

The Streets Around Us

1st Grade: Teacher's Guide/Workbook

Lesson 5/6: Car Emissions



Lesson 1: How Do We Get Around the City?

Lesson 2: Street Observation Form

Lesson 3/4: The Speed of Cars

→ Lesson 5/6: Car Emissions

Lesson 7/8: Public Service Announcements

What's in our Air?

Some BIG IDEAS:

- Cars and trucks release more than just CO₂ that are bad for us and the planet, including greenhouse gases and particulate matter.

- Particulate matter is made up of particles of soot and metals, and gives smog its dark color. We are going to study particulate matter by creating our own boards and looking at how much "dirt" ends up on them after a few days outside. It's a simple experiment with valuable results!

Some Facts:

- In addition to emitting particulate matter, cars release nitrogen oxides, hydrocarbons, sulfur dioxide, carbon monoxide, and toxic chemicals, which are also not good for your health.
- Very small particles are the worst for our health, because they can get deep into your lungs, and some may even get into your bloodstream
- There is a tool called the Air Quality Index that helps us find out how clean or polluted our air is day-to-day, and what effects it may have our health. To find the current air quality for your area, go to: <http://airnow.gov/>

(Source: Union of Concerned Scientists, Air Now <http://www.airnow.gov>)

Before you do this experiment

- You will want to figure out where you can hang these particulate boards. You can hang them on long pieces of string out of classroom windows, attach them to windows on the ground floor near the school entrance, hang them on the chain link fence in the playground - any place where you think that you will pick up the soot in the air.
- Identify a second location that does not have as much exposure to cars. If you have a courtyard at your school or windows that look out on to a playground with trees, this is ideal.
- The boards need at least 24 hours of time to pick up particles - 48 hours is even better. If there is rain in the forecast, you might want to wait to put them out because you really can't get a good sample.

Supplies you will need for this lesson:



- A copy of the work booklet for each student
- Paperclips, index cards (large with lines on one side), petroleum jelly, waxed paper and glue sticks
- String, wire and paper clips to hang your boards with.

Lesson Five: Making the Particle Cards

Follow the illustrations below to make the particulate boards to find what's in the air you are breathing around the school.

Education

Lesson Four Car Emissions

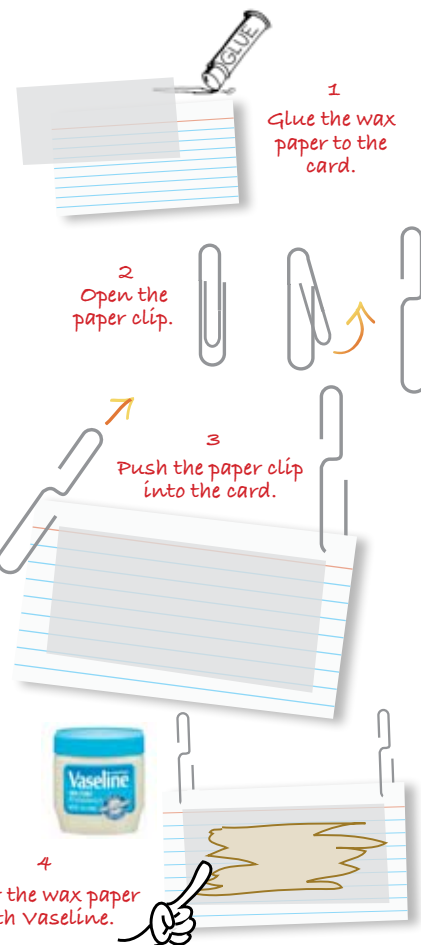


When cars run their engines, they put smoke into the air. This smoke has little particles in it. We are going to do an experiment to see how many particles are in the air near your school.

Preparing the Particle Card

You will get a card. Write your name on the back of it.

- 1) Take a rectangle of wax paper and use a glue stick to glue it to the card.
- 2) 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.
- 3) Cover the middle of the wax paper with a very light coating of Vaseline – just enough to catch particles in the air.
- 4) Wait for instructions as to where to hang them. A teacher will record the place it will be hung on the back of the card for later.



This step-by-step guide has been put together to help the students do this on their own. You do not need to use it and can talk your students through this if you think it is easier.

It is most successful to assign pairs for this experiment - one student for the street side and one for a side that is away from car traffic - in the courtyard or playground away from the street.

Lesson Six: Making Observations

1. Before you begin with the students, bring in the boards from where they have been hanging. They can be messy - and if the experiment went well, very messy.
2. Students should find their boards and sit with their partner, or work with a student who hung their board in the opposing location. They should take a minute to discuss their observations.
3. Particle cards will have yellowish particles from pollen and organic matter. They will have a greyish or black look to them when they have been exposed to car particles. If you are on a major avenue or busy street, you will get very dark boards (if it does not rain). Otherwise, the results will be less dramatic. What is important is to compare the two boards to each other.
4. Students should describe what they see using the worksheet. Encourage them to use words describing color, quality, if they can see big or small pieces on their boards. There should be a difference between the two locations - if so, have them write WHY they think this happened.

Lesson Five

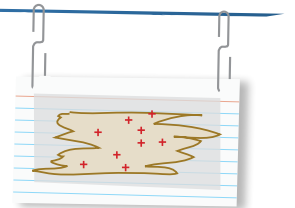
Car Emissions Data Session

Particle Card

- 1) Take a look at all of the particle cards in your group. Talk about where they were hung.

What kind of particles do you see on them?

Is it different depending on where they were hung?
- 2) Talk in your group about how you think cars might have had an effect on your cards



You will want to have some paper towels on hand in case the kids touch the boards. They are very messy.

Also, unlike many other materials from this unit, you will not want to keep them!!

B Compare Locations

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

Location 1:

Location 2:

Have the students fill out WHY they think the two boards look so different and have them discuss the different factors that were present in each location.

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

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Workbook Pages



Lesson Four

Car Emissions

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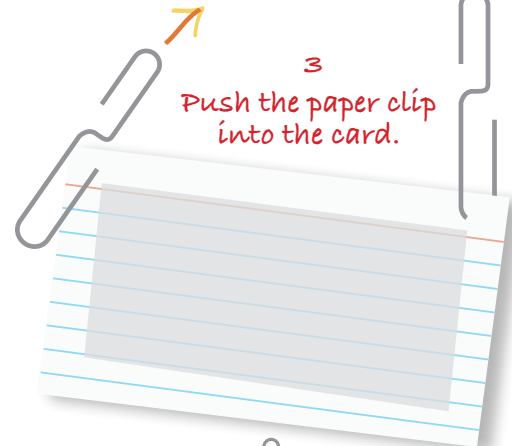
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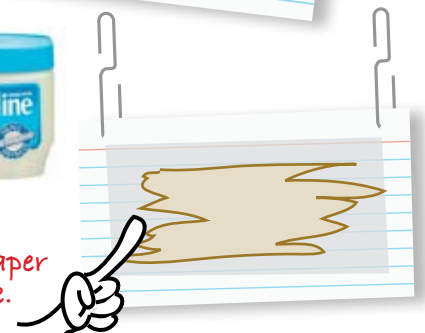
2
Open the paper clip.



3
Push the paper clip into the card.



4
Cover the wax paper with vaseline.





Lesson Five

Car Emissions Data Session

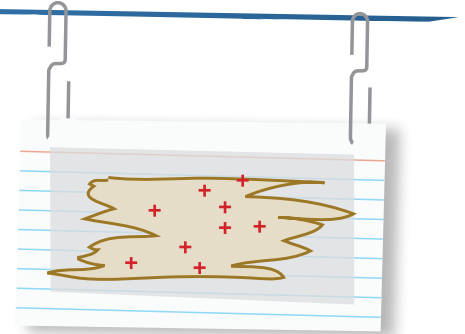
A Particle Card

- 1) Take a look at all of the particle cards in your group.
Talk about where they were hung.

What kind of particles do you see on them?

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