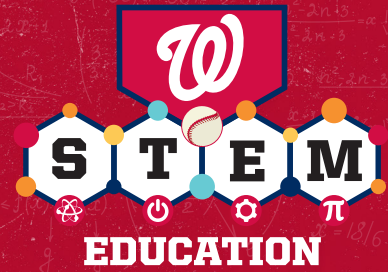# WASHINGTON NATIONALS
BASEBALL SCIENCE
FUN SHEETS

Elasticity

INTRODUCTION

What determines how high a ball bounces? This lesson explores the concept of elasticity and materials used to make balls for different sports.

OBJECTIVES

1. Compare the elasticity of different balls when dropped from the same height
2. Collect and graph a data set of measurements and calculate averages of the three trials
3. Discuss and hypothesize which factors (i.e., size, weight, design, construction materials) affects a ball's elasticity

KEY CONCEPTS

- Elasticity is the ability of an object or material to resume its normal shape after being stretched or compressed measurements of a variety of balls from the same height onto the same surface
- The balls are dropped so gravity will be the only force affecting the compression

MATERIALS

- Baseball
- Softball
- Tennis Ball
- Tape Measure (10')
- Notebook

KEY WORDS

- Elasticity
- Bounce
- Variables
- Force
- Gravity

FOCUS STANDARDS

Relates to Vertical Measurement:
CCSS.MATH.CONTENT.2.MD.A.4

Relates to Averaging:
CCSS.MATH.CONTENT.5.NBT.B.7

Elasticity

PROCEDURE

1. **Allow students to feel how much you can squeeze the tennis ball, softball and baseball without damaging it.** What does this say about the elasticity of each ball? What does it say about the material of the ball? Consider engaging students with one of the videos to spur discussion and conjecture about the outcomes of this activity.

2. **On a hard floor surface, drop different balls three times each from the same height.**

3. **On each drop, measure the height of the first bounce using the tape measure (10 ft.) and document it in your notebook. Also record the number of bounces after each drop.**

4. **Record the results in the table provided. Calculate the average of the three trials for each type of ball.** Note: If different students have turns at dropping the balls, place a "fixed height" mark to avoid variations. It might be discussed that in science experiments you try to control for variables not being tested. Be careful not to throw the ball; just drop it from your hand. (Before you begin, discuss whether the data will be rounded to the nearest whole number or if fractional amounts will be recorded for the averaging.)

5. **Compare the number of bounces for each type of ball on a single surface type.** How does the number of bounces relate to the elasticity of the ball material?

6. **Now, compare the number of bounces for the tennis ball on more than one surface type.** How does the number of bounces correlate to the elasticity of the surface material?

ADDITIONAL SUPPORT

- Review and then practice the measurement skill of aligning the left side (first inch) with the left side (or at the floor level) of the height measuring tool.

- Mark off on paper, or on masking tape, whole number height intervals to make recording the highest bounce measurement easier.

- Create data recording worksheets for both the trials with different balls as well as the repeated tennis ball trials on different surfaces.

- Consider rounding all measurements to the ½ or ¼ of an inch for ease of computation and graphing.

ONLINE RESOURCES

Sports Balls Bouncing (7:32) – https://tinyurl.com/y9xzxfk9 – Footage of 23 sport balls bouncing, the theme of this video corresponds to the science lab manual series, "Bounce, Roll, & Fly: The Science of Balls."

POTENTIAL EXTENSIONS

Extension Idea #1 – Try other sports balls like basketball, soccer ball, etc.

Extension Idea #2 – Repeat the previous drop tests on carpet, tile, or grass surface. What would happen if the drop test was repeated over a small pool filled with water?

Elasticity
WORKSHEET

STUDENT NAME

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INSTRUCTIONS: What determines how high a ball bounces? In this activity, you will explore the concept of elasticity and materials used to make balls used for different sports while practicing measurement and calculating averages.

	TRIAL 1		TRIAL 2		TRIAL 3		
	Bounce Height (in.)	Number of Bounces	Bounce Height (in.)	Number of Bounces	Bounce Height (in.)	Number of Bounces	Average Height (in.)
Baseball							
Tennis Ball							
Softball							