Name _____

Period ____

DISTANCE – TIME GRAPHS

INTRODUCTION:

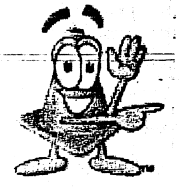
The motion of objects has always been one of the most interesting mysteries to humans. We are both amazed and confused with how objects move in our universe, and an understanding of such motion could be useful for a variety of purposes. For example, early humans needed to understand the results of gravity when an arrow is aimed at the family's dinner. Today, modern man needs to understand the forces of gravity in order to send space probes, or astronauts, to other planets. The most interesting thing about our knowledge of motion is that the more we know, the more questions that seem to be raised.

In order to understand motion, it is often helpful to display it in a visual form. This is done by the use of a **DISTANCE – TIME GRAPH.** In this type of graph, **TIME** is plotted on the x-axis, and **DISTANCE** is plotted on the y-axis.

This activity is designed to allow you to construct a variety of DISTANCE – TIME graphs and analyze the results.

DIRECTIONS:

PART 1: DISTANCE – TIME GRAPHS



Graph the data on the back of this page showing: CONSTANT SPEED, ACCELERATION (speeding up), DECELERATION (slowing down).

PART 2: THE RACE

To the right is a set of data that represents The distance traveled by 3 cars during a race.

Make a distance – time graph for **EACH** car (multiple line graph)

LABEL each line as to which car it represents

ANSWER the questions on the back of the lab

TIME (sec)	DISTANCE (meters)		
	CAR A	CAR B	CAR C
0	0	0	0
1	2	1	3
2	4	2	6
3	6	4	9
4	8	7	11
5	10	10	12
6	12	13	13
7	14	16	13
8	16	19	13
9	18	22	13
10	20	25	13

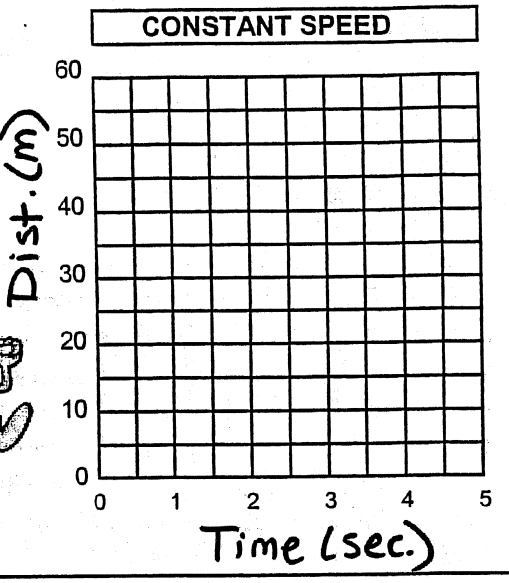
MOTION

The following is data for a car travelling at

CONSTANT SPEED

Plot the data on the graph to the right

TIME (sec)	DISTANCE (meters)
0	0
1	10
2	20
3	30
4	40
5	50

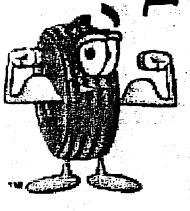


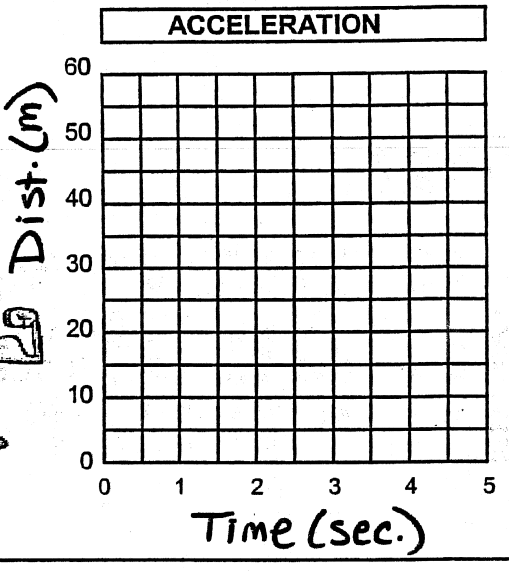
The following is data for a car travelling at

ACCELERATION

Plot the data on the graph to the right

TIME (sec)	DISTANCE (meters)
0	0
1	2
2	5
3	10
4	25
5	50



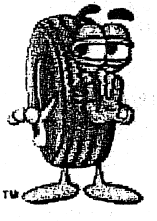


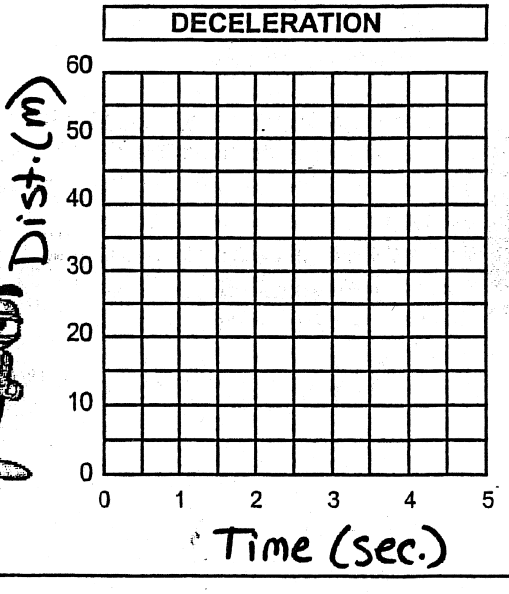
The following is data for a car travelling at

DECELERATION

Plot the data on the graph to the right

TIME (sec)	DISTANCE (meters)
0	0
1	20
2	35
3	43
4	48
5	50





NAME _____

DATE _____

PERIOD _____

DISTANCE - TIME GRAPHS

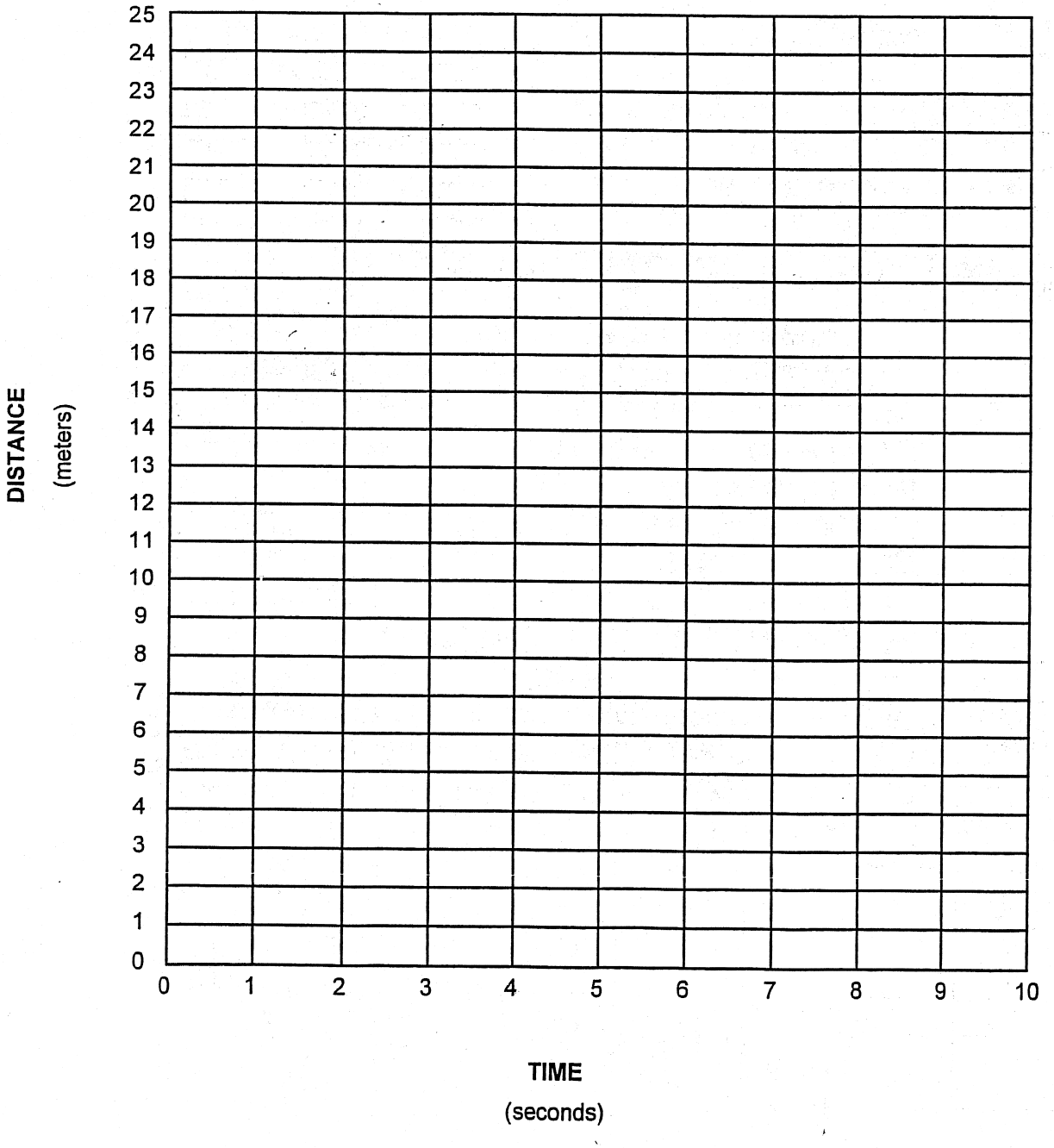
DIRECTIONS:

Plot the data from THE RACE on the cover on the graph below

Plot each car separately

Label which line represents each car

Use different colors to represent each car



LAB QUESTIONS

DISTANCE - TIME GRAPHS

Use the graph of THE RACE to answer the following questions:

		CAR A	CAR B	CAR C
1	Which car WON the race?	☐	☐	☐
2	Which car LOST the race?	☐	☐	☐
3	Which car traveled at CONSTANT SPEED?	☐	☐	☐
4	Which car showed ACCELERATION?	☐	☐	☐
5	Which car showed DECELERATION?	☐	☐	☐
6	Which car STOPPED?	☐	☐	☐
7	Which car was never winning the race?	☐	☐	☐

8 **CALCULATE** the **AVERAGE SPEED** of each car for the **ENTIRE** race: nearest 10th

$\star S = \frac{\quad}{\quad} \star$

	TOTAL DISTANCE (meters)	TOTAL TIME (sec)	Average Speed (m/sec)
CAR A	20	10	$S = \frac{d}{t} = \frac{20}{10} = 2$
CAR B			
CAR C			

CALCULATE the speed of each car **FOR EACH SECOND OF THE RACE** nearest 10th

CAR A		
TIME (sec)	DISTANCE (meters)	SPEED (m/sec)
0	0	**0**
1	2	2
2	4	2
3	6	2
4	8	
5	10	
6	12	
7	14	
8	16	
9	18	
10	20	

CAR B		
TIME (sec)	DISTANCE (meters)	SPEED (m/sec)
0	0	**0**
1	1	
2	2	
3	4	
4	7	
5	10	
6	13	
7	16	
8	19	
9	22	
10	25	

CAR C		
TIME (sec)	DISTANCE (meters)	SPEED (m/sec)
0	0	**0**
1	3	
2	6	
3	9	
4	11	
5	12	
6	13	
7	13	
8	13	
9	13	
10	13	