

The Air That I Breathe

Middle School

Lesson 2: Who's Driving Around Our Block?



Lesson One: The Air that I Breathe

→ Lesson Two: Who's Driving Around Our Block?

Lesson Three: Assessing Air Quality

Lesson Four: Assessing Air Quality

Lesson Five: Climate Change and Carbon Dioxide

Lesson Six: What's Your Carbon Footprint?

Lesson Seven: Write Your Representative

Lesson Eight: Share What You've Learned!

Lesson Two

Who's Driving Around Our Block?

BIG IDEAS

To Share With Your Students



→ **AVERAGE VEHICLE OCCUPANCY (AVO) SHOWS IF PEOPLE ARE CARPOOLING.**

AVO is a numerical way of saying “how many people, on average, are in each car that drives by?” By counting the number of people in each car, we can see if most cars have several passengers or only one passenger.

→ **TO CALCULATE AVO, COUNT THE NUMBER OF PEOPLE IN EACH CAR AND DIVIDE BY THE NUMBER OF CARS**

For your study, students work in pairs to count the number of people in each car for 30 cars that go by. Then the students will divide the total number of people in cars by 30.

→ **THE HIGHER THE AVO, THE BETTER YOUR NEIGHBORHOOD IS DOING AT CARPOOLING**

Unfortunately, it's rare for an AVO to be above 2. An AVO of less than 2 means most of the time, people are driving alone or maybe with one other person. Unfortunately, you will likely find these results with your group – people just don't carpool very often.

What We Will Learn

The students will learn about the benefits of carpooling and whether people are doing their part to carpool in the area around the school.

Know the Facts

- Each person who carools takes another car off the road
- Carpooling keeps harmful particulates and greenhouse gases out of our air
- U.S. drivers wasted 4.2 billion hours sitting in traffic in 2005
- By using the HOV lane (High Occupancy Vehicle lane), carpoolers save time and reduce traffic
- By sharing a ride, you spend time socializing
- According to the American Automobile Association, it costs an average of 26.2 cents per mile to drive a car. When you split the price of gas, carpooling saves you money.

(Sources: The Clean Air Campaign, “Carpooling”; Green Living Tips, “Carpooling for the Planet”)

Questions of the Day

- Why does carpooling make a difference?
- Are people carpooling in our area?
- What could we do to make carpooling easier and more popular?



Main Activities

The students will learn about carpooling, and why it's good for us and the environment, and through their own observations, find out if people are carpooling in the area near the school.

1) Catalyst - 2 mins

Students answer the following question in their "Livable Streets" journals: What is carpooling and why do we carpool?

- Students can brainstorm their ideas in a list form or write 2-3 sentences.

2) Talk with a Partner - 3 mins

Students talk with a partner about what carpooling is and the pros and cons of carpooling

- Pairs should come with both the pros and cons of carpooling. Ask them to think about all the possible factors that could make carpooling convenient or inconvenient for people.

3) Share with the class - 15 mins

Have a group discussion about the benefits of carpooling. Ask the class to explain carpooling (also known as ride-sharing or car-sharing). What are the benefits of carpooling, and in particular, how does it help cut down air pollution? Do we think people are carpooling in our neighborhood?

- Create a list as a class of the pros and cons of carpooling
- Have a discussion about this list: When we carpool, are we only helping ourselves? Are we

Quick View

TIME	NATIONAL STANDARDS
1hr	NS.5-8.1, NS.5-8.6, NSS-C.5-8.5, NS.5-8.6
GRADE LEVELS	SUBJECT AREAS
6th-8th Grade	Environmental Science, Social Studies

Materials

- AVO recording sheet
- Pen/pencils
- A hard notebook or clip boards to write on
- Calculator (Optional)

helping out other members of our community? Are we helping out the natural world - animals and other species, by cutting down on pollution? How does putting up with the minor inconveniences of carpooling ultimately contribute to long-term solutions for ourselves and our planet?

4) Core Activity: Average Vehicle Occupancy - 20 mins

Assign partners and explain that they will be calculating Average Vehicle Occupancy (AVO) to find out if people are carpooling in the area. Explain to the students that they will need to stand with a clear view of the street (but always stay on the sidewalk!) and work together to carefully count how many people are in 30 cars that pass by. This activity goes by quickly if you are in an area with heavy traffic.

Once outside, partners should stand on a sidewalk with a good view of the street. Ask partners to

work together to do their best to record how many occupants are in each of the next 30 vehicles that go by. If they can't see in a car that goes by (because of tinted windows or a high speed) they can let that car pass and count the people in the next car. Be sure to write the specific vehicle type in the chart. For example: "car, one person," or, "SUV, four people." Once you've collected accurate data for 30 vehicles, your students can go back inside to calculate the average number of occupants, or find a quiet spot outside.

5) Crunch the Numbers- 20 mins

Partners should add up the total number of people counted in the vehicles, and divide that number by the total number of vehicles (30 vehicles). Students work with their partner to find their team's own average, then compare with the rest of the class.

If you have time, you can add up each average and divide by the total number of averages to find the class average.

- What does this average mean about car ridership?
- If the number is 1.X, then people are not really carpooling.
- Why do you think people don't carpool very often? What could be done to encourage carpooling?

Tips for Success

- Make sure students agree with their partners on how many people they saw in each car
- If partners can't agree on how many people they saw, just don't count that car
- Don't record the AVO for buses or any public transit - only privately owned and driven vehicles and taxis (Cars, hybrids, SUVs, trucks, taxis, etc)
- It's up to you to decide whether you want the kids to use a calculator
- Your students can count taxi drivers as car occupants

Further Resources

- The Clean Air Campaign, "Carpooling";
- Green Living Tips, "Carpooling for the Planet"

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Handouts

Average Vehicle Occupancy (AVO)

Who's Driving Around Our Block?

For each vehicle that drives by, write the type of vehicle (car, SUV, van, truck, taxi) and the number of people inside.

	Vehicle Type	Number of People
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

	Vehicle Type	Number of People
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Calculate the AVO:

- ➔ Find the AVO by dividing the total number of people in the cars by the total number of cars (30).
- ➔ The higher the AVO, the better your community is doing at carpooling.

Your Block's AVO: