# GETTING AROUND

EARTH matters
Studies For Our Global Future

## introduction

The global transportation system is largely dependent on **fossil fuels**. This is especially true in the United States, where transportation accounts for 26 percent of all energy use.[1] While the transportation system includes buses, trains, airplanes and ships, personal vehicles (cars, trucks, and motorcycles) consume nearly two-thirds of transportation-related energy in the U.S. In 2019, people in the U.S. drove over 3 trillion miles – that's farther than driving to the sun and back 16,000 times.[2] This dependency on fossil fuels contributes to air pollution, ozone depletion, **climate change**, acid rain, and the loss of scenic beauty as roads and parking lots pave over the landscape.

A more sustainable transportation system starts at the local level. It is important to assess what transportation habits are contributing to fossil fuel use in individual communities and to develop locally-based plans to address those challenges.

**Vocabulary**: climate change, fossil fuels

## materials

- Sample Transportation Survey Questions (provided)

## procedure

1. Ask students to brainstorm environmental issues related to having a predominantly fossil fuel based transportation system and make a list or concept map on the board. (E.g. carbon emissions leading to climate change, risk of oil spills in transport, smog, soot, habitat destruction and fragmentation to make room for more roads, etc.).

2. Divide the students into groups of 3–5 and explain that in their group, they'll be creating a survey to assess transportation habits in the local community. After conducting their survey, they will analyze their data to identify a local transportation issue that contributes to a dependence on fossil fuels. (E.g. Are most people driving fuel inefficient vehicles? Is a lack of sidewalks or bike lanes preventing people from walking or biking? Is the public transit safe and reliable?) After identifying an issue based on people's current habits, groups will propose a solution that decreases dependence on fossil fuel based transportation in their community.

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### concept

Transportation habits in the United States contribute greatly to the region's dependence on fossil fuels and should be evaluated as we strive for more sustainable communities.

### objectives

Students will be able to:

- Create and conduct a survey to assess current transportation habits in their community.
- Analyze the collected data to determine one local transportation issue that contributes to a reliance on fossil-fuel based transportation.
- Develop a strategy that combats their identified transportation issue in order to make the community more sustainable.

### subjects

Environmental Science (General and AP), Government

### skills

Developing and administering a survey, collecting and analyzing data, creating an action plan

### method

Students create and conduct a survey to identify a local transportation issue and develop a strategy to make their community less dependent on fossil fuels.

3. Allow time for each group to write at least 10 survey questions. They can refer to the Sample Transportation Survey Questions for ideas.

   While developing the survey questions, students should consider:

   - What are the common forms of transportation in their community? (Students may need to be reminded that transportation includes any method of moving people from place to place – walking, driving, taxis, subway, biking, etc.)
   - What energy-related transportation issues do they *think* might exist and how can they get more information?
   - How will the survey be conducted? How will answers be collected?
   - How will the survey answers be evaluated?
   - What type of questions will provide the information they want (yes/no questions, multiple choice, short answer, or a combination of styles)?
   - Will they do a demographic breakdown of their data? (If so, they should add spaces for survey takers to check off factors such as their age, race, and gender identity.)

4. Groups can choose to conduct their survey in a number of ways including handing out a pencil and paper questionnaire, distributing a link to an online survey (like Survey Monkey or Google Forms), face-to-face interview, or another method of their choice.

   Since students will want to get a diverse sample from the community at large, it may be easiest for them to go to a busy area such as a shopping mall, grocery store, or transit station. When on location, students can set up a table to distribute the survey, walk around with a clipboard and the paper survey, or distribute the link for the online survey to interested passers-by. Alternatively, students could go door-to-door in their neighborhoods if they have parental and school approval.

   Respondents should be assured that their answers will be kept completely anonymous. Also, please remind students that the purpose of this activity is to collect data and not to make judgments on any individual's responses.

5. After all groups have completed their survey, allow time for each group to compile and analyze the results.

6. Based on the collected data, each group should identify one local transportation issue that contributes to the use of fossil fuels in their community. For example, they might think too many people drive individual cars to and from work or that people aren't aware of ride-sharing opportunities.

7. Next, each group should propose a solution for combating that specific issue. For instance, to address the problem of too many commuters in individual cars, students could propose creating a ride-sharing app to promote carpooling or having incentives for people who use the HOV lane. Encourage students to think through the pros and cons of various solutions to find one that will not only address the issue, but also be realistic and decrease dependence on fossil fuel based transport.

8. Allow each group to present their survey results, their chosen issue, and their proposed solution to the class. Survey results should include visualizations such as a graph or chart displaying the survey data.

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## discussion questions

1. Do you think the results of your survey accurately reflect the transportation habits in your community? Why or why not?

   *Answers will vary. Students might question the validity of their data because of where or how they conducted their survey. For example, if a survey was conducted at a transit station, the data may over-represent people who use public transportation. Students may also note that their survey questions were leading, that the sample size wasn't big enough, that their selection of participants may have been biased, etc.*

2. How broad is your solution? Does it only impact the issue you were addressing, or does it have larger implications?

   *Answers will vary. Students may note that some solutions address a wide range of issues while others are more targeted.*

3. Does your solution change the amount of energy required for transportation in your community? Is this change positive or negative? Explain.

   *Answers will vary.*

4. What obstacles might make implementing your strategy in the community difficult?

   *Answers may include: raising awareness of any new program or system, educating people about the environmental impacts of their current habits, getting approval from the city or any necessary businesses, convincing people to change their ways, etc.*

5. Do you think your strategy could be applied to other communities around the country? Why or why not?

   *Answers will vary. Many strategies might only be successful in certain settings. For example, increasing public transit options or creating a bike share program could be effective in an urban setting, but would be hard to implement in a more rural area.*

6. If you implemented your strategy today, do you think it would still be effective five years from now? 20 years? What characteristics of your community might change and impact the effectiveness of your plan?

   *Answers will vary. Students might mention that vehicle technology may change, that the population may grow and increase transportation needs, that there may be more/less funding for alternative transportation in the future, etc.*

## assessment

Students imagine they will share their proposed solution with the larger community. They should create a list of bullet points they would include in a letter to the editor or a presentation to the city council. Students should include details on the data they collected and the issue they uncovered, as well as the pros and cons of their solution.

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## follow-up activities

1. Have students compare the results of their survey with national averages. Many of these national trends, can be found on the Census Bureau website. For example, the site has data on national commuter trends.

2. Students can research transportation habits in another country. Students should consider car ownership rates, vehicle fuel efficiency, public transportation options, and keep in mind the country's population size, economy, and existing environmental concerns.

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[1] U.S. Energy Information Administration. (2021, April). *Use of energy explained: Energy use for transportation*. Retrieved July 6, 2021 from https://www.eia.gov/energyexplained/use-of-energy/transportation.php

[2] U.S. Department of Transportation Federal Highway Administration. (2020). *Traffic Volume Trends 2019*. Retrieved from https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm

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# GETTING AROUND | sample transportation survey questions

## Yes/No Questions

1. Do you drive a vehicle?
2. Would you characterize the traffic in your area as congested?
3. If a hybrid or electric car suited your needs in all areas, except it had a slightly higher cost, would you buy it?
4. Do you use ride sharing services (e.g. Uber, Lyft) in your area?
5. Do you use your car to commute to school or to work?
6. Do you carpool? If yes, how many people are in your car and do you use High Occupancy Vehicle (HOV) lanes?
7. Do you ever bike or walk to work? If yes, do you feel safe while you are doing it?
8. Do you think your area needs more roads or highways?
9. Does your area have a car sharing company (e.g. Zipcar) and if yes, do you use it?
10. Do you use public transportation? If yes, do you feel that your area's public transit system is adequate for your needs?
11. Do you feel safe when you ride your area's public transportation?
12. Do you drive less when gas prices are higher?

## Multiple Choice Questions

1. How would you characterize traffic in your area?

    a. Very few cars on the road
    b. Few cars on the road
    c. Moderate traffic
    d. Congested
    e. Very congested

2. If you own a vehicle, what size is it?

    a. Motorcycle
    b. Compact car
    c. Mid-size or large sedan
    d. Minivan
    e. Full-size van
    f. SUV/truck

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3. When buying a vehicle, what features are most important?

    a. Gas mileage
    b. Color
    c. Style/appearance
    d. Roominess/comfort
    e. Engine size/power
    f. Price
    g. Environmental impact
    h. Other

4. What type of gas do you use?

    a. Regular unleaded
    b. Premium unleaded
    c. Ethanol
    d. Diesel
    e. Other
    f. None (electric cars)

5. How many miles do you put on your car each week?

    a. 0-100
    b. 101-300
    c. 301-600
    d. 600+

6. How much time do you spend commuting by car to and from work or school in a typical day?

    a. 1-30 minutes
    b. 31-60 minutes
    c. 1-2 hours
    d. More than 2 hours

7. How many cars does your household own?

    0 1 2 3 4 5 6

8. What types of alternative transportation do you use? (Circle all that apply)

| | | |
|---|---|---|
| None | Carpool | Bike |
| Walking | Bus | Car Share Program |
| Subway | Ride Sharing (Uber, Lyft) | Light Rail |

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