

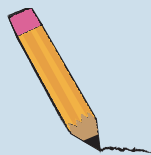
# Pollution Solutions

## Overview

Students will learn about the various ways humans pollute the environment, with solids, liquids and gases. Pollution Solutions will connect ideas about pollution directly to modes of transportation, and will have students explore the idea of “sharing your ride.” They will also learn about the positive benefits of getting exercise while getting around.

### Supplies

- ✓ Copies of *What is Pollution?* for each student
- ✓ Double sided copies of *Every Trip Counts* for each student
- ✓ Copies of *Transportation Word Problems* for each student



## Activity: What is Pollution?

Time: 30 Minutes

- Review the concept of Pollution with students: products in the environment, such as car exhaust, that are dirty and unhealthy for humans and other living things. Emphasize these are mostly waste products from human activity such as burning things for fuel or discarding things when we are done with them.
- Using the *What is Pollution?* handout, have students work in pairs or small groups to identify pollutants that take the form of solids, liquids or gases. Students should cut the pictures of solids/liquids/gases and paste them in the correct sections of the worksheet.
  - Liquids: Chemicals, detergents, oils, gasoline
  - Solids: Scrap metals, solid waste, plastics
  - Gases: Smoke, fumes, exhaust
- Discuss how these different pollutants affect the air, water and the earth.
- Connect this information to the air and carbon dioxide cycle. Review the human respiration process (breathing in oxygen and out carbon dioxide) and how plants do the opposite. Show students the illustration of the CO2 Cycle. Talk about how when this balance is good, the air is clean. CO2 is not by nature “bad” and is needed to keep the planet cool and plants alive.
- Explain that too much CO2 is bad for the planet and can create changes in the climate. Discuss ways we can reduce CO2 emissions in the air. These can include: burning less fuel, driving less and sharing your ride.



## Activity: Every Trip Counts

Time: 20 Minutes

- Make a list of all of the different ways to get around town with other people. Make sure that buses, BART and carpooling are listed. Discuss that when we share our ride with others, we put less pollution in the air. Also, when we use BART, because it runs on electricity, it really helps keep the air clean.
- Distribute *Every Trip Counts/Share Your Ride* handout. Review the first page which outlines on average how many people can fit in each mode of transportation most common in Alameda County. When they finish have students complete the word problems. Discuss the answers as a class.
- Discuss how sharing our ride impacts the CO<sub>2</sub> in the air and resulting pollution. Have students discuss what they could do differently getting to and from school to reduce the CO<sub>2</sub> in the area. If your school is in an area with little public transportation, discuss the benefits of carpooling.





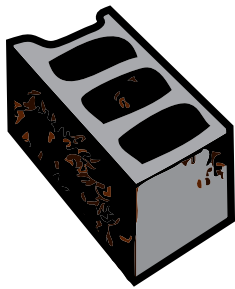
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# What is Pollution?

Cut out the pictures of pollutants and paste them in the appropriate category below:

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## Solids



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## Liquids



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## Gases

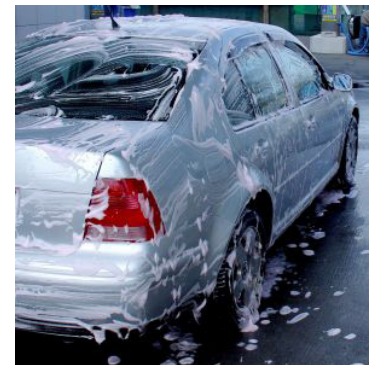




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## Pictures of Pollutants:

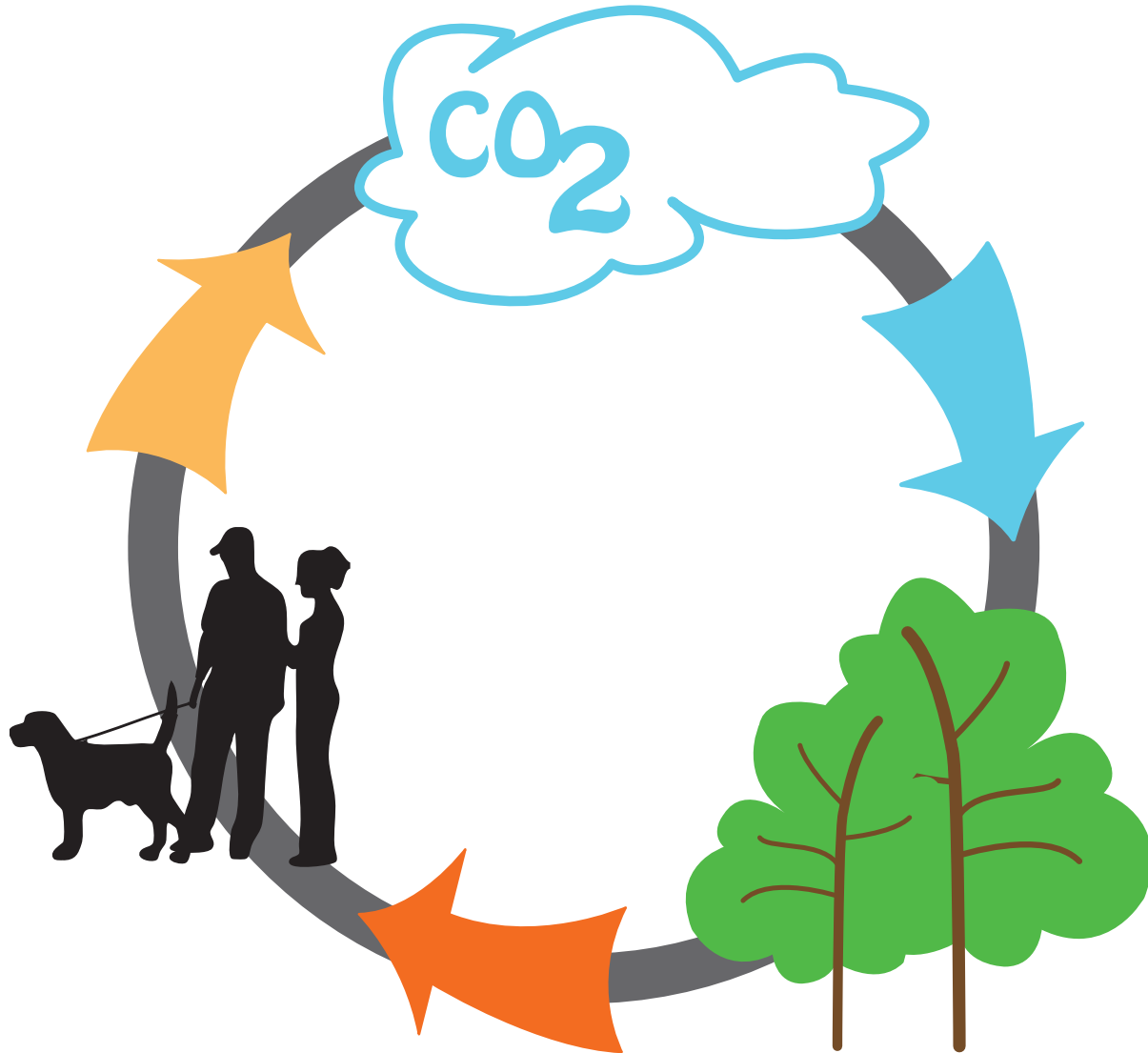
Liquids - Solids - Gases





Name: \_\_\_\_\_

## CO<sub>2</sub> CYCLE



All living things are made of carbon. Carbon is also a part of the ocean, air, and even rocks. Because the Earth is a dynamic place, carbon does not stay still. It is on the move!

In the atmosphere, carbon is attached to some oxygen in a gas called carbon dioxide. Plants use carbon dioxide and sunlight to make their own food and grow. The carbon becomes part of the plant. Plants that die and are buried may turn into fossil fuels made of carbon like coal and oil over millions of years. When humans burn fossil fuels, most of the carbon quickly enters the atmosphere as carbon dioxide.

Carbon dioxide is a greenhouse gas and traps heat in the atmosphere. Without it and other greenhouse gases, Earth would be a frozen world. But humans have burned so much fuel that there is about 30% more carbon dioxide in the air today than there was about 150 years ago, and Earth is becoming a warmer place. In fact, ice cores show us that there is now more carbon dioxide in the atmosphere than there has been in the last 420,000 years.

**Credit:** <http://eo.ucar.edu/kids/green/cycles6.htm>

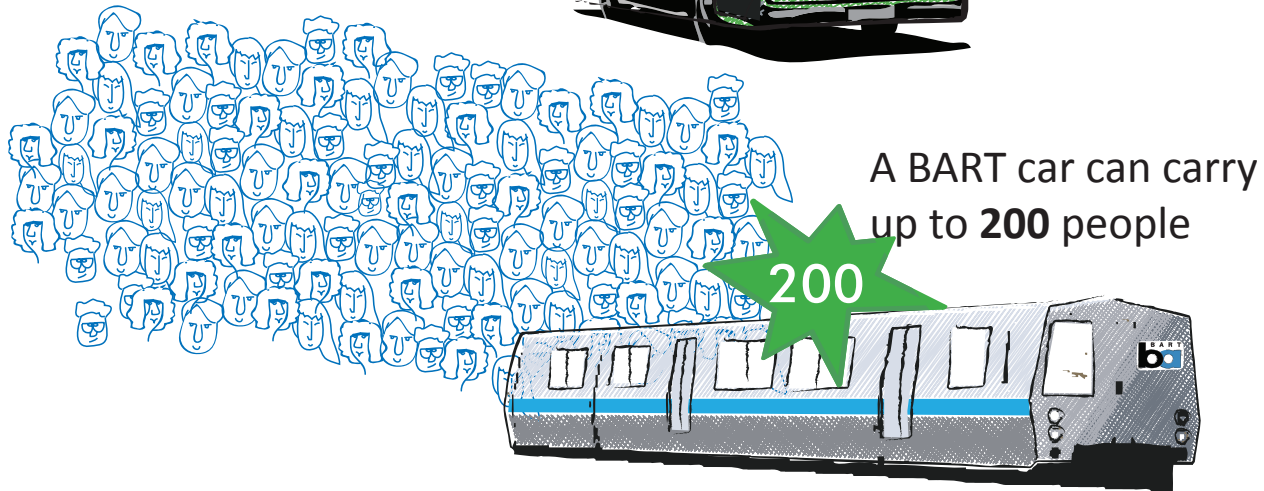
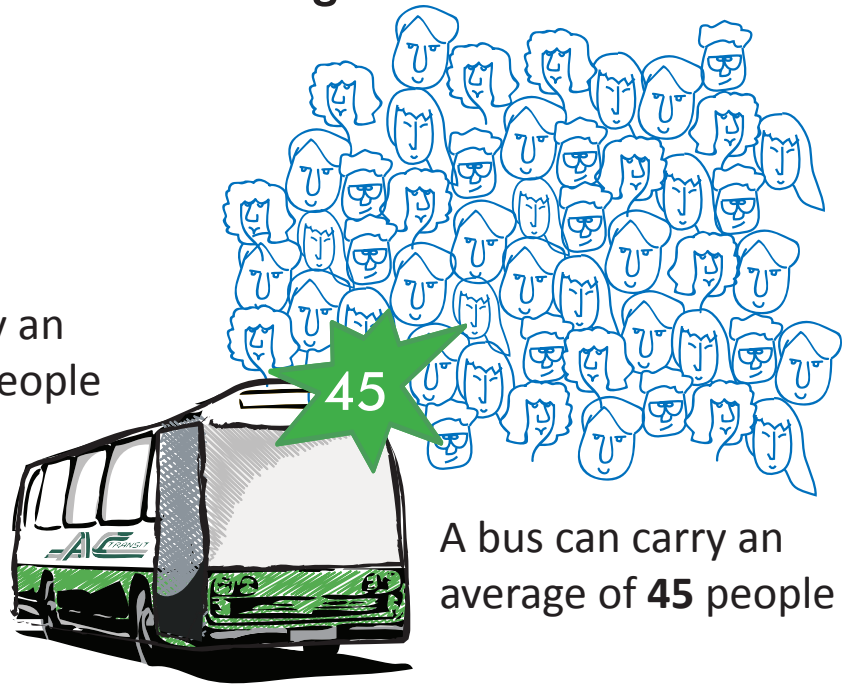
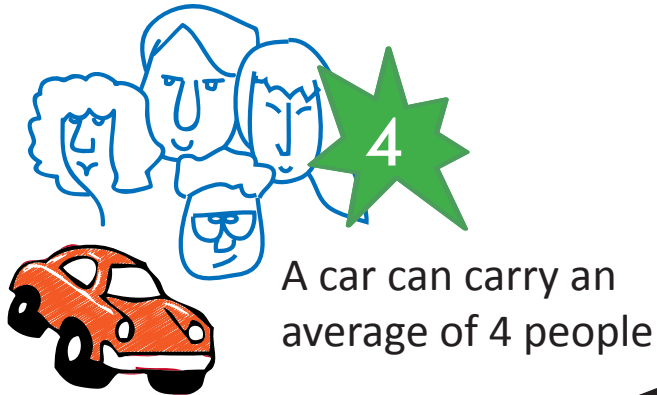




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# Every Trip Counts

With your team look at the following facts:



Answer with your team:

Which of these modes of transportation is the greenest choice? Why?

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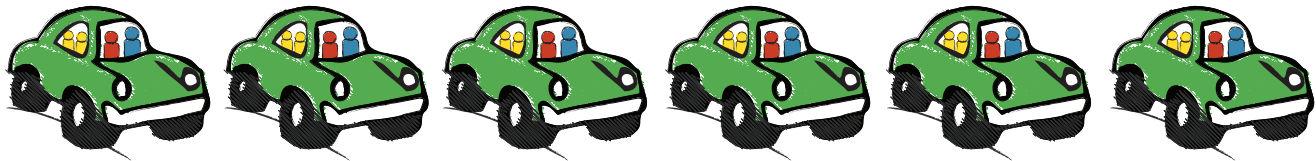
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# Share Your Ride

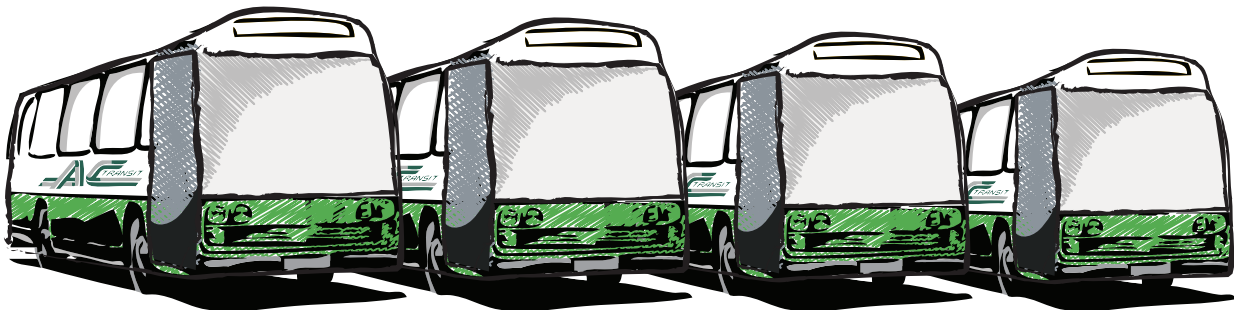
1. 16 people want to carpool to the zoo. They have 6 cars and 4 people can fit in each car. What is the “greenest” way for the people to carpool? \_\_\_\_\_

How many cars would they need? \_\_\_\_\_

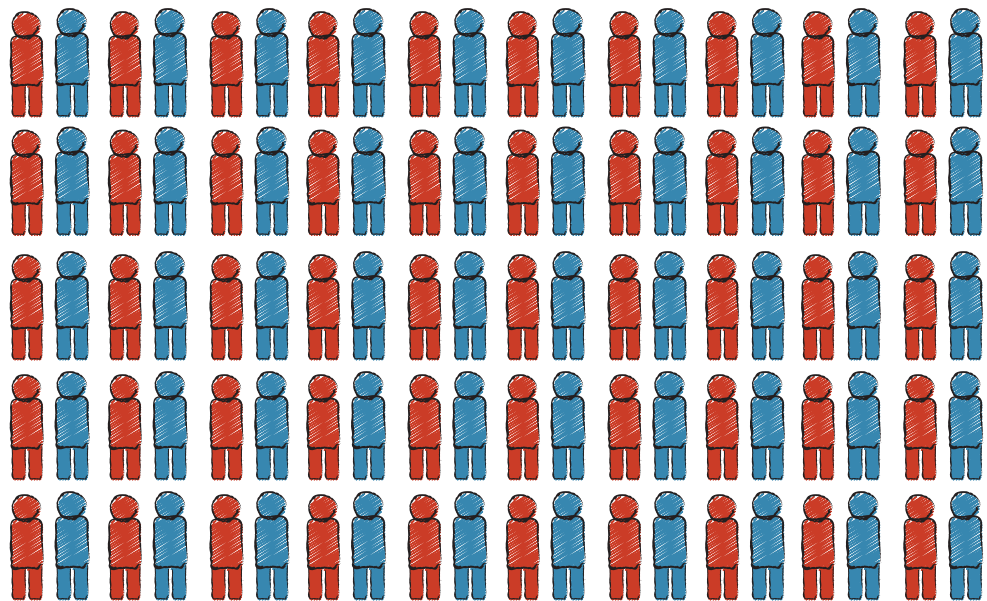


2. Challenge: 90 students are going on a field trip. Their teachers can get four buses to take the students on the trip. 45 students fit in one bus.

What is the least amount of buses that the teachers will need to get? \_\_\_\_\_



Sharing your ride  
can make a green  
difference!



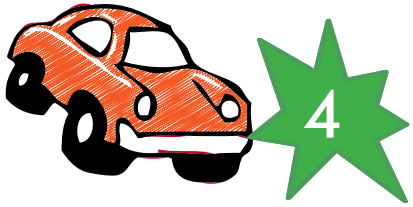
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# Transportation Word Problems

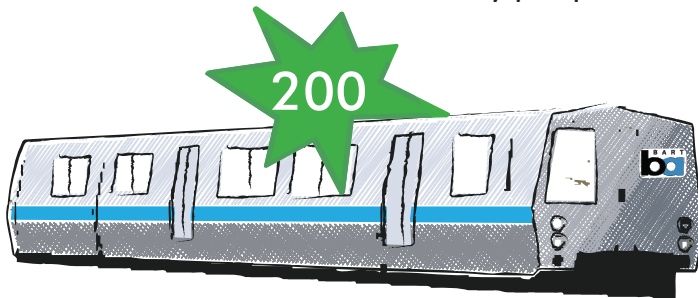
If a bus can carry 45 people, how many people can three buses carry? \_\_\_\_\_



If a car can carry 4 people, how many people can 8 cars carry? \_\_\_\_\_



If a BART car can carry 200 people,  
how many people can 2 BART cars carry? \_\_\_\_\_



**Bonus:** Make up your own transportation word problems on the back of this page. When you are done with your word problem, trade pages with a partner to solve each other's challenge problems. Talk about how you solved each other's problems.

