



# The Dangers of Hot Cars

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**Subject:** The dangers of leaving people and pets in hot cars

**Grade Levels:** 2<sup>nd</sup>-7<sup>th</sup> grades

**Time:** 2 to 3 days, about one hour active time each day. Eight or more hours to bake the dog treats.

**Audience Size:** Up to 25

**Special Note:** Must be done on a warm, sunny day and the lesson must begin first thing in the morning (or do a hypothesis the day before).

## Objectives:

- Students will identify the dangers of leaving both people and pets in vehicles on hot days.
- Students will use the scientific method to form and test a hypothesis.
- Students will use a line graph to track and compare data.
- Students will learn to use measuring utensils and to mix ingredients.

## Materials:

- Graph paper
- Colored pencils
- Vehicle
- Cookie sheet
- Cookie cutters
- Mixing bowl
- Measuring spoons
- Measuring cups
- Spatula or wooden spoon
- Rolling pin
- Cooling rack
- Recipe ingredients (see handout)
- Two thermometers
- Daily forecast

## Notes:

The following lesson uses the scientific method to track the rising temperatures inside a car on a hot day. We do this while baking dog treats on the dashboard. We have provided you with a recipe that avoids common allergens and dangerous raw ingredients. The recipe also includes standard baking directions, so students can bake treats at home in a conventional oven.

**Procedure:**

1. Start a discussion about the danger of hot cars in the summer time. Consider asking some of the following questions:
  - a. How does it feel when you get in a car during the summer? How does that compare to the temperature outside?
  - b. Is it dangerous to be inside a car on a hot day? Why?
  - c. Does it get hotter inside a car than outside a car?
  - d. What are some ways people keep their cars cool in the summer?
  - e. Who is in danger when left in a hot car?
2. Explain that we will be running an experiment to answer the following question: How high can the temperature climb inside a car?
3. Review steps of scientific method and, if at grade level, the difference between independent and dependent variables. Your school or organization may use a slightly different model, but we will be using the following (substitute yours in if it doesn't match):
  - a. Research
  - b. Hypothesis
  - c. Experiment
  - d. Analysis
  - e. Conclusion
4. The first step of the scientific method is research. To expedite the lesson, we have provided some facts for you:
  - a. A human in a closed car would die after 10 minutes in temperatures of 140 degrees Fahrenheit.
  - b. Once the interior temperature of a car reaches 110 degrees, a dog's chance of heat stroke is very high.
  - c. On sunny, humid days, the interior temperature of a car can rise more than 30 degrees ~~per a~~ minute.
5. Encourage your class to come up with a hypothesis to answer the question. You can solicit guesses from the room and then take an average or median. Save the hypothesis.
6. To begin the experiment, place two thermometers: one should be inside a closed car; the other should be outside, but near the car (be sure not to place the thermometer in the shade of the car; that will throw off your reading). Record your starting temperature for each thermometer. This step should be done early in the morning, so the thermometers' readings will be about the same. Record these for later.
7. Follow the recipe for the dog treats (see attached). Split your class into small groups, so everyone can take turns measuring and mixing ingredients. Each group will make a batch of treats. Encourage them to read the ingredients aloud, then help each other find the correct measuring spoons and cups. Have students roll the dough flat with a rolling pin and cut into shapes with cookie cutters. Help those who have never used these items. As the students cut the treats into

- shapes, have them carefully place the treats onto a cookie sheet. Depending on your class size, you may need more than one sheet. After all treats are laid out, move the pans to the car's dashboard. Record both temperatures when you place the treats in the car.
8. Back in the classroom, review a line graph. You will chart the two temperatures on a line graph. To help your students, you may want to do a graph on the board while they do one individually on their paper. Choose one color for in-car temperature and another color for outside temperature. Go ahead and plot the four temperatures you should have already (two temperatures from the beginning of the lesson and two temperatures from when you put the dog treats in).
  9. Throughout the day, record the temperatures at hourly intervals. Continue to chart the progress.
  10. After temperatures have noticeably dropped and the graphs are beginning to resemble a bell-curve, remove the dog treats. Set the treats on a cooling rack. At this point, most classes will have gone home and the lesson will have to continue the next day. After cooling, place the treats in an air-tight container for storage.
  11. After the experiment is complete, the class should analyze the data. Discuss the following points:
    - a. What was the highest temperature in the car? What was the highest temperature outside?
    - b. Why was it so much hotter inside the car?
    - c. Was the hypothesis correct?
    - d. Did anything happen during the experiment that may have affected the results? (A freak rainstorm, the car was unexpectedly shaded, etc.)
  12. After discussing the experiment, encourage the class to come to a conclusion. What happens inside a car on a hot day? Is it safe to leave a pet or human in a hot car?
  13. After discussing the experiment, you may want to package the treats and deliver them to your local shelter. When NHES does this experiment, we are at our adoption center, so we can pass out treats to adoptable dogs.