

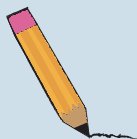
What's in Our Air? Two Day Activity: What is in Our Air?

Overview

Students will learn about air quality and the way that it affects our health. *What's in Our Air?* will reinforce the concept of excess CO₂ in the air and its impact on the environment. Students will hypothesize about the specific impact of cars on the air quality outside the school and test these theories with simple particle boards. Students will also connect these results to high asthma rates and learn about ways to mitigate particulate emissions around the school.

Supplies

- ✓ Copies of *Alameda County Air Quality* for each student
- ✓ Copies of *Our Actions, Our Pollution* for each student
- ✓ Copies of *Particle Board Observation* for each student
- ✓ Copies of *Particles and Asthma* and a package of drinking straws
- ✓ Particle Board supplies: 4x6 index cards, petroleum jelly, wax paper, paper clips, glue sticks
- ✓ Chart paper



Time: Day 1-40 minutes;
Time: Day 2 -60 minutes

Day One: Warm Up

- Write “Know” on one piece of paper and “Want to Know” on another. Write how air pollution is created and what the impacts are on human health. List these facts on the “Know” paper. Ask students to think about what they would like to know about the air in their community and list these questions on the “Want to Know” piece of chart paper.
- Reinforce the idea that CO₂ is not “bad” – we need it as part of the natural exchange among living things – but that too much creates a situation that is contributing to climate change.
- Review the *Alameda County Air Quality* sheets. Have the students read the facts and fill out the questions. Discuss their answers and then look at the pie chart on the worksheet. Examine the large percentage of greenhouse gases that are emitted by cars (46%.) Ask why they think there is almost as much CO₂ coming from cars as it takes to heat and cool the commercial and residential buildings combined.



Name: _____

Alameda County Air Quality



Carbon dioxide (CO₂) is the dominant greenhouse gas that causes climate change.

What else do you know about climate change?

Burning fossil fuels—coal, oil and natural gas—is the main source of human-produced CO₂ emissions.

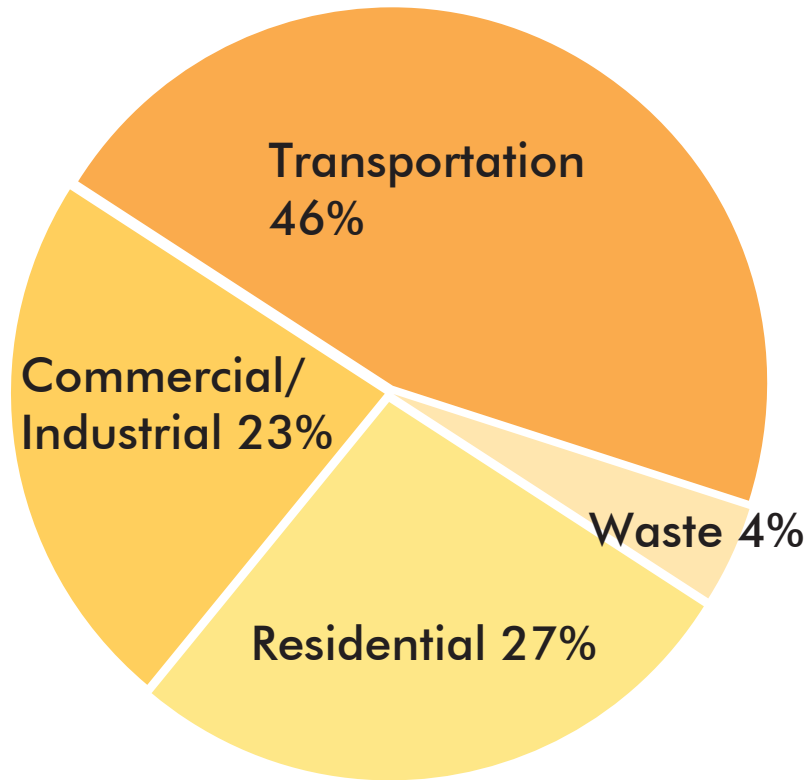


Why do we burn fossil fuels?

Controlling CO₂ emissions from personal vehicles is key to addressing global warming.

List ways of doing this:





Alameda County Greenhouse Gas Emissions

1. What percent of Alameda County's greenhouse gas emissions are from transportation?

2. What fraction of Alameda County's greenhouse gas emissions are from transportation?

Hint: Percent means "out of 100." _____

3. What percent of Alameda County's greenhouse gas emissions are from waste?

Write this percent as a decimal. _____

4. What percent of Alameda County's greenhouse gas emissions are from waste?

Write this percent as a decimal. _____

5. What percent of Alameda County's greenhouse gas emissions are from residences?

Write this percent as a decimal. _____

6. Do more of Alameda County's greenhouse gas emissions come from waste or residences?

How much more? _____

Day One Activity: Making Particle Boards

Time: 20 Minutes

Tips for this activity:

- ✓ Find a good location near traffic on the street for the experiment group (*location #1*) A second location with less exposure to cars (*location #2*), either in an internal courtyard or a window near a playground with trees is ideal.
 - ✓ The boards need to be left out for a minimum of 24 hours and 48 hours is strongly recommended. If there is rain in the forecast, wait to put them out. If it rains on these boards, all of the data will be lost.
- Explain to students that they will be making particle boards to get a sense of how much dirt is in the air around the school. Explain that cars and trucks put particles into the air when their engines are running and that idling (*when a car's engine is on but the car is not moving*) can exacerbate this, which happens at every red light and curbside drop off.
 - Pass out 4x6 index cards and assign each student a partner: one partner will be part of the experimental group (*location #1 - card facing the street*) and the other will be the control group (*location #2 - card facing inside away from the street.*) To make it easy for partners to find their pair of cards when they are collected, have them create a symbol that they draw on each pair of cards.
 - On the lined side of the card have them write their names, and a 1-2 sentence prediction about what they think both of the cards will look like after being outside for a day or two. They should list predictions for Location #1 and Location #2.
 - Follow these step-by-step instructions to make the particle board.
 - Hang the boards in the two locations for at least 24

hours, if possible 48 hours or more when no rain is predicted. If it rains on these boards, all of the data will be lost.

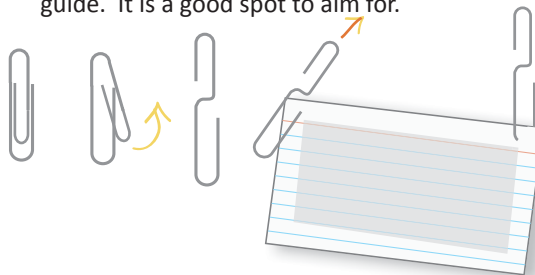
Preparing the Particulate Matter Board

- 1) On the lined side of the card, write your name. Then write what you think you will find on the card after leaving it outside for a few days.

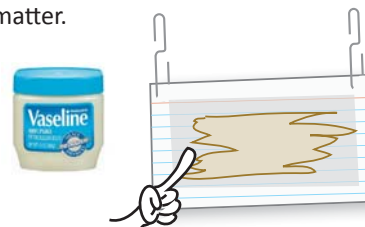


- 2) Cut out a wax paper rectangle slightly smaller than the card, and use a glue stick to glue it to the unlined side of the card.

- 3) Open up a paper clip and stick it through the card to make a hook. Put it in far enough down to not tear the paper. Use the red line as a guide. It is a good spot to aim for.



- 4) Cover the middle of the wax paper with a very light coat of petroleum jelly. This thin coat will be just the right amount to catch particulate matter.



Day Two: Analyzing Particle Boards

Time: 30 Minutes

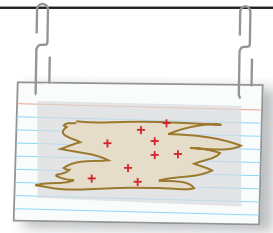
- Before you begin with the students, bring the boards in from where they have been hanging. They can be messy - and if the experiment went well, very messy.
- Students should find their boards and sit with their partner. They should take a minute to discuss their observations and check these against their original predictions.
- Particle cards will have yellowish particles from pollen and organic matter. They will have a grayish or black look to them when they have been exposed to car particles. If you are on a major avenue or busy street, they will get very dark. Otherwise, the results will be less dramatic. What is important is to compare the two boards to each other.
- Students should describe what they see using the Particle Board Observations handout. There should be a difference between the two locations. If there is, ask them to write WHY they think this happened.

lead to asthma attacks.



Name: _____

Particle Board Observations



Compare Locations

Compare the particles from different locations. Write down your observations.

Location 1:

Location 2:

Why do you think the two particle cards are so different?
