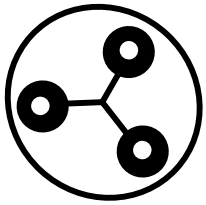
Slow

Bicycle



Race

Thomas Jefferson National Accelerator Facility - Office of Science Education
http://education.jlab.org/

Slow Bicycle Race

How slowly can you ride a bike without touching the ground?

1. Fill in the names of your teammates on the **Slow Bicycle Race Data Chart** on the next page.
2. Each person will ride a bike through a track three times in a row. The track is a rectangle about 6 meters long and 60 centimeters wide. You have to ride the bike through the track as slowly as you can.
3. Use a stopwatch to time how long each ride takes:
    - **Start** the timer when the bike's **back** tire enters the track
    - **Stop** the timer when the bike's **back** tire leaves the track **or** if the rider's foot touches the ground
4. Record the time of each ride on the **Slow Bicycle Race Data Chart**. Remember, each person gets three turns in a row. Make certain that you record everyone's times.
5. How can you tell which team won? Since the slowest team wins, you'll need to calculate how slow your team went. To do that, you need to know:
    - **How far** your team went
    - **How much time** your team took to go that far
6. Use the data you collected and the **Team Results Chart** to help you calculate your team's speed.

Safety Rules

- **You must wear a helmet on your head when you are on a bike**
- **Both wheels of the bike must be on the ground at all times, so**
    - **NO Bunny hops**
    - **NO Wheelies**
    - **NO Flying through the air in general**
- **Stay in your team's track**
- **Watch out for your classmates**

Slow Bicycle Race Data Chart

Name of rider	Ride Number	Distance (meters)	Time (seconds)
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.

Team Results Chart

Directions: Transfer each team member's **Total Distance** and **Total Time** onto the results chart below.
Calculate your **Team's Total Distance** by adding each rider's total distance together.
Calculate your **Team's Total Time** by adding each rider's total time together.

Rider's Name	Rider's Total **Distance**	Rider's Total **Time**
		.
		.
		.
		.
		.
		.

	.
Team's Total **Distance**	Team's Total **Time**

HOW SLOW DID OUR TEAM GO?

Team's Total Distance ÷ Team's Total Time = Team's Speed

	÷	.	=	.

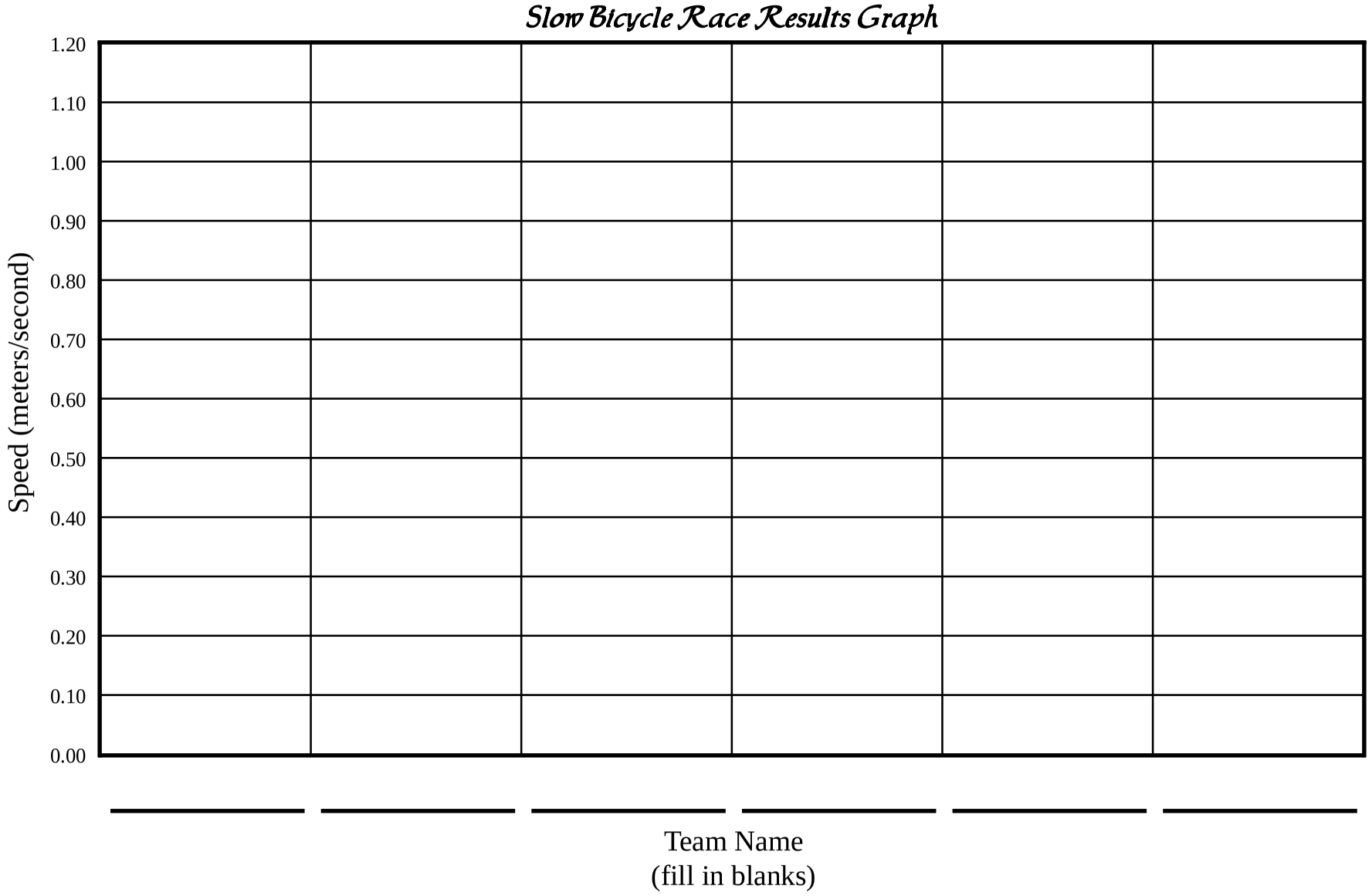
(Round to the nearest hundredth)

WHICH TEAM WON?

Team Name	Team's Total **Distance**	Team's Total **Time**	Team's **Speed**
		.	.
		.	.
		.	.
		.	.
		.	.
		.	.

LET'S MAKE A GRAPH!

Directions: Create a **bar graph** to show each team's average speed.



Writing About A Trip

AT JEFFERSON LAB, YOU RODE A BIKE AS SLOWLY AS YOU COULD.

Write about taking a trip. Would you like to go someplace nearby or far away? How would you get there? Who would go with you? How long would you stay? What would you do once you got there? What would you bring with you?

Slow Bicycle Race Data Chart

Name of rider	Ride Number	Distance (meters)	Time (seconds)
Student Name 1	1	***6 m***	***10.03 s***
	2	***6 m***	***9.81 s***
	3	***6 m***	***5.88 s***
TOTAL Distance and Time		***18 m***	***25.72 s***
Student Name 2	1	***6 m***	***5.98 s***
	2	***6 m***	***7.34 s***
	3	***6 m***	***8.88 s***
TOTAL Distance and Time		***18 m***	***22.20 s***
Student Name 3	1	***6 m***	***1.08 s***
	2	***6 m***	***15.81 s***
	3	***6 m***	***22.88 s***
TOTAL Distance and Time		***18 m***	***39.77 s***
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.
	1		.
	2		.
	3		.
TOTAL Distance and Time			.

Team Results Chart

Directions: Transfer each team member's **Total Distance** and **Total Time** onto the results chart below.
Calculate your **Team's Total Distance** by adding each rider's total distance together.
Calculate your **Team's Total Time** by adding each rider's total time together.

Rider's Name	Rider's Total **Distance**	Rider's Total **Time**
Student Name 1	***18 m***	***25.72 s***
Student Name 2	***18 m***	***22.20 s***
Student Name 3	***18 m***	***39.77 s***
		.
		.
		.

54 m	***87.69 s***
Team's Total **Distance**	Team's Total **Time**

HOW SLOW DID OUR TEAM GO?

Team's Total Distance ÷ Team's Total Time = Team's Speed

54 m ÷ ***87.69 s*** = ***0.62 m/s***

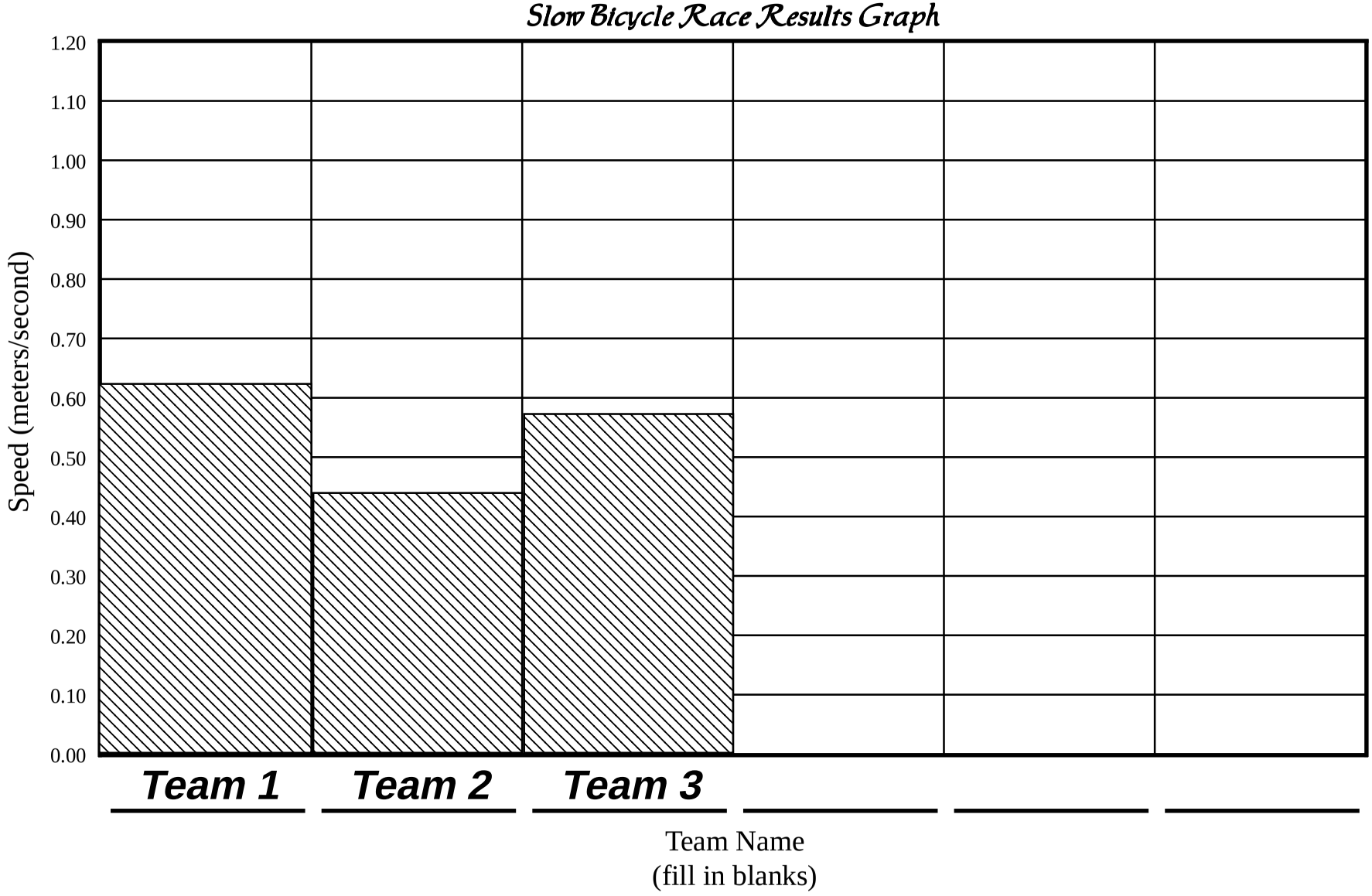
(Round to the nearest hundredth)

WHICH TEAM WON?

Team Name	Team's Total **Distance**	Team's Total **Time**	Team's **Speed**
Student Team 1	***54 m***	***87.69 s***	***0.62 m/s***
Student Team 2	***54 m***	***123.45 s***	***0.44 m/s***
Student Team 3	***54 m***	***93.41 s***	***0.58 m/s***
		.	.
		.	.
		.	.

LET'S MAKE A GRAPH!

Directions: Create a **bar graph** to show each team's average speed.



Slow Bicycle Race

This is an activity in which students compute the speed at which they rode a bicycle.

Objectives:

In this activity students will:

- work in teams
- ride a bicycle as slowly as possible
- use a stopwatch to measure time
- record data
- use multiplication and addition to determine team's total distance and time
- use division to calculate team's average speed
- compare average speed with other teams to determine which team was the slowest
- create a bar graph to depict each team's average speed

Questions to Ask:

1. What was the most difficult part about riding the bike?
2. What happens to the speed as the time increases?
3. What happens to the speed as the time decreases?

Travel Book Activities:

- Writing About a Trip

Virginia State Standards of Learning

Math 6.8 Computation and Estimation

- by problem-solving using decimals with whole number divisors to determine speed (chart and graph included)

Science 6.1 Scientific Investigation, Reasoning and Logic

- by collecting, recording and analyzing precise measurements of time to determine speed over distance

The Slow Bicycle Race
Teacher Overview and Materials List

Background:

Experiments at Jefferson Lab will take weeks to months to complete. During this time scientists will collect millions of pieces of data. Once the scientists have the data, they begin to analyze the data using computers, looking for evidence to support or disprove their theories. To simulate the scientific data collection process, students will create the necessary data to calculate speed.

Minimum Materials Needed for Each Student Group:

Bicycle helmet

Bicycle

Race track

Stopwatch

Pre-Activity Preparations:

The Race Track

1. Mark off one race track for each team. Each track should be a rectangle 6 meters (~19.5 feet) long and 60 centimeters (~2.4 feet) wide.

Materials for The Slow Bicycle Race