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# Air Pollution and Art, part 2

created by

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A 6th grade STEM lesson



# Notes for teachers

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This lesson provides context for the 6th grade physical science standards dealing with matter. It enables students to anchor their learning in real world issues as they combine data literacy and art in the style of current working artists.

In this lesson, students build on knowledge in the following lesson, Air Pollution and Art, part 1.

## List of Materials

- slide deck
- teacher internet access for websites to display
- copies of pollution graphs (slides 8 and 9)
- colored pencils or other art materials
- optional: internet access for students to research images to help them with their art



# Standards



1.a Ask questions that arise from careful observation of phenomena, models, or unexpected results

1.b Ask questions to clarify or identify evidence and the premise(s) of an argument

6 e Apply scientific knowledge and evidence to explain real-world phenomena, examples, or events.

# Standards

6.P1U1.3 Develop and use models to represent that matter is made up of smaller particles called atoms.



## Objective(s):

Today I will:

- interpret air quality data.
- use what I know about air pollutants to create an art piece.



# Agenda (70 minutes)



Phoenix data (warm up)

readings (whole class)

art (individual)

feedback (pairs)



## Intro/Driving Question/Opening

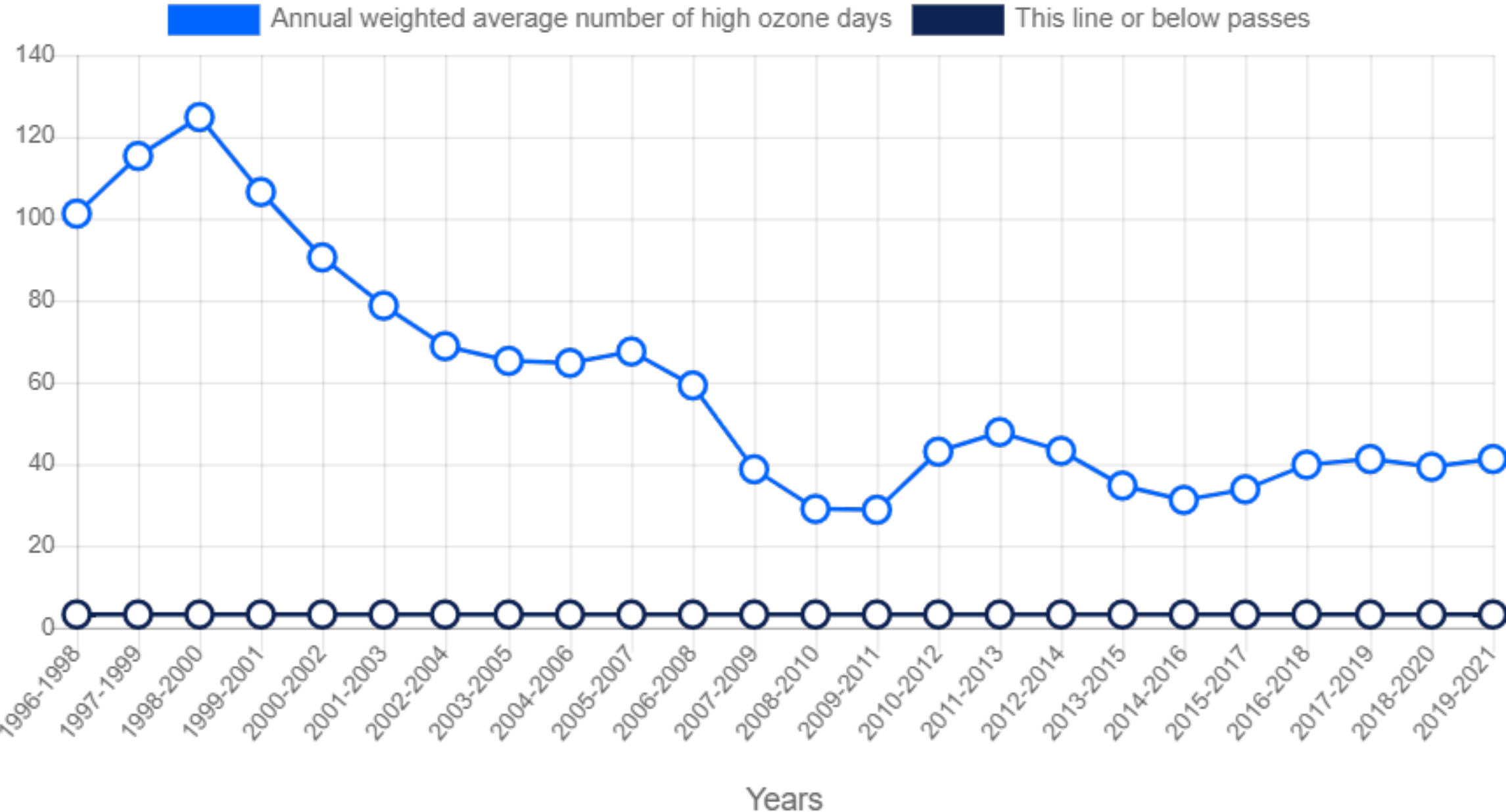
Display each graph. Ask students to make observations and ask questions.

Help students interpret both lines and describe trends in the graphs:

Use what you learned about ozone and particle pollution previously to try to explain the trends in the graphs.

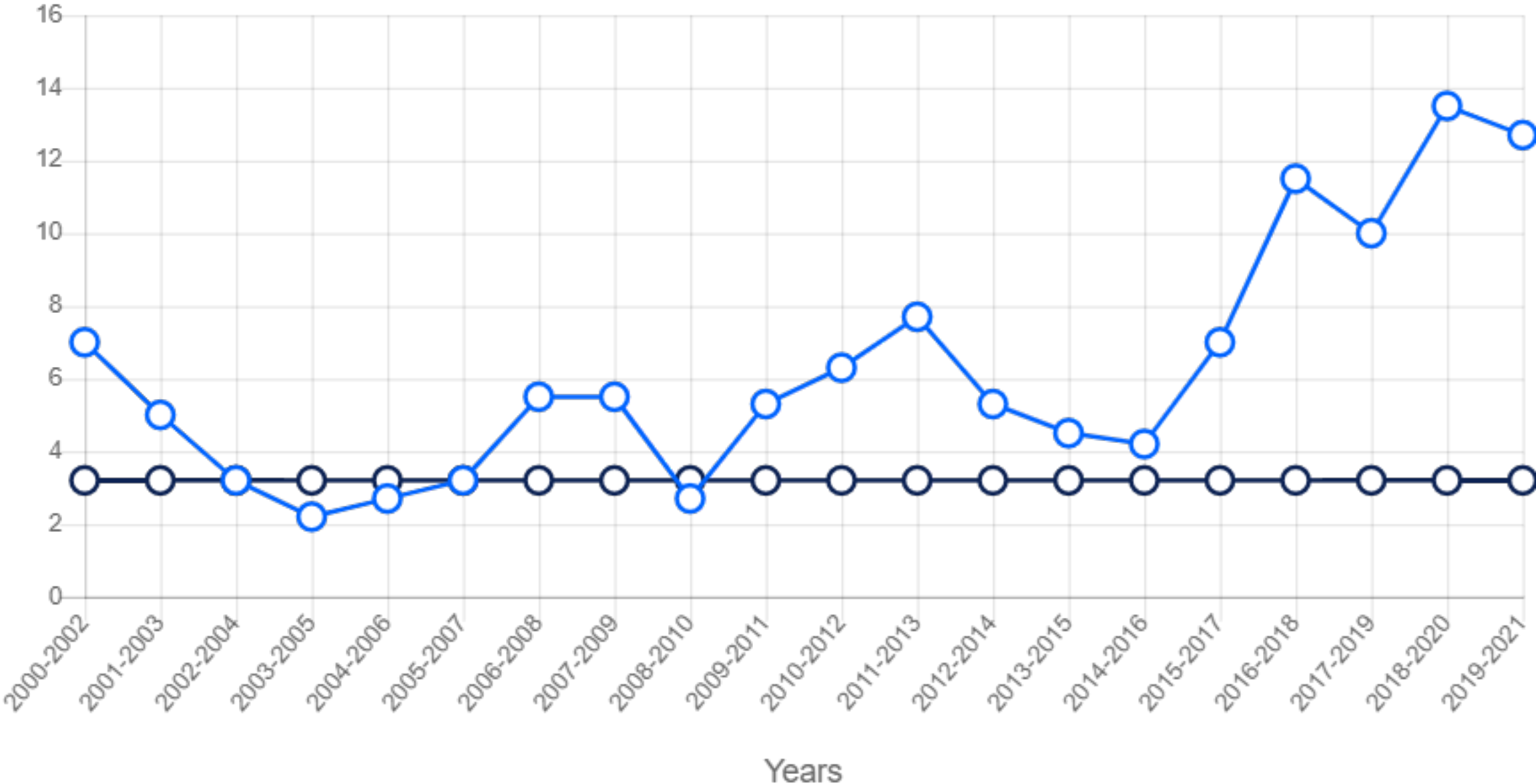
Use the readings on the next slides to provide further possible explanations for the trends.

# High Ozone Days: Phoenix, AZ



Particle Pollution - 24 Hour- Phoenix, AZ

Annual weighted average number of high particle days      This line or below passes



**Ground-level ozone** is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight and heat, making it a summertime pollutant. Air pollutants from car exhaust, paint, aerosol products, and manufacturing emissions are some of the major contributions to ground level ozone.

Breathing in ground level ozone can reduce lung function by 20 percent and can trigger health reactions by those most particularly sensitive to poor air quality – children, older adults, those with respiratory or pulmonary conditions, athletes, and those most often outdoors – in addition to our ecosystem. Reactions may look like shortness of breath, coughing, wheezing, fatigue, headaches, nausea, chest pain, and eye and throat irritation.

Unlike ground-level ozone, **particle pollution** (also known as **particulate matter**) is a mixture of extremely small particles and liquid droplets in the air, which can occur year-round. Particles enter the air from a variety of sources and may be either directly emitted or may form under a chemical process much like the way ground level ozone forms. Many enter the air directly from power plants, factories, automobiles, construction vehicles, unpaved roads, wood burning, and agriculture sites. Others come from a reaction between gases from burning fuels, sunlight, and water vapor.

High levels of particles in the air can affect our lungs and heart and have been shown to trigger asthma and heart attacks, among other health problems. Particles also contribute to visible haze that obscures our skyline and impacts our scenic vistas.

A short horizontal bar with a purple-to-yellow gradient.

**Intro/Driving Question/Opening**

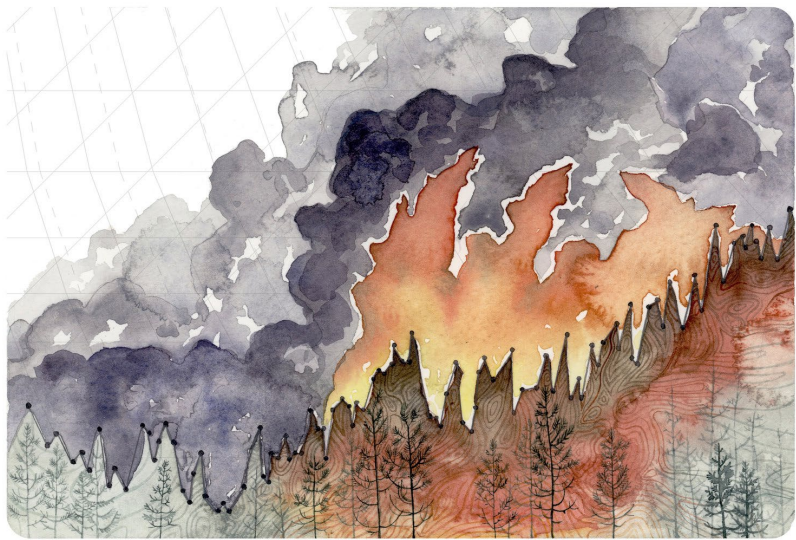
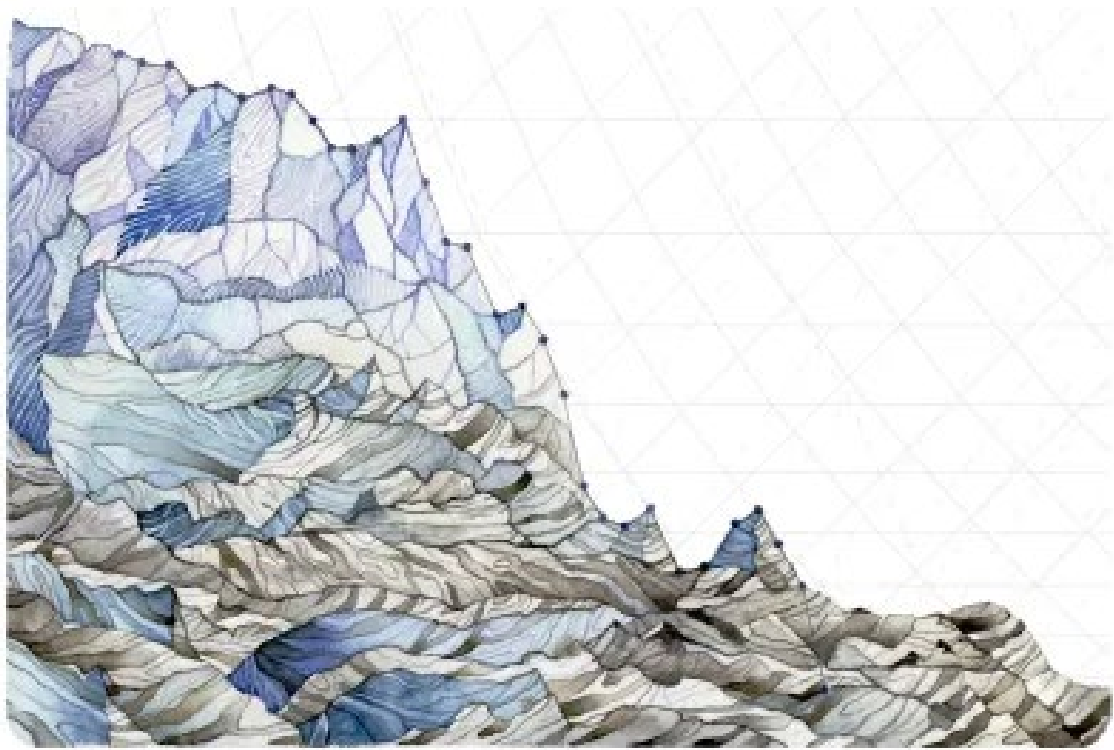
**What stories do these data  
tell?**



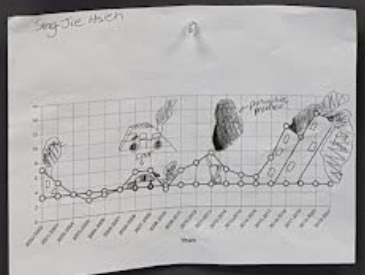
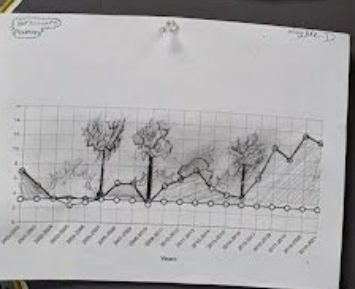
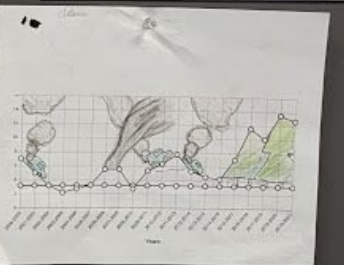
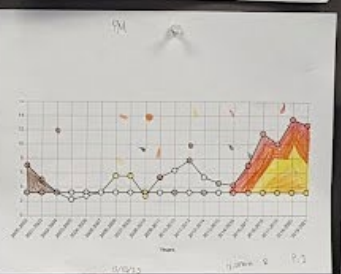
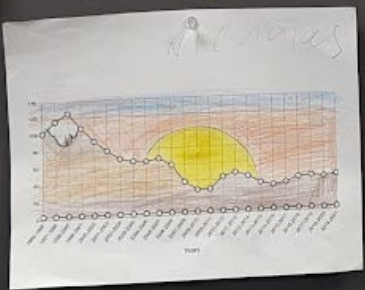
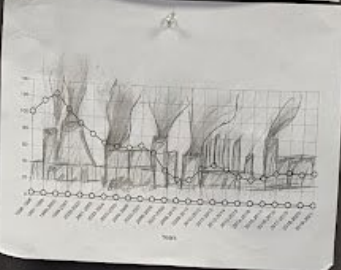
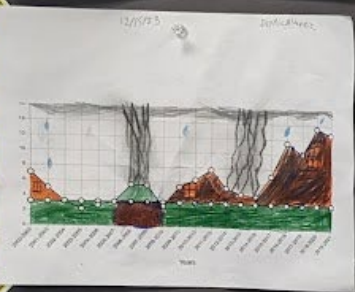
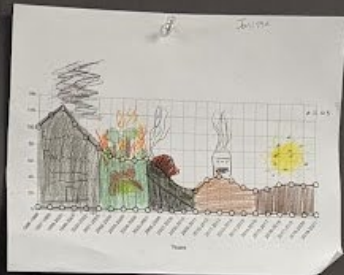
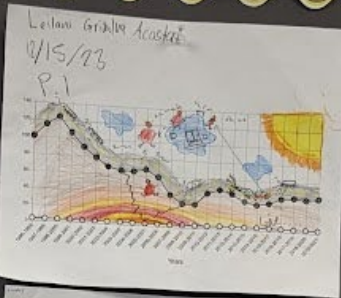
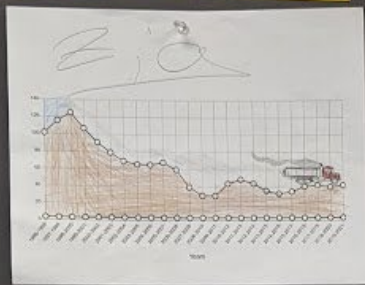
# Hands-on Activity Instructions



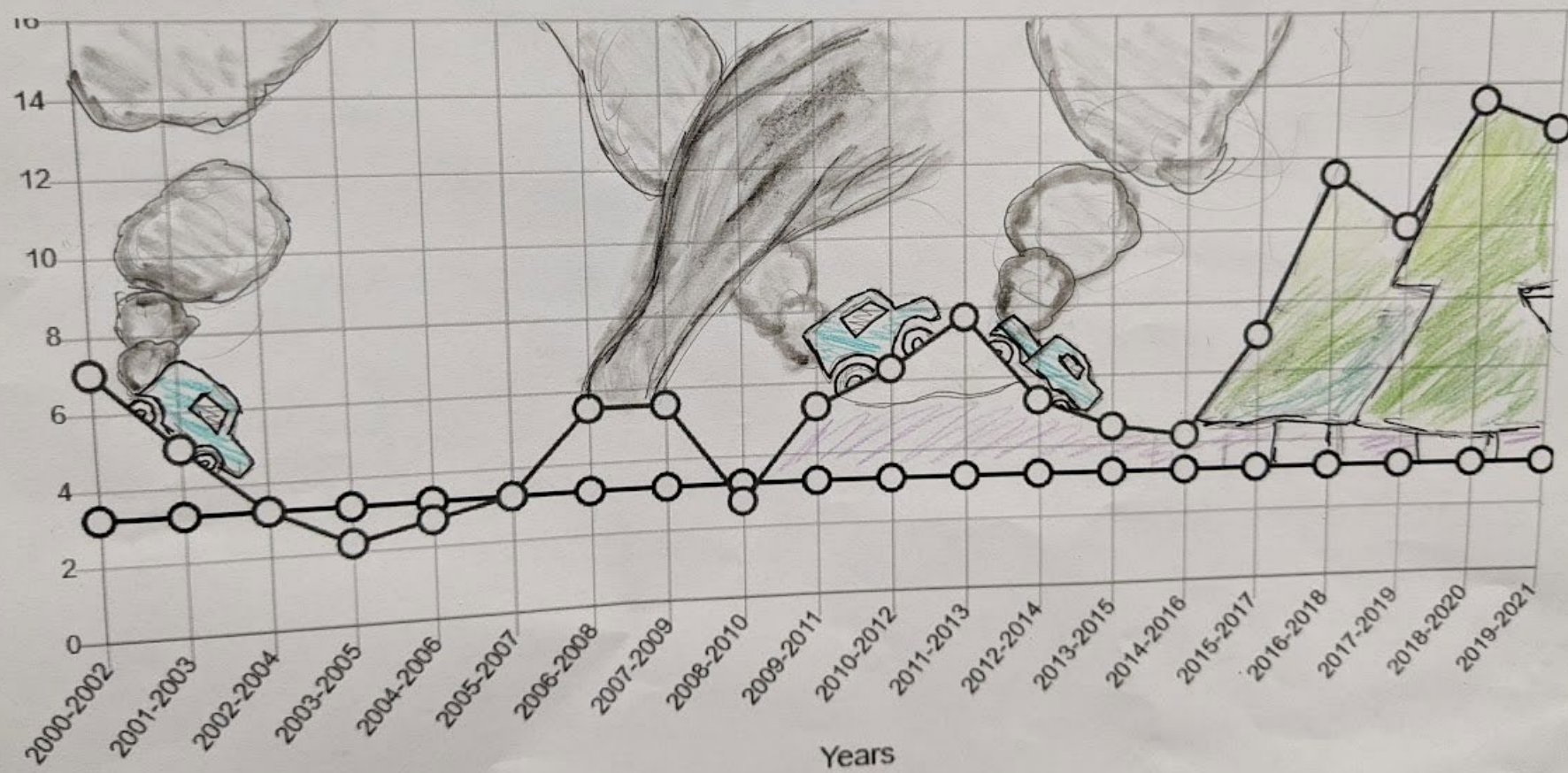
- Introduce [Jill Peltó's work](#) and [Alisa Singer's work](#).
  - notice and wonder
  - motivation
  - methods
- How does the art tell us a story about the data?
- Display Phoenix graphs again.
- What stories could we tell about this data?
- Students select either graph to begin creating an art piece with.

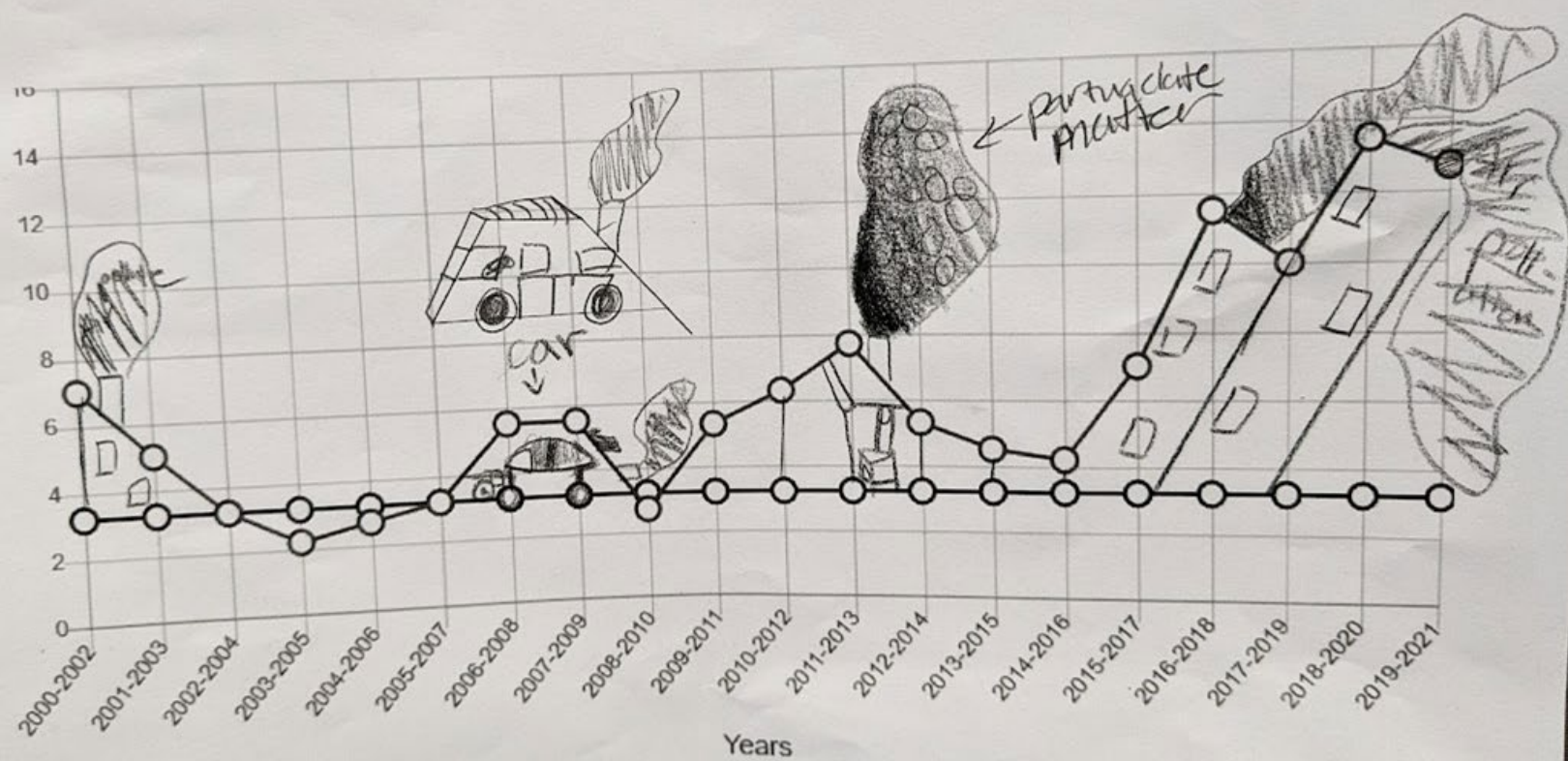


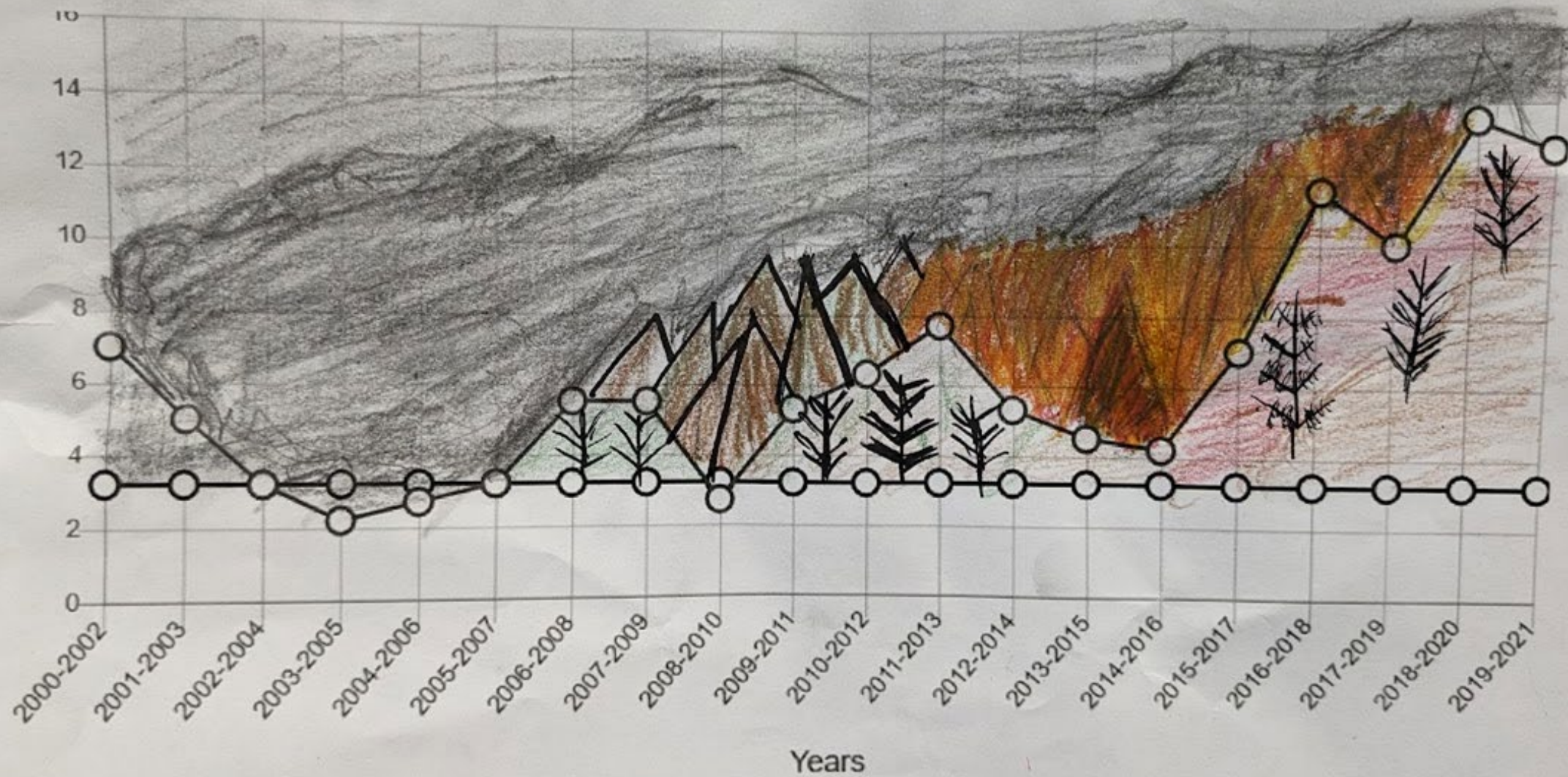
# How can we describe a place?



How can we describe something we can't directly observe?









# Assessment

## Partner Share and Feedback

- Explain your art. What did you draw? What were you trying to show?
- Give feedback:
  - Something you like and why (be specific)
  - A question
  - A suggestion



# Differentiation

## Remediation

Students can use Google search terms related to their chosen pollutant/ climate change to give them ideas for their art piece.

## Extension/Enrichment

This art piece can serve as a draft.

Students can get larger paper and draw the line graph on it (approximating the trend as best as possible).

They can redo their art piece, implementing the feedback they received from peers.



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the support of the  
Arizona STEM  
Acceleration Project**



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