

Environment and Racing



Grade Level: Middle and High School

Student Objectives

- Examine geology and weather's impact on racing
- Utilize weather data to predict race implications

Materials List

- Worksheet
- Photos and images
- NASCAR background informational sheet
- Bike or inflatable device (toy)
- Tire gauge
- Air pump
- Hose with sprinkler feature
- Surfaces like asphalt, grass, concrete and dirt/clay
- Temperature gauge (such as the app Smart Temperature - lay your smart device down to monitor temperature reading)

Lesson Plan and Procedures

1. Read the NASCAR background informational sheet and view suggested photos and web links.
2. Complete the worksheet using these resources.
3. Conduct an experiment(s) using weather conditions, surfaces and air pressure.

Temperature-Surface Experiment:

- Locate three different types of surfaces in your neighborhood such as asphalt, concrete, grass or dirt/clay.
- Measure the temperature of each surface for at least 10 minutes at 1-hour intervals between 8 a.m. and 6 p.m.
- Record the time and your readings on the worksheet for each type of surface.





- Plot your data by time and temperature.
- What did you observe? What impact might this have on rubber tires?

Kick It Up a Notch Experiment: Using a bike, try riding on the different surfaces at different times of the day. Make notes of how the surfaces may change or feel different to ride on. Did any become easier (requiring less energy/less pedaling) or harder?

Make It Rain Experiment: Using a hose with a sprinkler attachment, wet your surfaces and record the changes in temperatures. Did the temperatures go up or down?

Riding After the Rain Experiment: Using your bike, try riding on each of the surfaces after it has rained – if possible, within 15 minutes after its stops. What changes did you notice by the surfaces being wet and interacting with your tires?

Air Pressure Experiment:

- Please get your parent’s permission before beginning this experiment! If you have a bike, air pump and tire gauge (to measure air pressure), you can conduct this experiment. If you have an inflatable tire or other inflatable rolling device, you can substitute it for the bike, but you’ll need a family member or friend to assist you.
- Measure the full/recommended inflation of your tire. Recommended tire pressure is printed on the sidewall of the tire, or you can look up the psi (pressure) online.
- Ride on the surfaces you have been tracking. Note any observations you have about performance and handling, or steering and control.
- Reduce the tire pressure by 3 psi. Then, retest the surfaces by riding on them. Note your observations on the worksheet. Do not deflate tires beyond 30 percent of the recommended pressure; you may cause permanent damage to the tube inside the bike.





- Re-inflation the tire to its recommended pressure, and then add 1 to 3 psi. Go for a ride and note your observations for handling on the worksheet. Do not overinflate tires beyond 10 percent above the recommended pressure, or tire tubes may blow/break.
 - Chart your readings and performance.
4. Wrap Up: You've had a chance to experiment with some of the environmental factors that impact racing which crew chiefs, engineers and drivers experience. Drivers need to provide live and real-time feedback on the car's performance, which in many cases is tied to the environmental influences on the car. Crew chiefs and engineers need to prepare before, during and after the race to understand how the environmental factors impacted the car and what they need to do in future races. All the data collected is retained year after year and referenced at races at the same track.

