

## Sustainable Transportation

**Grade Level:** 5-8

**Objective:** The student will learn the meaning of sustainable transportation and investigate renewable resources that can be used to power methods of transportation in the future.

**TEKS:** This activity uses scientific inquiry, teaches students field and classroom investigative skills and fosters critical thinking skills. With this the activity strives to include Science TEKS 1-4 to some degree. This activity also uses critical thinking, problem solving, and decision making skills found in the Social Studies TEKS.

**Science:** 5.8(A), 5.11(C), 6.9(A,B,C), 7.14(C), 8.5(A,B,C), 8.14(C)

**Social studies:** 5.13(A,B), 5.14(B), 5.24(C,D,E), 6.5(A), 6.6(B), 6.9(A,B), 6.20(C), 7.20(C,D,F)

**Time:** 1 class period to design and draw, 1 class period for discussion and presentations, 1 class period for the optional extensions

**Materials:** 2 large sheets of butcher paper per group, map pencils, markers, rulers, explanations of renewable resources printed out for each group

**Vocabulary:** sustainable, geothermal, biomass

### Background Information:

For thousands of years, people used renewable energy sources for transportation. Walking, riding an animal, and eventually traveling by boat (using wind power) were some methods of renewable energy travel. In the last two centuries, people started to use fossil fuels for transportation. These fuels are not renewable and will therefore eventually run out.

When we look at “vehicles of the future,” most of us see designs that are too “out there” to be used today. But the technologies used in these vehicles can be incorporated into our vehicles of today.

For more information on each of the renewable energy sources, read the Renewable Energy Educator’s Guide that comes with the Renewable Energy Traveling Energy Exploration Station. This can be found at <http://www.wattwatchers.org/pages/renewenergy.htm>.

### Setting the Stage:

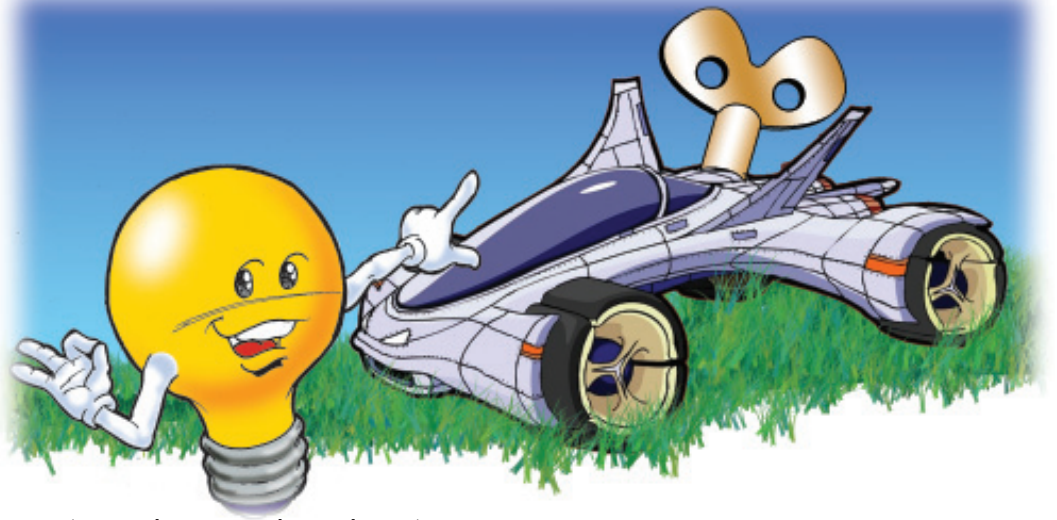
Show your students a picture of a sailboat on the water. Ask them what the energy source being used is (wind, tidal, could possibly have a solar panel to charge batteries). Ask the students to give you a list of transportation services they can think of that use renewable energy sources. Write these on the board for reference later. Ask them if they can think of any other commercial transportation that might be able to use these renewable energy sources. Write these on the board as well.

### Activity 1: Design

1. Break your students up into groups and assign or allow each group to pick one situation from the following list.

Situations:

1. Ferry cars across the opening to a bay
2. Ship goods down a river
3. Transport students to school



4. Transport people around an airport
5. Transport oil from an offshore rig to the shore

2. Give each group 2 sheets of butcher paper and some drawing materials. Have them separate one sheet of paper into four squares. Write the following questions in the squares: “What are the advantages of my plan?”, “What are the disadvantages of my plan?”, “Why is my vehicle sustainable?”, and “What is the demand for our vehicle (including, where it could be used, why it would be used there, and what specific situations could it be used in)?”.

3. Each group will then begin to brainstorm about their scenario and which one renewable energy source they will use (Solar power, Hydro power, Tidal energy, Geothermal energy, Wind power, and Biomass). The group should plan the design and look of their vehicle keeping the questions in mind.

4. Draw the design on the second sheet of butcher paper. Have each group draw the design from several angles (view from above, side, head-on, etc.), and label as many parts as they can.

5. Students then write a short explanation for their vehicle using bullet points they can later refer to during the presentation.

6. Name the vehicle and write this name at the top of the design page.

7. Answer the questions from the first sheet of butcher paper.

### Activity 2: Class Presentations

1. Each group will have a turn to explain their scenario and method of transportation using the notes they made. They should include some of the information from questions 3 and 4.

2. Have the students point out some of the advantages and disadvantages to their design.

3. Have the class add advantages or disadvantages that they see to the questions. The group should write down all responses and post both the design page and the question page in the room.

4. Continue with the other groups’ presentations.

### Extensions

1. Reassign the students to different groups, leaving one member from each of the original groups with the vehicle.

2. Allow the new groups to critique the design and suggest improvements including the additional use of another renewable energy source or supplemental fossil fuels.

3. Have the group adapt the plan and draw a new vehicle from their brainstorming.

4. Present the new next to the old and explain how the modifications will make the vehicle better suited for the scenario.

**Resources:** [www.wattwatchers.org](http://www.wattwatchers.org)  
[www.ecotopia.com/st](http://www.ecotopia.com/st)



“In the long term, the economy and the environment are the same thing. If it’s unenvironmental it is uneconomical. That is the rule of nature.”

- Mollie Beattie, U.S. Fish and Wildlife Service 1996

