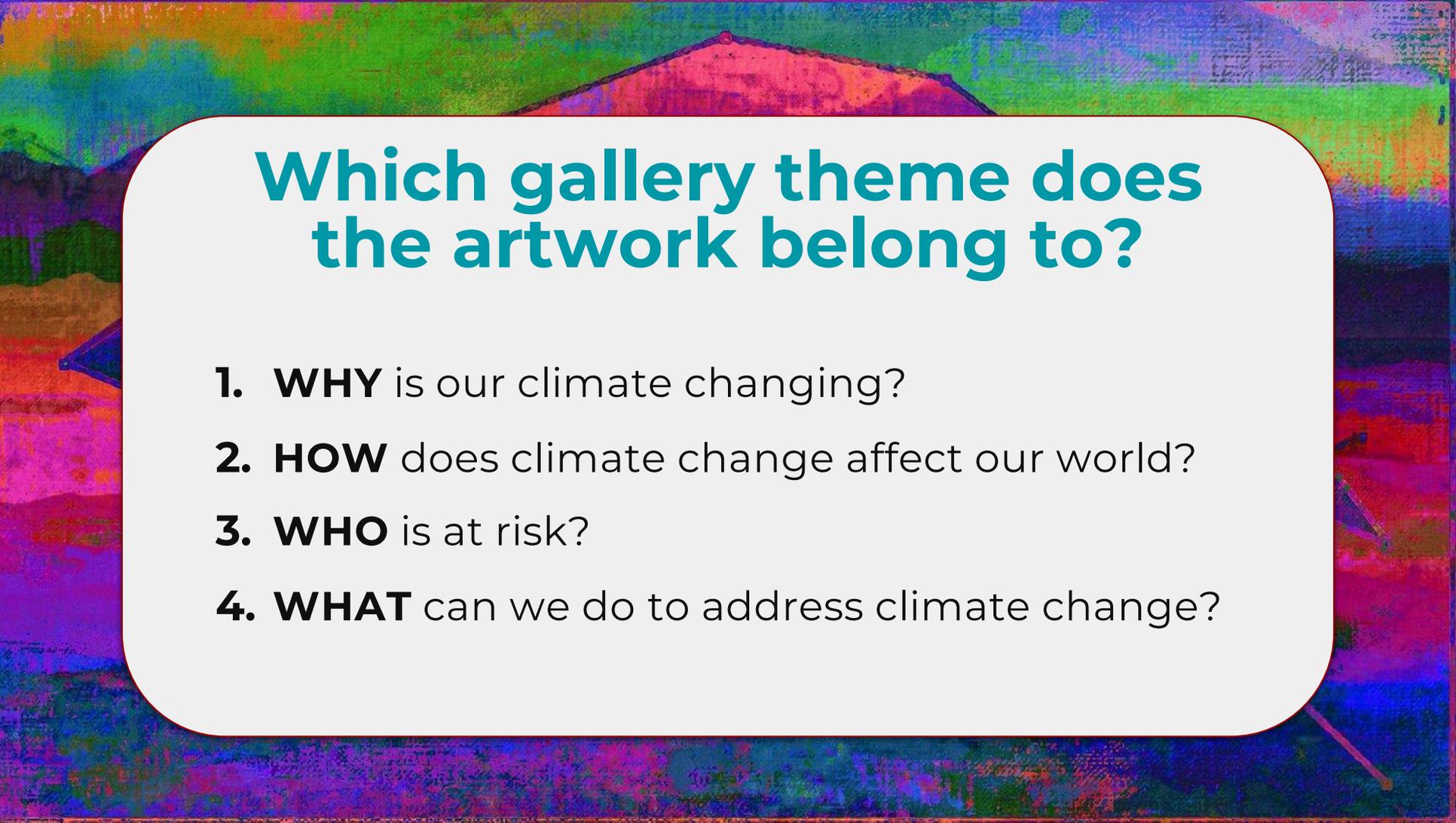- What questions do you have about the graph?

Image - Page 19.
Teacher Guidance:

Remind students to return to their original poster. In groups, students will discuss with their peers, if they had to categorize their artwork with corresponding graph into one of the categories - why, how, who, or what, which gallery would the piece of artwork belong to? Students should be able to justify their answer and share out what is inspiring or compelling about the artwork as well.

There is an option to provide students with additional background information on the artwork and corresponding graph to present to the whole class, which can be found on the website or the links are provided on the following slides.

Image Source - 127C.+LO+RES+European+Central+Bank+energy+price+paths.jpg

Which gallery theme does the artwork belong to?

1. **WHY** is our climate changing?

2. **HOW** does climate change affect our world?

3. **WHO** is at risk?

4. **WHAT** can we do to address climate change?

Image - Page 21.
Teacher Guidance:

Display this slide as students share their justification of which gallery this artwork belongs to and why. This belongs to the "Why is Our Climate Changing?" gallery. The graph shows the different components of carbon emissions over time. Please feel free to select other pieces of art from the gallery that will meet the needs of your students from the website
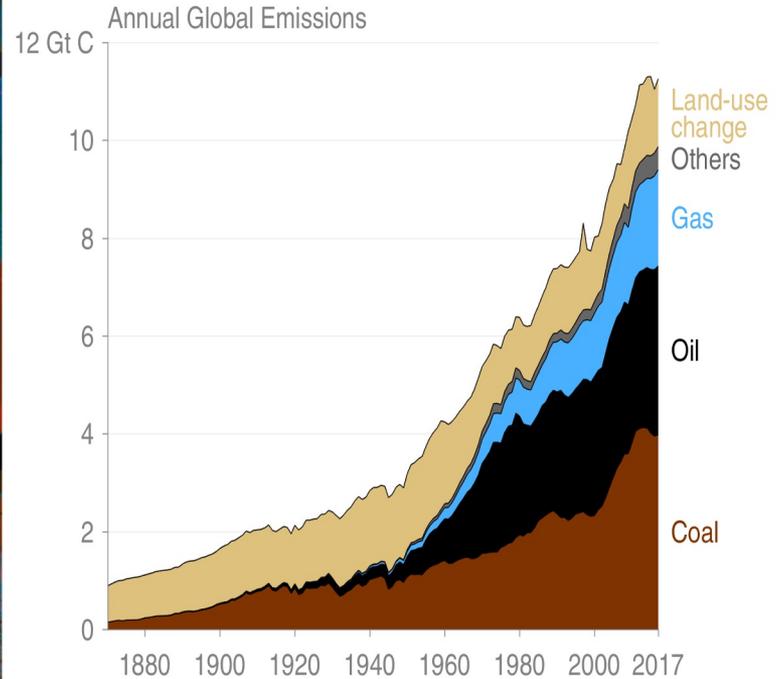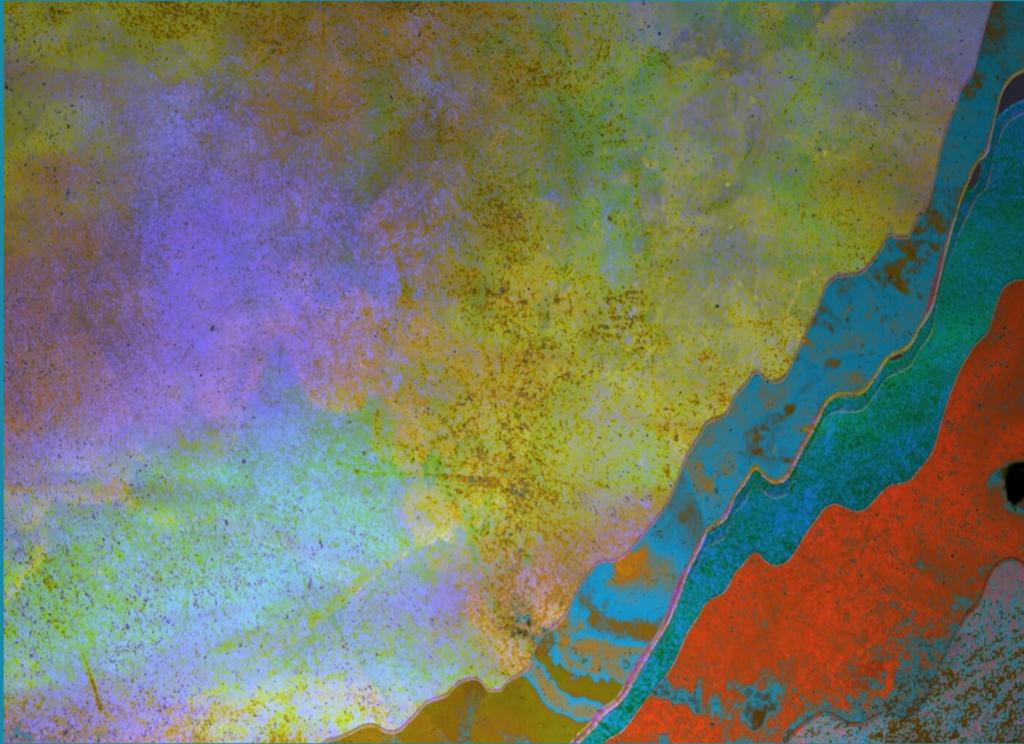https://www.environmentalgraphiti.org

Background Information
Until around 1950, changes in land use as a result of agriculture and deforestation were the principal sources of carbon emissions from human activities. Since then, however, burning of fossil fuels accounts for most of the anthropogenic (human caused) carbon emissions, and such emissions continue to rise.

Source - https://www.environmentalgraphiti.org/all-series/global-carbon-emissions-by-source

Image - Page 23.
Teacher Guidance:

Display this slide as students share out their justification of what gallery this artwork belongs to and why. This belongs to the "How is Our World Affected" gallery. The graph shows the changes In US temperature by region. Please feel free to select other pieces of art from the gallery that will meet the needs of your students from on the Environmental Graphiti website. https://www.environmentalgraphiti.org
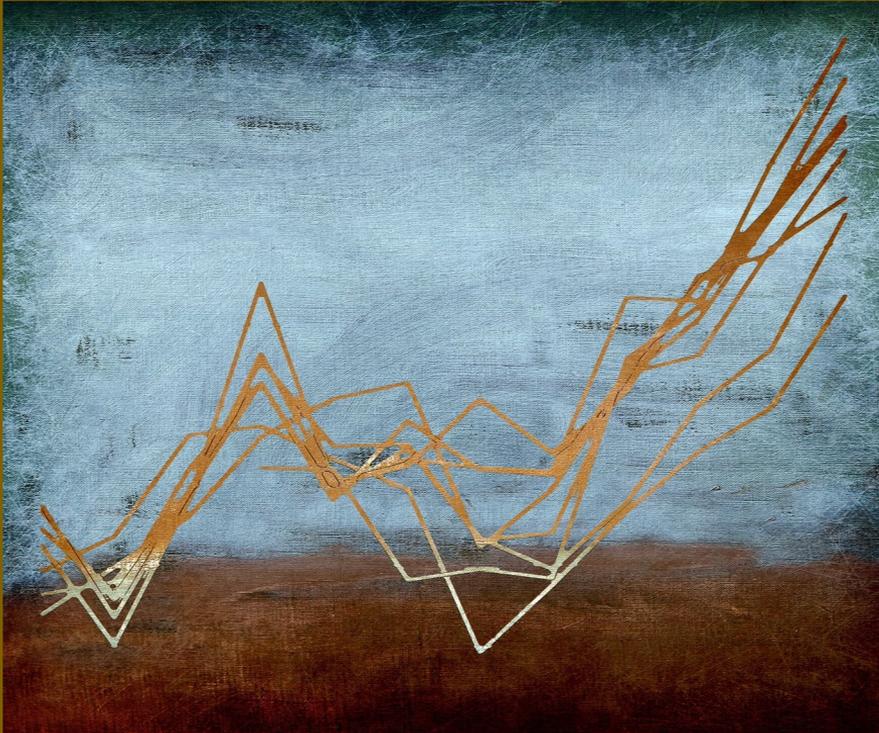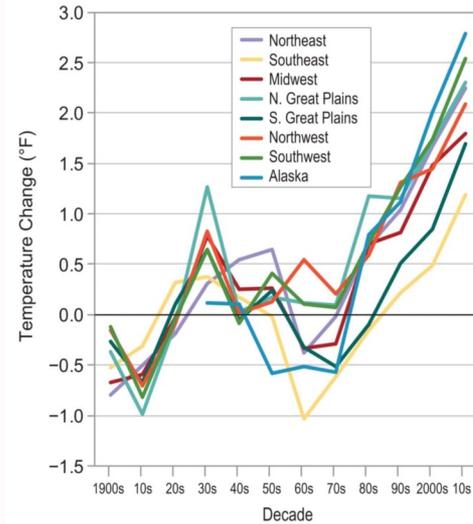

Background Information
While regional temperatures can vary from year to year and decade to decade, all US regions have experienced clear warming trends over the last three decades.

Source - https://eg-v2.squarespace.com/all-series/changes-in-us-temperature-by-region

How is our world affected?

US Temperature Change by Region

Fourth National Climate Assessment Vol. I, Figure A5.14, US Global Change Research Program
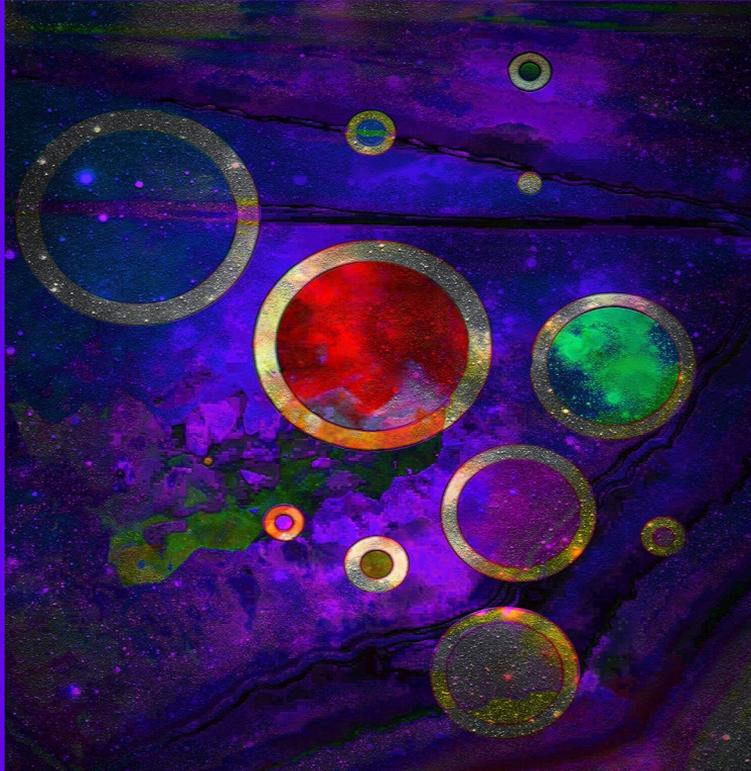
Image - Page 25.

Teacher Guidance: Display this slide as students share out their justification of what gallery this artwork belongs to and why. This belongs to the "Who's At Risk?" gallery. The graph shows information about climate refugees. Please feel free to select other pieces of art from the gallery that will meet the needs of your students from on the Environmental Graphiti website . https://www.environmentalgraphiti.org
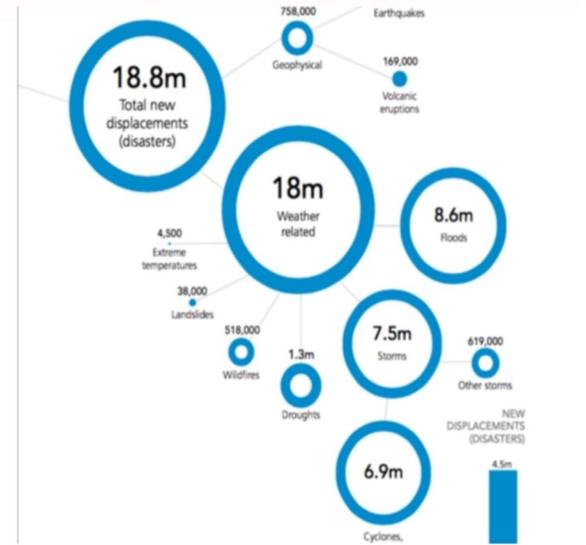
Background Information
It is estimated that during 2017, 18 million people across the globe were forcibly displaced within their own countries due to disasters such as floods, storms, drought as well as other events such as wildfires. All of these disasters are made worse by the changing climate.

Source - https://eg-v2.squarespace.com/all-series/climate-refugees

Who's at risk?

Weather Related Human Displacement

18.8m
Total new displacements (disasters)

758,000
Earthquakes
Geophysical

169,000
Volcanic eruptions

18m
Weather related

8.6m
Floods

4,500
Extreme temperatures

38,000
Landslides

518,000
Wildfires

1.3m
Droughts

7.5m
Storms

619,000
Other storms

6.9m
Cyclones,

NEW DISPLACEMENTS (DISASTERS)

4.5m

Source: Internal Displacement Monitoring Centre, Global Report on Internal Displacement 2018

Image - Page 27.

Teacher Guidance:

Display this slide as students share out their justification of what gallery this artwork belongs to and why. This belongs to the "What Can We Do?" gallery. The graph shows the dramatic differences in use of resources among types of foods - highlighting the fact that individual choice of which foods to eat can make a difference. Please feel free to select other pieces of art from the gallery that will meet the needs of your students from on the Environmental Graphiti website. https://www.environmentalgraphiti.org

Background Information

Decreasing the amount of meat we eat, especially red meat, could cut in half the per capita greenhouse gas emissions relating to agriculture. According to a 2019 report by the World Economic Forum, switching from beef to other sources of protein could cause global greenhouse gas emissions to fall by 25% and reduce diet-related deaths by 5%. It would also help avoid further deforestation and reduce the amount of water used for agricultural purposes. This could have a significant effect - 80% of the water used in the U.S. is for agricultural purposes and the amount required for meat production is significantly more than that used for plant production.
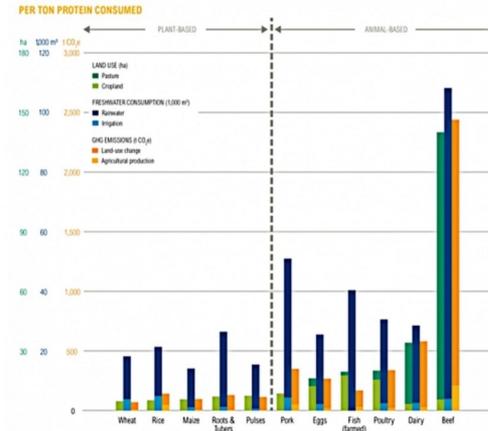
Source - https://eg-v2.squarespace.com/all-series/animal-vs-plant-based-food-resource-impact

What can we do?

Less Red Meat = Greener Planet

Animal-Based Foods Are More Resource-Intensive than Plant-Based Foods

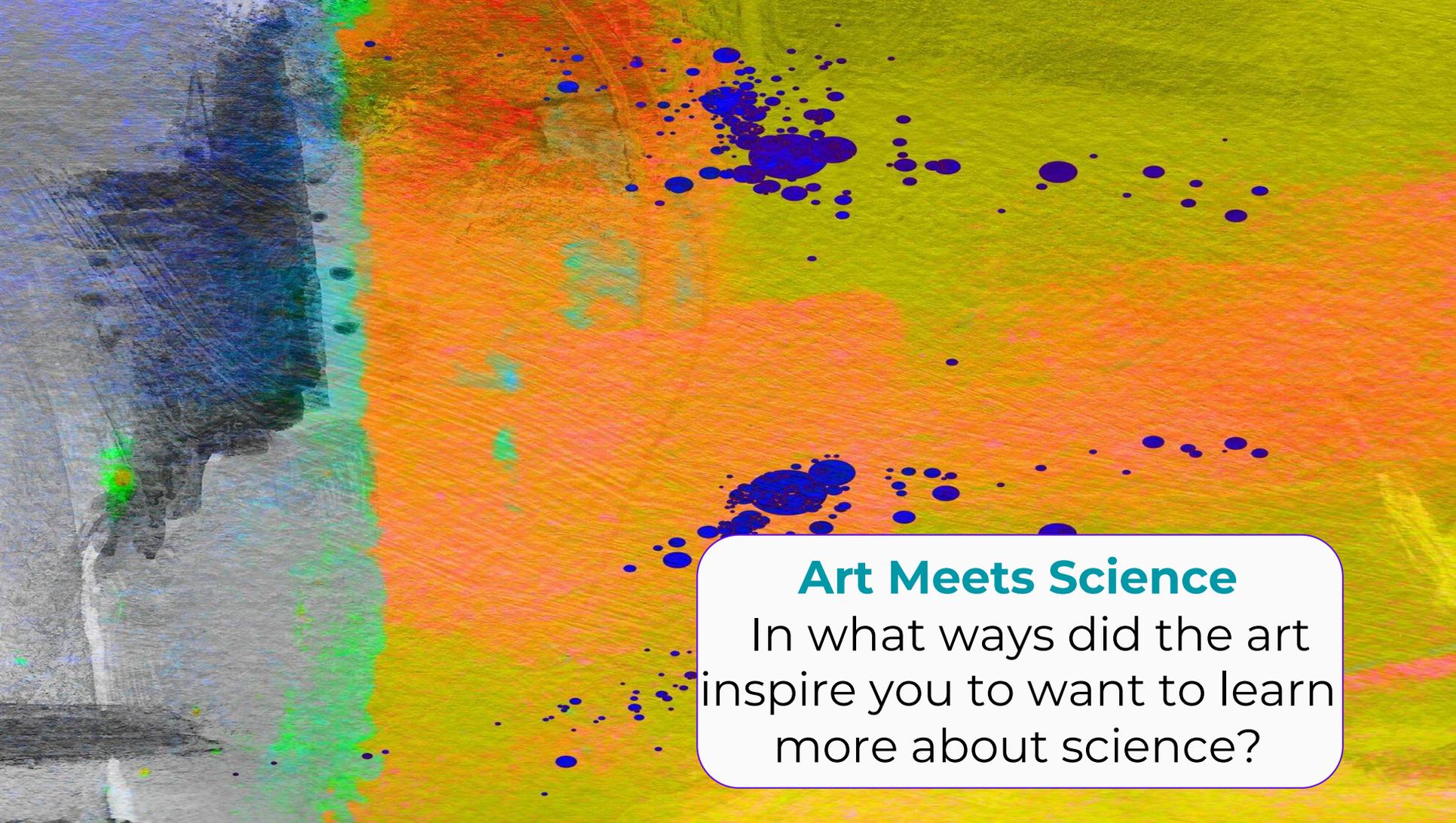PER TON PROTEIN CONSUMED

wri.org/shiftingdiets

WORLD RESOURCES INSTITUTE

Image - Page 29.
Teacher Guidance:

Have students engage in discourse with their partner. Consider trying **Think-Pair-Share**. Give students time to think individually to give them time to process. Have your students share their thoughts to the person next to them for one minute. This allows students to gather their thoughts and actively participate in the class discussion. Remember that students write the way they speak, so giving them many opportunities for discourse strengthens many skill sets.

Image Source - 136c.Lives+Saved+Calculator+LO+RES.jpg

Art Meets Science
In what ways did the art inspire you to want to learn more about science?

Image - Page 31.
Teacher Guidance

Given this activity, have students engage in whole group discourse with one or a few of the following questions:
- What are you curious about now?
- What are the major takeaways that you have about climate change?
- In what ways does art inspire you to take action against climate change?
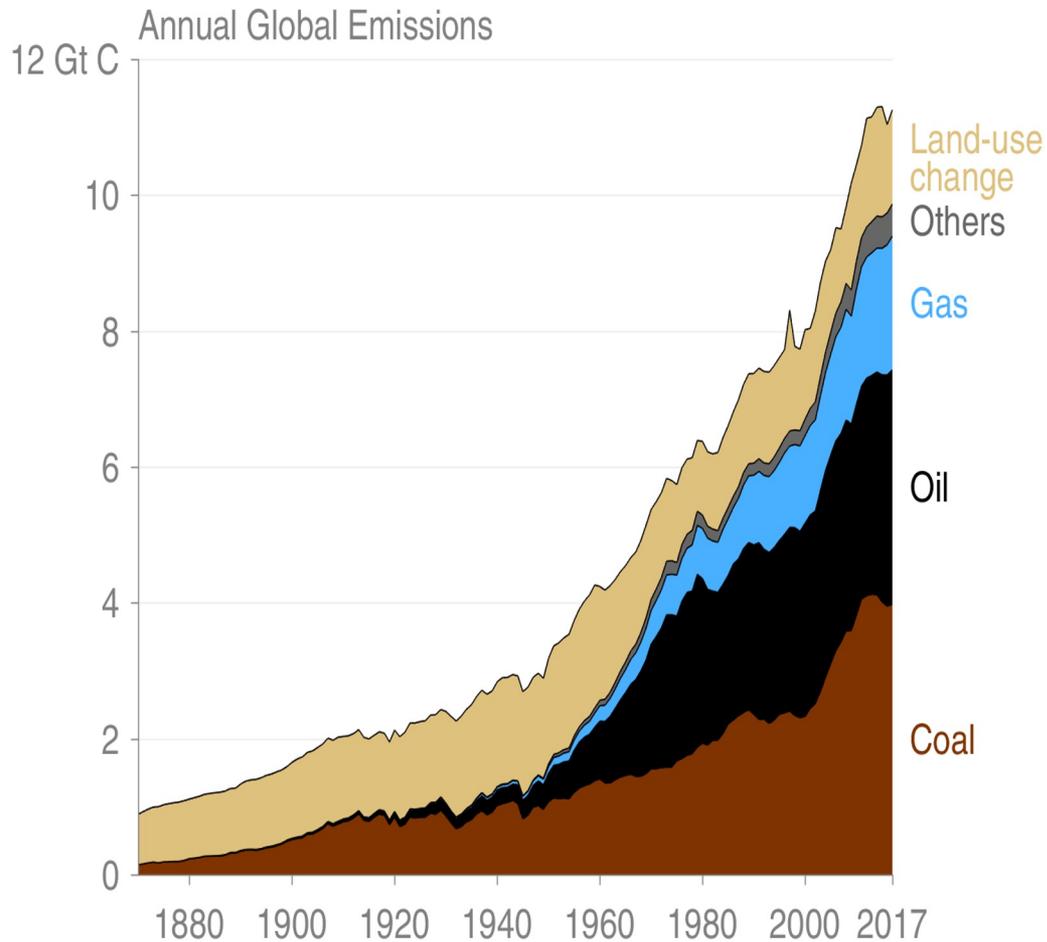
Now that students have analyzed each art side-by-side with the data that inspired the art, in addition to the questions on the slide, consider asking students:
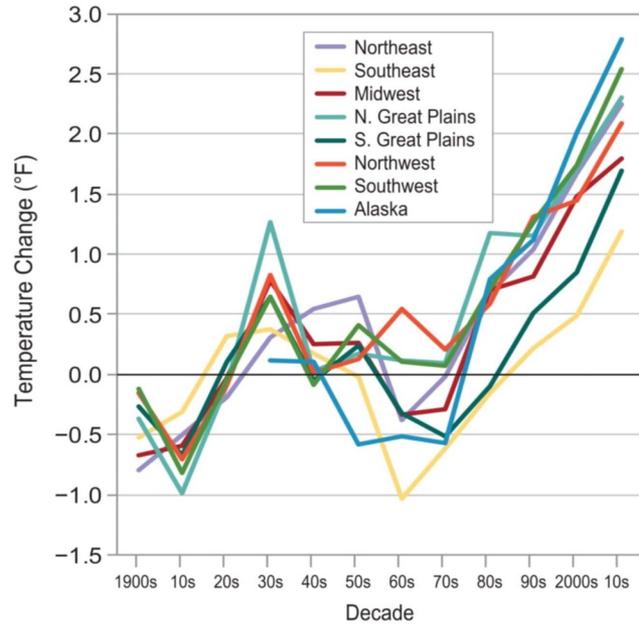
"How have your thoughts changed now?"

"Consider patterns, colors, images, or how the art makes you feel now."

Reflection Questions

- How do you feel now that you learned the art was created based on facts about climate change?
- How would you have created art from the graph provided?
- How did art help you engage in the data provided?
- How is art an effective tool for communicating climate change information?
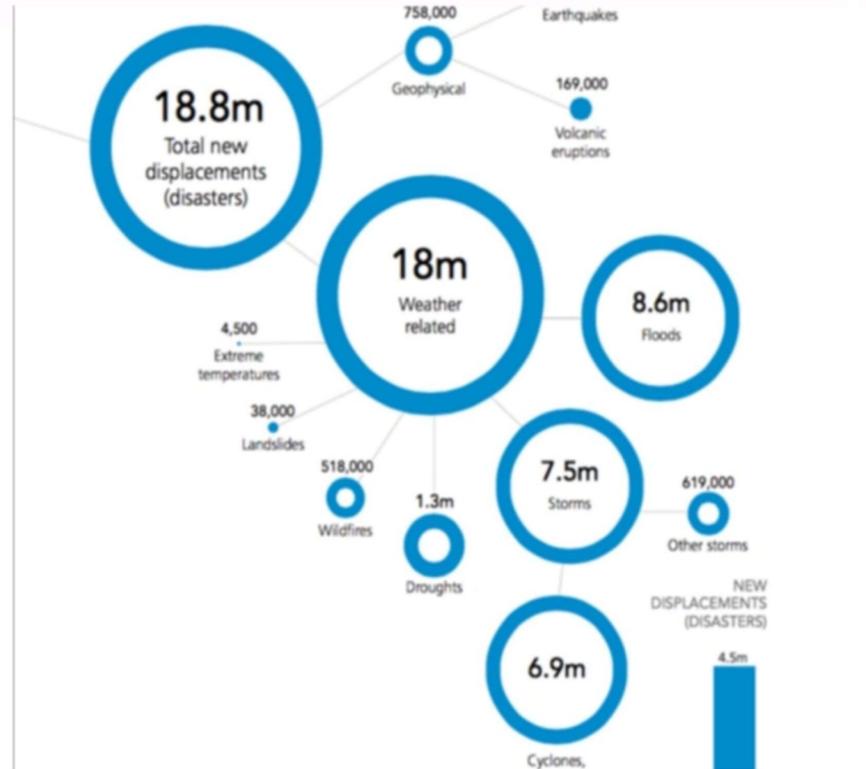
Annual Global Emissions

Land-use change

Others

Gas

Oil

Coal

12 Gt C

10

8

6

4

2

0

1880   1900   1920   1940   1960   1980   2000   2017

cc (i) Global Carbon Project • Data: CDIAC/GCP/UNFCCC/BP/USGS

US Temperature Change by Region

Fourth National Climate Assessment Vol. I, Figure A5.14, US Global Change Research Program
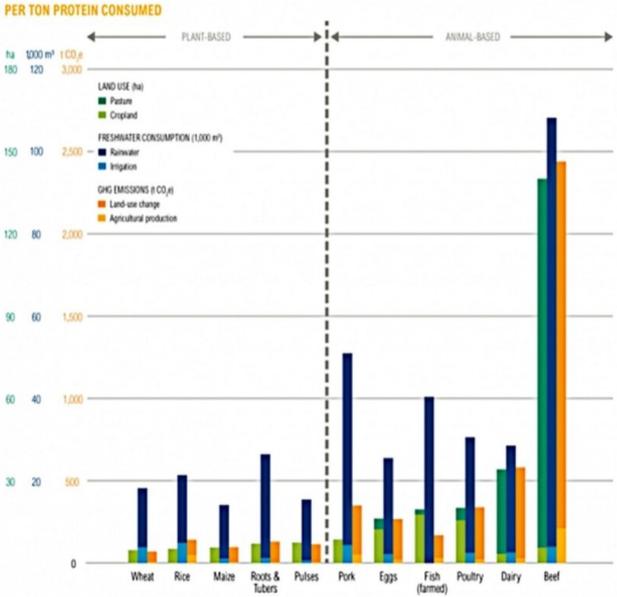
Weather Related Human Displacement

Source: Internal Displacement Monitoring Centre, Global Report on Internal Displacement 2018

Less Red Meat = Greener Planet

Animal-Based Foods Are More Resource-Intensive than Plant-Based Foods

Acknowledgements and Credits

This Toolkit was created through a collaboration between **Environmental Graphiti** and the the team at the **UCI (University of California-Irvine) Science Project**.

Environmental Graphiti® is a collection of contemporary digital paintings that use art as a vehicle to enhance the public's understanding of the science of climate change. Each of the more than 100 paintings in the series is derived from a graph, chart, map, word or number representing key facts or data about climate change.

The art has been extensively exhibited in the US and other parts of the world and was commissioned for the covers of three recent major UN (IPCC) climate change reports. It is owned by dozens of universities, including sizable collections held by University of California - Irvine, Loyola University - Chicago, Michigan Tech University and most recently, Georgetown University and Smith College. The art can also be found at the Ontario Science Centre (Toronto) and the Peggy Notebaert Museum (Chicago).

https://www.environmentalgraphiti.org

The UCI Science Project "…specializes in working students, PK-12, teachers, and educational leaders to tackle 21st century issues using research-based approaches in science education…The UCI Science Project is grounded in research-based educational practices and understands the paradigm shifts needed for the Next Generation Science Standards. Our goal is to support educators as transformative leaders who build capacity in their schools through empowering learning experiences…"

https://scienceproject.cfep.uci.edu