



LESSON 2 FRICTION

START YOUR ENGINES!

ASK: Will a ball roll farther on the grass, on the playground or on the sidewalk? Discuss. Let's go outside and experiment. Allow time to experiment rolling balls on different surfaces. Why is there a difference how far the ball rolls? (Allow time to speculate.)

SAY: The ball rolled farther and faster on a smooth surface because there was less friction between the ball and the surface. This is an important principle to understand in drag racing. Let's learn more about friction and what it means for our gravity-powered race cars.

GO!

Give your child the "Friction" Worksheet.

SAY: Look at the two ramps—"A" and "B"—at the top of the page. **ASK:** How are the ramps alike? How are they different? Why will the car travel faster down the smooth ramp? (A: less surface friction)

Create a chart like the one below to help guide the discussion about Friction. Leave the answer section blank and have your child write his/her own answers after reading the section "What is Friction?" Look for answers to the questions on the chart while you read.

QUESTIONS	ANSWERS
What is friction?	
What does it do to moving things?	
Why does a rolling ball eventually stop?	

ANSWERS: What is friction? *Friction is when two things rub against each other.*
 What does it do to moving things? *Friction slows or stops moving things.*
 Why does a rolling ball eventually stop? *Friction between the ball and the ground make it stop.*

OBJECTIVES

Your child will:

- Understand the relationship between friction and motion
- Compare smooth and rough surfaces
- Build content vocabulary (friction, burnout)
- Determine cause and effect
- Think critically about physical forces

You will need:

- Balls (playground, tennis, golf, etc.)
- Friction *Kid Scoop News* Worksheet
- Engineer's Journal (see Lesson 1)



LESSON 2
FRICION

SAY: Read the Section “Fun with Friction.” Why would race drivers complete a burnout BEFORE the race?

WRITE “Cause” phrases on a piece of paper in a “T-Chart.” **ASK** students to help you complete the “Effect” side. (Answers are shown.)

CAUSE	EFFECT
Because Ramp B has a rough uneven surface ...	
Because there is friction when two moving things rub against each other ...	
Because the drag racers spin the car’s wheels while the car stays still (a “burnout”) ...	

ANSWERS: Because Ramp B has a rough uneven surface ... *it creates more friction when the car travels over it.* Because there is friction when two moving things rub against each other ... *moving things will eventually slow or stop.* Because the drag racers spin the car’s wheels while the car stays still (a “burnout”) ... *the tires heat up and smoke.*

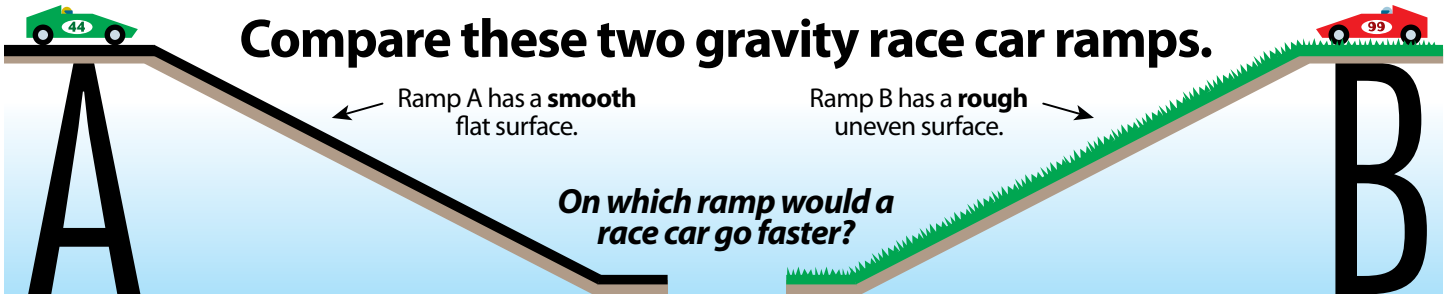
VICTORY LANE!

- 1. Chat it UP!** Explain the relationship between friction and motion to a family member or friend. How will this information make you a better engineer?
- 2. Imagin-eer!** In your Engineer’s Journal, design two ramps with very unique and different surfaces (e.g., mirror vs. eggshells, gravel vs. tin foil, etc.) Describe which surface will be better for racing your car and why. Use all five of these words in your explanation: smooth, rough, friction, ramp, gravity.
- 3. Write On!** Imagine you’re a news reporter covering your first burnout at the drag strip. Describe what happens before, during and after. Use *who, what, when, where* and *why* format. Submit your news coverage story to steam@sonomaraceway.com

STUDENT NAME: _____

THE SCIENCE OF RACING

FRICTION • IT CAN REALLY SLOW YOU DOWN



When a car goes down a smooth surface like ramp A, it will travel more quickly because it has less surface friction.

Ramp B has a rough surface, which creates more friction when the car travels over it, making it go much slower than the car on ramp A.

What is friction?

Friction is what happens when two things rub against each other. Friction slows or stops moving things. A rolling ball eventually stops because friction between the ball and the ground brings it to a stop.

See Friction in Action!

Roll a ball from one end of a basketball court to the other. Pretty easy, right?

Now try to roll the ball that same distance on grass or gravel. Friction makes that a lot harder to do!



FUN WITH FRICTION

Before racing down the **Sonoma Raceway** drag strip, drag racers complete a **burnout**, which spins the car's wheels while the car stays still. This causes the tires to heat up and smoke due to friction.

Drag racing tires perform better at higher temperatures. A burnout is the quickest way to raise tire temperature immediately prior to a drag race.

Photo: RCrampton/MFinnegan

Have you ever fallen and scraped your knee? Ouch! Friction between the skin on your knee and the hard ground is what made it hurt!