

Name \_\_\_\_\_ Teacher \_\_\_\_\_

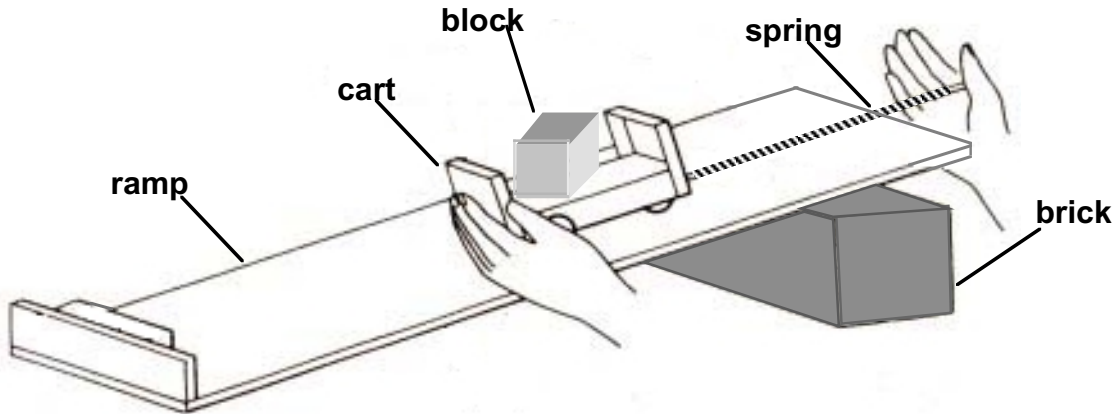
Date \_\_\_\_\_

Pedro and Samantha were roller blading. Two friends held them in place at the top of a hill and then let go. Pedro and Samantha rolled to the bottom of the hill.



1. Pedro and Samantha got to the bottom of the hill at the same time. They wanted to figure out why that happened. What do they need to think about? *Circle the best answer.*
  - a) Each person's mass.
  - b) The force of gravity on each person.
  - c) Each person's mass and the force of gravity.
  - d) The speed of each person down the hill.
  
2. Samantha and Pedro rolled down the hill for multiple trials. What does it mean to do multiple trials? *Circle the best answer.*
  - a) They rolled down the hill several times.
  - b) They each rolled down the hill from a different starting point.
  - c) They separately rolled down the hill several times.
  - d) They rolled down several different hills.
  
3. If Samantha is heavier than Pedro, what claim can we make from their results that they got to the bottom of the hill at the same time? *Circle the best answer.*
  - a) Girls and boys can travel down hills in the same amount of time.
  - b) People of different mass can travel down hills in the same amount of time.
  - c) Objects of the same size can travel down hills in the same amount of time.
  - d) Objects of different mass can travel down hills in the same amount of time.

This is a model Samantha and Pedro created to study what happened during their roller blade races.



4. Circle the word that describes each part of the model. *Circle one word for each part.*

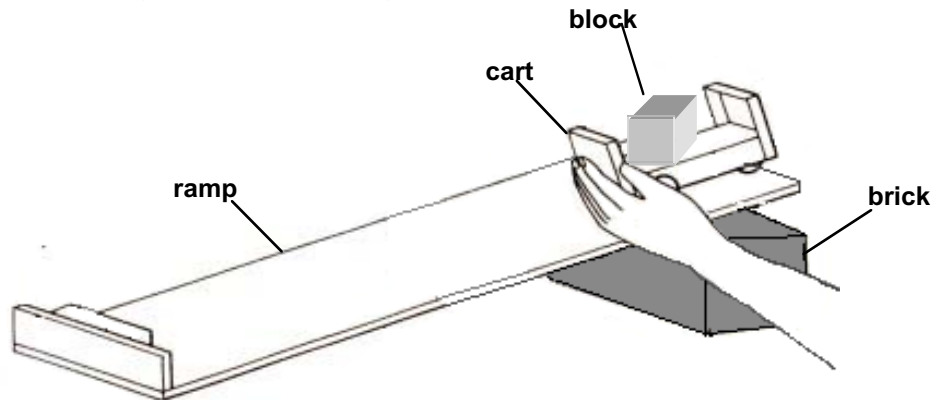
<b><u>Ramp</u></b>
gravity
height
hill
people
roller blades

<b><u>Cart</u></b>
gravity
height
hill
people
roller blades

<b><u>Block</u></b>
gravity
height
hill
people
roller blades

<b><u>Spring</u></b>
gravity
height
hill
people
roller blades

Pedro and Samantha used this set-up to find out how different amounts of mass on a cart affect its motion down a ramp. They put different numbers of blocks on the cart, and used stop watches to time how long it took the cart to go down the ramp.

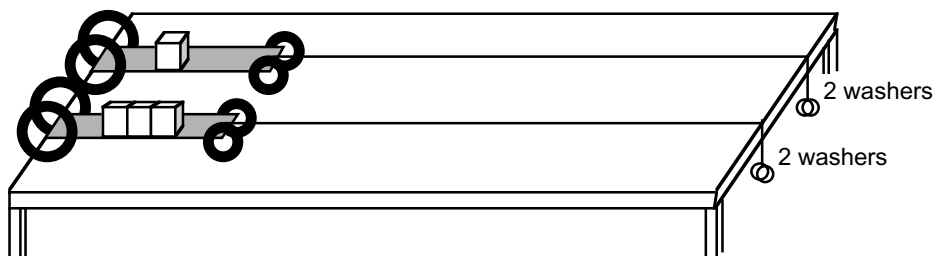


These are their results:

Mass on Cart (number of blocks)	Time (seconds)		
	Trial 1	Trial 2	Trial 3
0	2.43	2.44	2.47
1	2.40	2.43	2.44
2	2.47	2.45	2.43

5. When the cart had 2 blocks on it, how long did it take to get to the end of the ramp in Trial 2?  
*Circle the best answer.*
- a) 2.43 seconds
  - b) 2.44 seconds
  - c) 2.45 seconds
  - d) 2.47 seconds
6. What claim could you make from the results in the table? *Circle the best answer.*
- a) The times for the cart increase the more trials you do.
  - b) The cart took around 2.4 seconds to go down the ramp.
  - c) The cart traveled about the same amount of time in each trial.
  - d) The mass on the cart did not affect its speed down the ramp.

Ling and Peter were studying motion with the materials in the drawing.



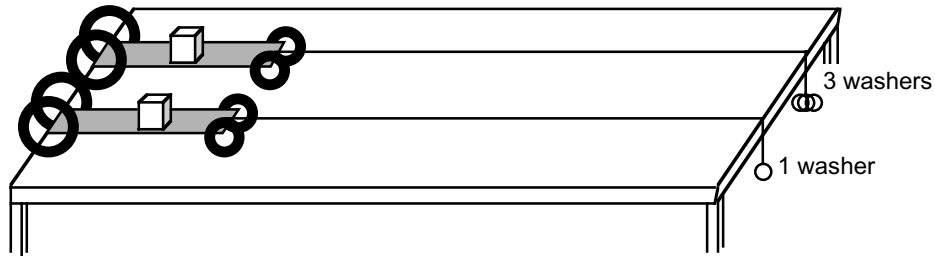
7. In this set-up, everything is the same, *except* Circle the best answer.
- a) the size of the carts
  - b) the weight of the carts
  - c) the amount of force pulling the carts
  - d) the distance the carts moved

Peter and Ling used stop watches to measure the time carts took to reach the end of the table. Here are all their results.

Force (number of washers)	Mass (number of blocks)	Time (seconds)			
		Trial 1	Trial 2	Trial 3	Trial 4
2	1	1.80	1.74	1.71	1.75
2	2	1.88	1.80	1.84	1.85
2	3	1.90	1.95	1.88	1.91

8. What does the table show that they were studying? Circle the best answer.
- a) The effect of mass on motion.
  - b) The effect of force on motion.
  - c) The effect of force and mass on motion.
  - d) The time that a cart took to travel.
9. Ling marked the times in the table that were the same. Since some times were the same even though the mass was different, what should Peter and Ling do next? Circle the best answer.
- a) Ignore the times that were the same when the masses were different.
  - b) Do more trials for each mass.
  - c) Average the times of the trials for each mass.
  - d) Do trials with masses of 4 and 5 blocks.

Ling and Peter continued their study of moving objects. They changed the force by adding washers.



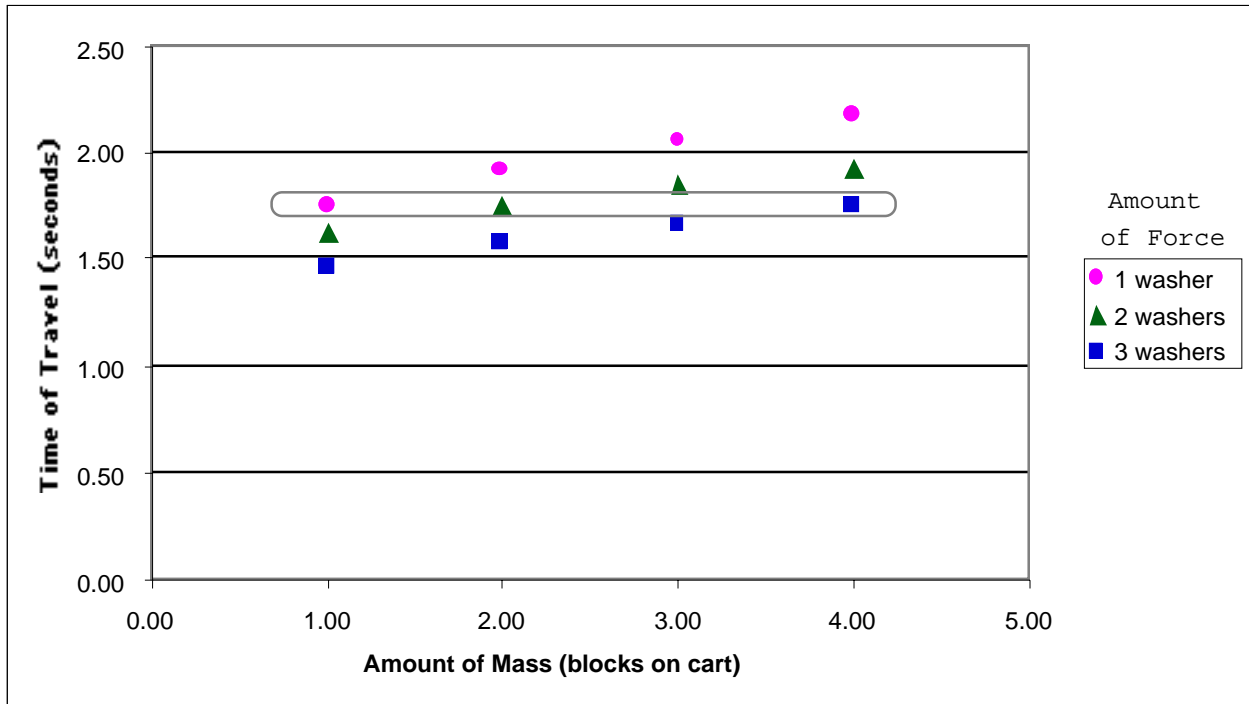
When they were finished with the carts, Ling and Peter decided to average the times of their trials. These are their results.

Force (number of washers)	Mass (number of blocks)	Average Time (seconds)
1	1	1.75
	2	1.91
	3	2.05
	4	2.17
2	1	1.63
	2	1.75
	3	1.85
	4	1.92
3	1	1.46
	2	1.58
	3	1.66
	4	1.74

10. What does the table show that they were studying? *Circle the best answer.*

- a) The effect of mass on motion.
- b) The effect of force on motion.
- c) The effect of force and mass on motion.
- d) The time that a cart took to travel

This is a graph of Ling and Peter's data.



11. What can we tell from the points that are circled? *Circle the best answer.*

- a) Objects with different amounts of mass can take the same amount of time to travel.
- b) Objects with different amounts of force can take the same amount of time to travel.
- c) Objects with different amounts of force and mass can take the same amount of time to travel.
- d) Objects with different amounts of force, mass, and speed, can take the same amount of time to travel.