ENERGY AND NASCAR

LESSON PLAN 3: ENERGY AND SPEED

UNDER THE HOOD

TIME REQUIRED: 1 hour, plus time for optional extension activity

MATERIALS: Completed racecars from the **Three Ds of Speed** unit, straws, balloons, rubber bands, tape, scissors, index cards

ACTIVITY AND RESOURCE SHEETS: *Energy and Speed Activity Sheet*

Download additional sheets as needed at scholastic.com/nascarspeed.

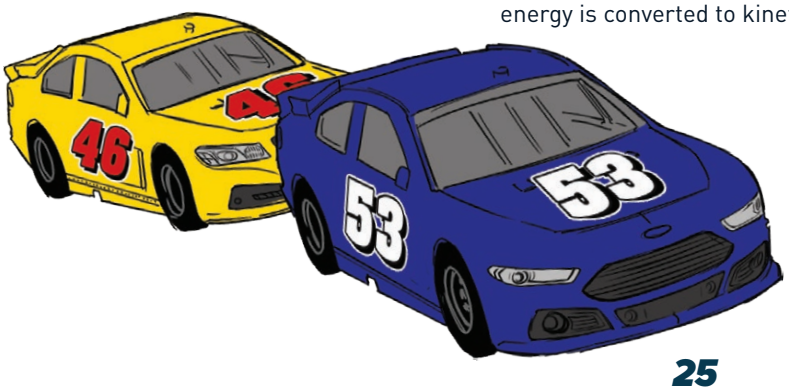
LEXILE SCORE: *1050L*

Central question:
How are potential and kinetic energy connected?

1. Read the following description to your class: "My hands tightly grip the steering wheel. My ears are filled with the loud roar from the engine. I feel my body pushed back into my seat. A crowd of people whips past my window." Ask students if they can guess which activity you are describing. (*Driving a racecar.*)
2. Show students a picture of a roller coaster. Ask them to explain what's going on in the image. What clues let them know what's taking place? Have them recall the idea of **potential energy** (stored energy) and **kinetic energy** (energy of motion). Ask them how these concepts relate to what's going on in the picture. (*A roller coaster gains potential energy as it reaches the peak of each track. It's converted to kinetic energy as the roller coaster plunges downward.*)
3. Explain that in these two activities, students practiced making inferences. They used prior knowledge, evidence, and reasoning to make connections and draw conclusions.

Central question:
Why are speed limits important for NASCAR safety?

1. State that making inferences is an important skill to have when reading texts. It helps students "read between the lines" and identify ideas that are not directly stated.
2. Hand out the *Energy and Speed Activity Sheet*, where students will read a passage about NASCAR's safety measures to reduce high-speed crashes. After reading the passage, have them answer the reading comprehension questions on the sheet, which require them to make inferences about the text. They'll also be asked to explain how they came to their conclusions. (*Answers: 1. Fuel. 2. The flow of fuel into the car's engine is reduced. 3. No one has been able to beat Bill Elliott's record speed since restrictor plates were introduced. 4. A high-speed crash in 1987. 5. To ensure that no team has an unfair advantage over another and to make sure the teams do not tamper with the plates to go faster.*)
3. Prompt students to discuss in pairs their responses to the activity sheet's questions. Ask students to share real-world examples other than racecar engines during which potential energy is converted to kinetic energy.



Central question:
How does limiting potential energy reduce kinetic energy?

PIT CREW CHALLENGE (OPTIONAL)

1. In previous lessons and in the reading passage, students learned that the fuel in a racecar's gas tank holds chemical potential energy. When the fuel burns, it undergoes a chemical reaction that unleashes energy to power the car's engine and propel the vehicle forward.
2. Pass out a straw, balloon, and rubber band to each pit crew. Instruct teams to insert the straw into the mouth of the balloon and wrap a rubber band around the balloon's neck so it makes an airtight seal. Tell pit crews to tape the straw lengthwise to the top of their completed cars from the *Three Ds of Speed* unit. The balloon end of the straw should point toward the front of each car.
3. Place a piece of tape on the floor to act as a starting line. Have students blow into the open end of their straws to inflate their balloons until they measure four inches wide, and then pinch the end of the straw so the air can't escape. Have pit crews place their cars on the line and, on your signal, release the ends of the straws. Discuss what happened as a class. How did the balloon-powered racecars convert potential energy into kinetic energy?
4. Have each crew cut a hole one-eighth of an inch wide in the center of an index card. Fit the neck of the balloon through the hole, then reattach the balloon to the straw and retape it to the car. Have students inflate their balloons to four inches and race their cars again. How did the index card act like a NASCAR restrictor plate? How did it affect how far each car rolled?