

Cleaning Up Our Air

Overview: This lesson introduces students to the environmental impacts of air pollution caused by trucks and compares the impacts left from diesel and biodiesel. It helps students to identify ways they can reduce air pollution during their daily lives.

Keywords: Transportation, diesel, biodiesel, air pollution

Age / Grade Range: 1st

Transportation: Moving objects or people from one place to another using cars, planes, buses, trains, bikes, or walking.

Energy: Comes in different forms. We get energy from eating food that we grow. Cars and trucks get energy from gas or diesel that we get at a gas station.

Diesel: This non-renewable resource is derived from crude oil which is found in liquid form between layers of the Earth's crust.

Background: Biodiesel: This is a renewable replacement of diesel that is clean burning and derived from vegetable oils and fats. Here are a few articles about biodiesel emissions: <http://tristatebiodiesel.com/biodiesel-facts/>
<http://www.deq.state.or.us/aq/diesel/reducepollution.htm>

Air Pollution: A foreign substance in the air that doesn't belong or an increase in a substance that can cause harm. Introduce air pollutants to students by asking if they have ever seen the black smoke that comes out of a big truck or a school bus. Explain that when our cars burn gasoline it places air pollutants into the air through the pipes where the black smoke comes out of.

NGSS:

K-ESS3-3.3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Common Core:

**Next Generation
Science Standards &
Common Core:**

RL.1.1 Key Ideas and Details

1. Ask and answer questions about key details in a text.

1.S.1.2.1 Make observations, collect data, and use data

Goals:

- To introduce students to different forms of fuel and compare the amount of air pollutants that come from each of these fuel sources.
- To help students make informed decisions about ways to reduce air pollution.

Objectives:

- Students will understand that many forms of transportation, including trucks, run on fuel and that these forms of fuel effects our environment by creating air pollutants.
- Students will compare the amount of air pollution from diesel, biodiesel, and riding a bicycle.
- Students will then be able to make informed decisions on behaviors that will help cut down on air pollutants caused by transportation.

Materials:

- “Magic School Bus Gets Cleaned Up”
- 24 Air Pollution cards: 8 green, 8 orange, 8 white
- White board and tape for debriefing
- 2 wagons and a bicycle

Set up:

Print 24 cards labeled “Air Pollution” 8 of them should be printed on green paper, 8 on orange paper and 8 on white paper. Pre-determine a road route for the wagons or “trucks”, and bicycles to drive on. This could be done around your school or playground.

Classroom Time:

1 hour

Read “The Magic School Bus Gets Cleaned Up” then discuss the books in terms of transportation and air pollutants that come from cars and trucks. Also introduce biodiesel.

Potential Questions:

**Introduction
(Engage):**

- In the book we saw that the magic school bus needed energy or a fuel source to drive. What type of energy or fuel source did the bus need in order to drive? (Diesel)
- How do we get our energy to walk or ride a bike? (Food)
- What did the buses energy source, the diesel, do to the air? (Created air pollution)
- There are different types of fuel for trucks. We saw in the book that diesel was one of them that came from oil way underground. Another type of fuel that we can put in our trucks is called biodiesel. This comes from vegetable oils or grease like our parents cook with. (Then introduce the activity so students can look at the air pollutants that come from diesel, biodiesel, and bike riding).

Activity (Explore):

Students will need to be assigned roles. 4 students will represent mile markers, 2 students will be the truck drivers who will pull a wagon behind them, one will be a diesel truck and the other will be a biodiesel truck and one other student will need to be a bike rider. Each of the truck drivers and the bike rider will start off with 8 cards, orange cards go to the diesel driver, green cards go to the biodiesel driver, and white cards will go to the bike rider. The children representing the mile markers will spread out around the pathway. Each of the drivers will drive the same distance and stop at each mile marker. The diesel truck driver will give two pollution cards at each marker, biodiesel truck driver will give one pollution card at each mile, and the bike rider will not give any cards away. At the end of the course, everyone will hang on to their cards and head back to the classroom for discussion and observations.

Explanation

Back in the classroom, write on the board the words “Diesel Air Pollution”, “Biodiesel Air Pollution”, and “Bike Air Pollution”. Under each of these three categories also write “No Air Pollution Created”. Ask Mile Marker 1 student to come tape the corresponding cards that was collected from the drivers under the correct words on the board. Do this for each of the 4 mile markers. Then ask the drivers to come tape the cards that they did not use, meaning they didn’t pollute the air, under the words, only biodiesel and the bike rider will have any to tape up. Ask the students to take a minute and quietly think about what they see on the board. Then prompt students to discuss the comparisons that they see. Wrap up should include a discussion about what we can do to reduce the amount of air pollutants that we put into the air. Ask students to name some suggestions for things that they can do differently (ride a bike instead of drive, turn off the car when we aren’t driving...) you can refer back to the book and ask students ways that the kids in the Magic School Bus prevented air pollution.

Elaboration:

Depending on the number of students you have, assign more roles such as more mile markers, a person walking, or gas stations that show the drivers have to stop and use non-renewable resources to fuel their cars.

Evaluation:

There will be a pre-test and post-test about what students know about air pollution and how they can individually reduce air pollution.

Additional resources:

Visit <http://epa.gov/cleanschoolbus/msb-book.htm> to request a free copy of “The Magic School Gets Cleaned Up”

<http://auto.howstuffworks.com/air-pollution-from-cars.htm>

Visit http://www.eia.gov/kids/energy.cfm?page=about_home-basics for more information about different forms of energy.

Air Pollution Cards (Print this sheet 3 times on different colored paper)

Air Pollution

Air Pollution

Air Pollution

Air Pollution

Air Pollution

Air Pollution

Air Pollution

Air Pollution

Pre-Assessment:

Hand out a piece of paper and crayons to each student. Ask them to draw a picture of air pollution and what it comes from. Make sure to tell students that it is ok if they don't know what it is or where it comes from but to draw what comes to mind and try their best.

Post-Assessment:

Do the exact same procedure as the pre-assessment to see what students have learned but also have them include ways to prevent air pollution in their drawings.