Racing Velocity
Summative Assessment #1
For
A Television in My Room

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Racing Velocity
Summative Assessment #1

Type of Assessment:
Constructed Response

Duration:
60 to 90 minutes

Standard (s) Assessed:
SC.C.1.2.1.4.1, SC.C.2.2.1.4.1, SC.C.2.2.2.4.1, MA.B.4.2.1.4.1, MA.B.4.2.2.4.1, MA.D.2.2.1.4.1, MA.D.2.2.1.4.3

Description of Assessment Activity:
This is a two-part assessment. Part one includes three scenarios for students to read. The students then write a solution to the problem related in the scenario. Use of a simple machine must be included in the solution. Part two includes building and measuring two ramps. The ramps are then used to accelerate miniature cars. Students use measuring tools and calculations to figure the velocity of their cars using each ramp. This assessment combines science and math standards.

Teacher Directions:
Preparation –

1. Gather ramp-building materials such as stiff cardboard or wood planks that can be placed on a stack of books to form an inclined plane.
2. Ask students to bring various miniature cars such as Matchbox cars.
3. Gather a variety of measuring tools. Be sure to have enough distance and time measuring tools for each student. Other measuring tools should also be available so students must choose the correct one to use.

Gain students' attention by reminding them of all the experiments that they have been doing with velocity. Tell them that the objective of this assessment is for them to have a chance to show what they know about velocity.

Part 1, Scenarios – Distribute scenarios. Instruct students to read and respond to the scenarios in the space provided.

Part 2, Finding Velocity – Distribute one small car to each student. Students are instructed to build a ramp, measure the various parts of the ramp (height of the books and length of the inclined plane), roll a miniature car down the ramp, timing the car from the top of the ramp to two feet past the end of the ramp (or until the car stops if before the 2 foot line). Calculate the velocity of the car. Calculator use is recommended for figuring velocity if you are choosing to reduce the fraction. Then, repeat the procedure after changing the height of the ramp. All data is written on the "Finding Velocity" section of the assessment.

Student Directions:
Part 1, Scenarios – Read the story. Think about the problem stated. Explain how the problem can be solved using a simple machine.

Part 2, Finding Velocity – Build a ramp. Measure and draw a line two feet from the end of the ramp to be used as the ending point when figuring the distance. Gather measuring tools needed to figure the velocity. Hold your car at the top of the ramp. Let go of your car allowing gravity to pull the car down the ramp, but without you pushing it. Measure the time and distance. Fill in the chart for experiment #1. Change the height of the ramp and repeat the experiment. Fill in the chart for experiment #2. Complete the chart.

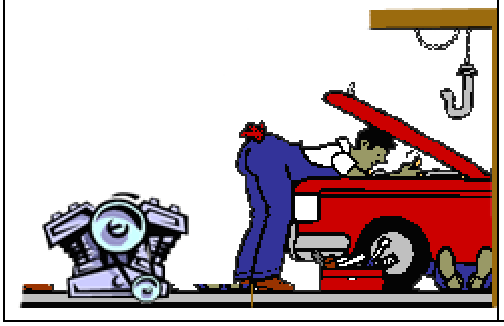
Scoring Method and Criteria:
Mark each standard as mastered or not yet mastered. See the teacher key for standard/item alignment and criteria. For scoring purposes, a majority correct for any standard is considered mastered. When assigning a grade, use a percentage correct. There are 16 math possibilities for assigning a math grade. There are six scenario, plus four velocity possibilities for a total of ten possible correct answers for assigning a science grade.

Name _____
Date _____

Racing Velocity
Part 1 - Scenarios

Directions: Read the story. Think about the problem stated. Explain how the problem can be solved using a simple machine.

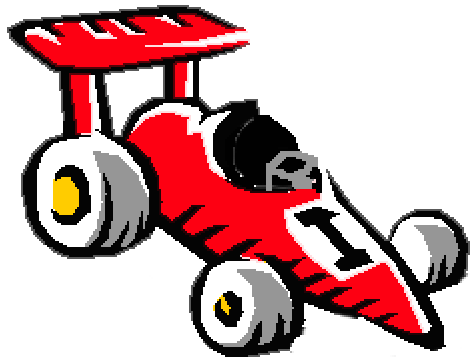
1. Carson and his dad have been working on their racecar for months. Now, they are almost finished. Dad reaches above his head and grabs the hook that is part of the pulley. "What are you going to do with that pulley?" asks Carson.

	What will the pulley be used for?

2. Tomorrow is race day. Dad gets in his truck and tips the bed of the truck so it forms a ramp. "What are you going to do with that inclined plane?" asks Carson.

	What will the inclined plane be used for?

3. Now, Carson and his dad are at the track. Carson sits in the racecar and takes hold of the steering wheel. “Use your wheel and axle well!” Dad says excitedly.

	What will the wheel and axle be used for?

Write a sentence to answer the question.

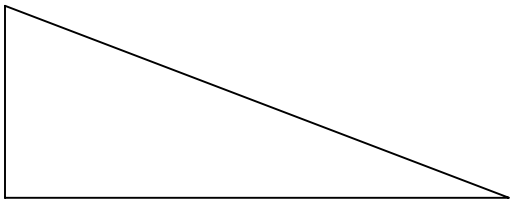
4. What does velocity describe?

Racing Velocity
Part 2 – Finding Velocity

Directions:

1. Build a ramp.
2. Gather measuring tools needed to figure the velocity.
3. Measure and draw a line two feet from the end of the ramp to be used as the ending point when figuring the distance.
4. Hold your car at the top of the ramp. Let go of your car without pushing it.
5. Measure the time and distance.
6. Fill in the chart for experiment #1.
7. Use a calculator to figure the velocity.
8. Change the height of the ramp and repeat the experiment.
9. Fill in the chart for experiment #2. Complete the chart.

Experiment #1



Height of the ramp _____

Length of the incline _____

What tools did you use to measure the ramp?

Tool _____
Unit of measure _____

What is the velocity of the car?
Show your work.
Label your answer with the unit of measure.

Time _____
Distance _____
Velocity _____

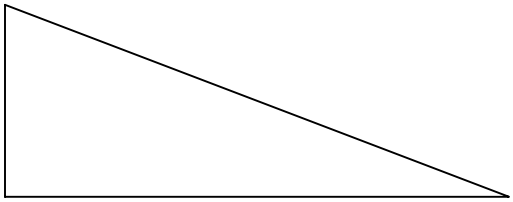
Use v=d/t

What tools did you use to measure the velocity?

Tool _____
Unit of measure _____

Tool _____
Unit of measure _____

Experiment #2



Height of the ramp _____

Length of the incline _____

What tools did you use to measure the ramp?

Tool _____
Unit of measure _____

What is the velocity of the car?
Show your work.
Label your answer with the unit of measure.

Time _____
Distance _____
Velocity _____

Use v=d/t

What tools did you use to measure the velocity?

Tool _____
Unit of measure _____

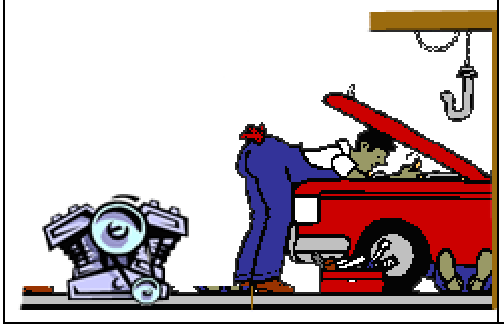
Tool _____
Unit of measure _____

Compare the two experiments. What did you find out?

Racing Velocity
Part 1 – Scenarios
Teacher Answer Key

Directions: Read the story. Think about the problem stated. Explain how the problem can be solved using a simple machine. **(SC.C.2.2.1.4.1)**

1. Carson and his dad have been working on their racecar for months. Now, they are almost finished. Dad reaches above his head and grabs the hook that is part of the pulley. "What are you going to do with that pulley?" asks Carson.



What will the pulley be used for?

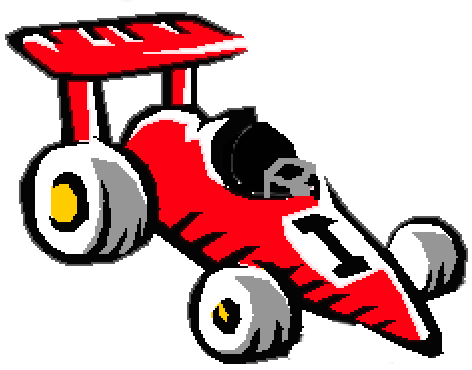
The most obvious answer is that the pulley will be used to lift the motor into the car; however, any logical use of a pulley is acceptable.

2. Tomorrow is race day. Dad gets in his truck and tips the bed of the truck so it forms a ramp. "What are you going to do with that inclined plane?" asks Carson.

What will the inclined plane be used for?

The most obvious answer is that the inclined plane will be used get the racecar onto the truck; however, any logical use of an inclined plane is acceptable.

4. Now, Carson and his dad are at the track. Carson sits in the racecar and takes hold of the steering wheel. “Use your wheel and axle well!” Dad says excitedly.

	What will the wheel and axle be used for? **The most obvious answer is that the wheel and axle will be used to steer the car; however, any logical use of a wheel and axle is acceptable.**

For scoring purposes, two out of three scenarios answered correctly is considered mastered.

Write a sentence to answer the question.

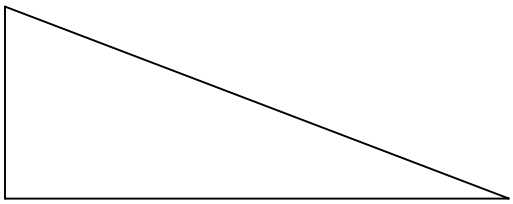
4. What does velocity describe?

(SC.C.1.2.1.4.1)
Velocity describes a change in distance over time.

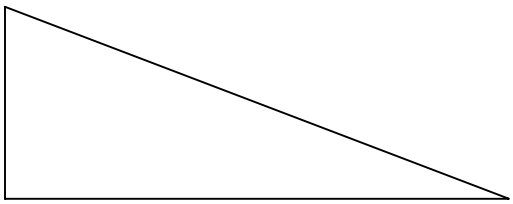
Racing Velocity
Part 2 – Finding Velocity

Directions: Build a ramp. Measure and draw a line two feet from the end of the ramp to be used as the ending point when figuring the distance. Gather measuring tools needed to figure the velocity. Hold your car at the top of the ramp. Let go of your car without pushing it. Measure the time and distance. Fill in the chart for experiment #1. Use a calculator to figure the velocity. Change the height of the ramp and repeat the experiment. Fill in the chart for experiment #2. Complete the chart.
All measurements and calculations must be determined on an individual basis. Teachers must circulate among the students and observe proper tool selection and measuring. Since each velocity will be unique, the calculations must be determined on an individual basis.

Experiment #1

 **(MA.B.4.2.2.4.1)** Height of the ramp _____ Length of the incline _____ What tools did you use to measure the ramp? **(MA.B.4.2.2.4.1)** Tool _____ Unit of measure _____	What is the velocity of the car? **(SC.C.1.2.1.4.1)** Show your work. Label your answer with the unit of measure. **(MA.B.4.2.1.4.1)** Time _____ Distance _____ Velocity _____ **(SC.C.2.2.2.4.1, MA.D.2.2.1.4.1, MA.D.2.2.1.4.3)** Use v=d/t What tools did you use to measure the velocity? **(MA.B.4.2.2.4.1, MA.B.4.2.1.4.1)** Tool _____ Unit of measure _____ Tool _____ Unit of measure _____

Experiment #2

 **(MA.B.4.2.2.4.1)** Height of the ramp _____ Length of the incline _____	What is the velocity of the car? **(SC.C.1.2.1.4.1)** Show your work. Label your answer with the unit of measure. **(MA.B.4.2.1.4.1)** Time _____ Distance _____ Velocity _____ **(SC.C.2.2.2.4.1, MA.D.2.2.1.4.1, MA.D.2.2.1.4.3)** Use v=d/t
What tools did you use to measure the ramp? **(MA.B.4.2.2.4.1)** Tool _____ Unit of measure _____	What tools did you use to measure the velocity? **(MA.B.4.2.2.4.1, MA.B.4.2.1.4.1)** Tool _____ Unit of measure _____ Tool _____ Unit of measure _____

Compare the two experiments. What did you find out? **(SC.C.1.2.1.4.1)**

For scoring purposes, a majority correct for any standard is considered mastered. When assigning a grade, use a percentage correct. There are 16 math possibilities for assigning a math grade. There are six scenarios plus four velocity possibilities for a total of ten possible correct answers for assigning a science grade.