

Motion Musing



Motion Musing

Motion Musing

Ryan practises skateboarding every day on a straight path.

A straight path!!!!
... is that supposed to be fun???

Sure! ... Ryan is collecting data about skateboarding speed because his goal is to eventually build the ultimate skateboarding park.

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The illustration shows a skateboarder in a red shirt and green shorts riding a blue skateboard on a horizontal path. The path is divided into a red segment on the left and a blue segment on the right. A red flag is on the left end, and a blue flag is on the right end. The skateboarder is currently on the blue segment, moving towards the right.

[Move Ryan](#)

Internet:

[World Record: Fastest Speed on a Skateboard](#)

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	<p>This is Ryan. Ryan practices skateboarding everyday on a straight path.</p>
<p>CLICK World Record: Fastest Speed</p>	<p>His idol is Gary Hardwick, the Guinness Book of Records fastest skateboarder. Gary was clocked at 100.66 km/hour. That's the maximum speed for many Ontario Highways. He credits his speed to the aerodynamic shape of his helmet.</p>
<p>CLICK Skateboard Parks</p>	<p>Ryan plans to build a skateboard park that will provide him and his friends hours of excitement. He has searched the internet to get ideas for different designs. He has checked out the links to Skateboard park builders. (Select the link to this web page) The information posted by the SiteDesignGroup has given him lots of ideas. View the video of their Skateboard park designs.</p>
<p>Many of the decisions Ryan will need to make about the park design, ramps and turns will depend on the speeds that students like Ryan can reach with their skateboard. Ryan will begin by collecting data about his speed. He will ride the skateboard between two positions; one marked by a red flag, the other by a blue flag.</p>	
<p>CLICK Next Page</p>	<p>We will join Ryan as he collects, records and analyzes his speed.</p>

	<p>Ryan begins by exploring the distance between the red and blue flag. He uses a counter that measures the distance in meters from the blue flag. The display on the counter reads 30m. That means that Ryan's distance from the blue flag is 30m.</p>
	<p>He also created a vertical axes that records his distance from the blue flag. The distance is marked with a red point. The axes show that he is starting 30m from the blue flag.</p>
	<p>Move Ryan to any position by dragging the back of his skateboard between the two flags. Notice how the distance counter and vertical axes record his distance from the blue flag. Use the RESET button if you would like to begin again.</p>
<p>Press a blue arrow key</p>	<p>Watch Ryan's position from the blue flag, the counter and the vertical axes as you collect the data.</p>
<p>Press a red arrow key</p>	<p>Watch Ryan's position from the blue flag, the counter and the vertical axes as you collect the data.</p>
<p>Explore Distance</p> <p>Question 1</p> <p>Question 2</p> <p>Question 3</p>	<p>LEARNING CHECK-IN</p> <p>Record your answers to the Explore Distance questions</p>

Motion Musing

Explore - Time Menu

Reset

Start/Stop Clock Red Ryan Blue

Elapsed Time = 0.0 s

Slowly Move Ryan Quickly

Distance 30 m Ryan to Blue = 30 m

Explore Time

Question 1
Question 2
Question 3
Question 4

Time (seconds)

Next Page

<p>Start/Stop Clock</p> <p>Elapsed Time = 0.0 s</p>	<p>Next, Ryan explores the amount of time it takes him to travel between the red and blue flag.</p> <p>He uses a stop clock to record the time in seconds.</p>
<p>Time (seconds)</p>	<p>He also created a horizontal axes that records the elapsed time in seconds. Every 10 seconds is marked with a number.</p>
<p>Click on the Start /Stop Clock button</p> <p>Start/Stop Clock</p> <p>Elapsed Time = 0.0 s</p>	<p>You can explore how both of these devices keep track of time by clicking on the Start/Stop button.</p> <p>Use the RESET button if you would like to begin again.</p>
<p>Explore Time</p> <p>Question 1 Question 2 Question 3 Question 4</p>	<p>LEARNING CHECK-IN</p> <p>Record your answers to the Explore Time questions</p>

Explore - Distance over a period of time

Reset

Start/Stop Clock

Red Ryan Blue

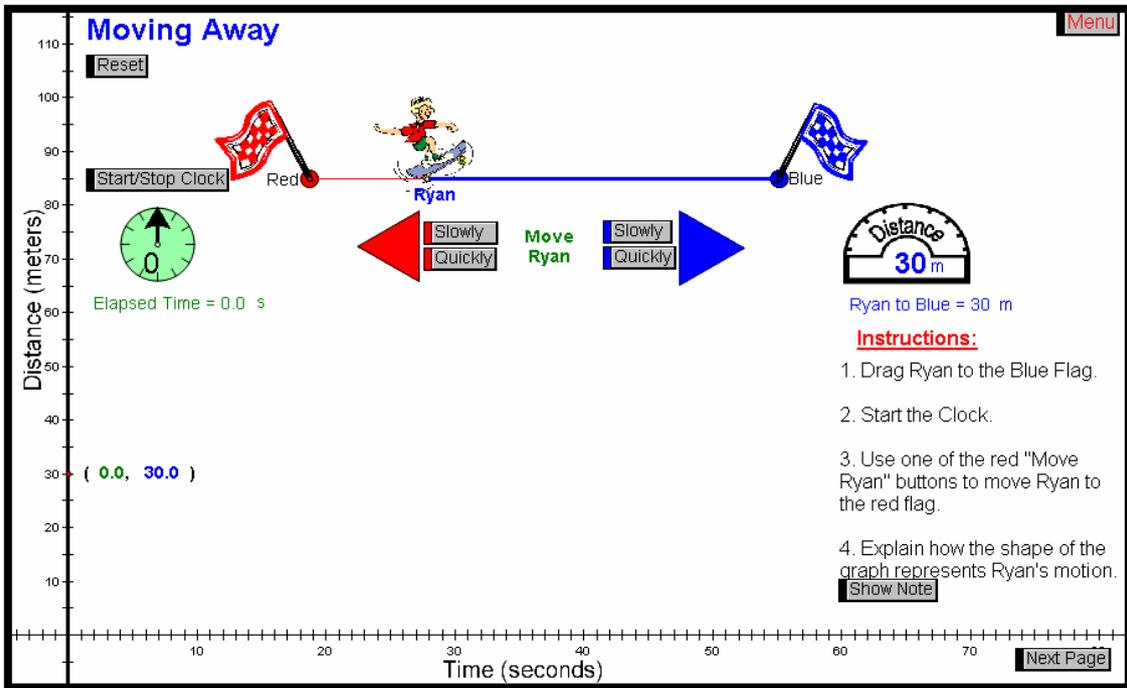
Elapsed Time = 0.0 s

Distance 30 m
Ryan to Blue = 30 m

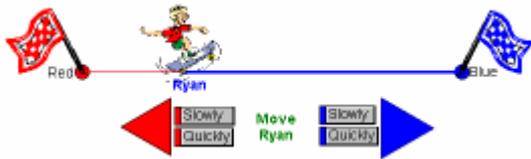
1) Show Distance Axis
2) Show Time Axis
3) Show Data Point
4) Start/Stop/Reset

	<p>Ryan is almost ready to explore the relationship between distance and time. He needs two more tools: the co-ordinate axes and data points.</p>
<p>Click on Distance Axis 1) Show Distance Axis</p> <p>Click on Time Axis 2) Show Time Axis</p>	<p>The co-ordinate axes is created when the distance and time axes are displayed.</p> <p>The co-ordinate axes will allow Ryan to explore the amount of time it takes for him to travel any distance.</p>
<p>Click on Show Data Point 3) Show Data Point</p>	<p>The display that will show his distance from the blue flag at any time as follows: (time, distance)</p>
<p>Click on Start/Stop/Reset 4) Start/Stop/Reset</p>	<p>Ryan completes a test run from a position 30m from the blue flag.</p>
	<p>LEARNING CHECK IN</p> <ul style="list-style-type: none"> • What are the co-ordinates of his starting position? What does each number represent? • What are the co-ordinates of his position at the end of the test run. What does each number represent? • What happens to the co-ordinate points as Ryan gets closer to the blue flag? • Explain how the shape of the graph represents Ryan's motion.

Motion Musing



Explore the shape of the graph created by Ryan as he moves away from the blue flag. Follow the on-screen instructions.



LEARNING CHECK IN

What are the co-ordinates of his starting position? What does each number represent?

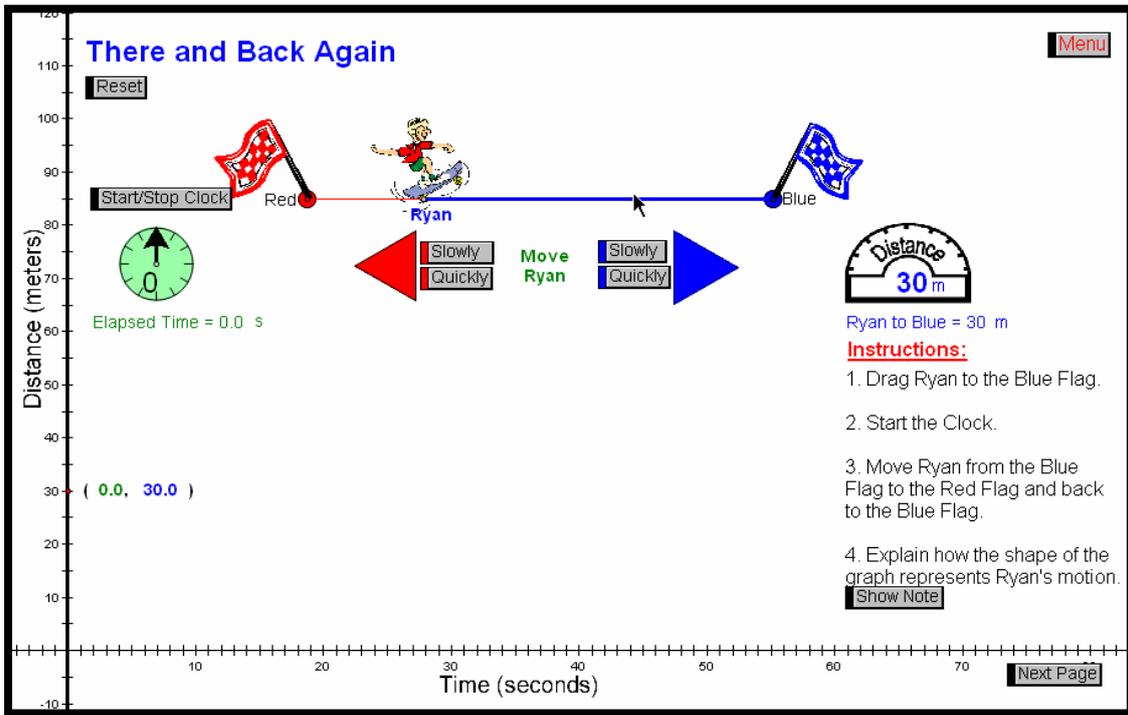
What are the co-ordinates of his position at the end of the test run. What does each number represent?

What happens to the co-ordinate points as Ryan gets closer to the blue flag?

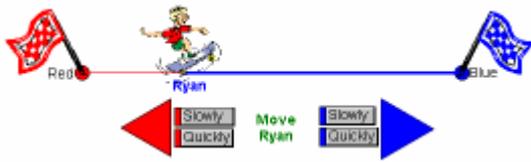
Explain how the shape of the graph represents Ryan's motion. Key words to include in your explanation are:

distance
 steepness
 direction of motion
 faster
 slower
 stopped
 time

Motion Musing



Explore the shape of the graph created by Ryan as he moves between the red and blue flag. Follow the on-screen instructions.



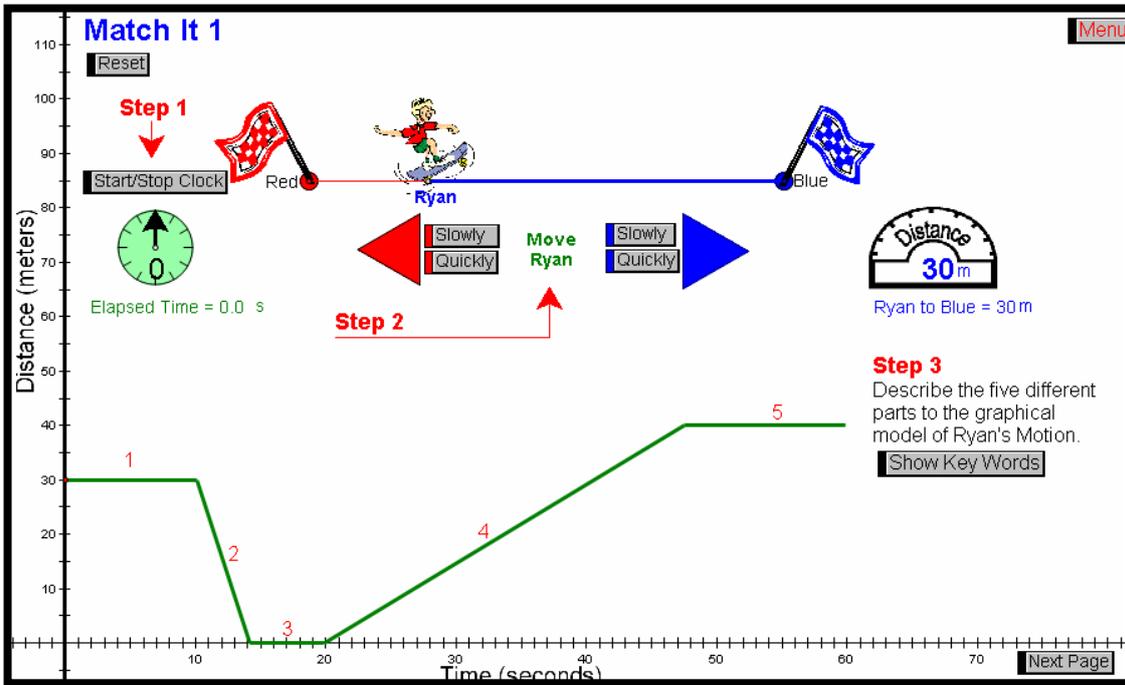
LEARNING CHECK IN

Explain how the shape of the graph represents Ryan's motion.

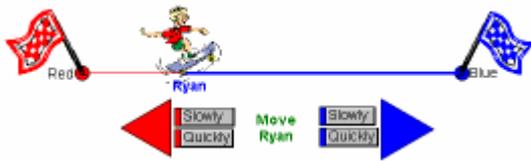
Key words to include in your explanation are:

distance
 steepness
 direction of motion
 faster
 slower
 stopped
 time

Motion Musing



Match the graph using the red and blue buttons to move Ryan between the flags. Follow the on-screen steps.



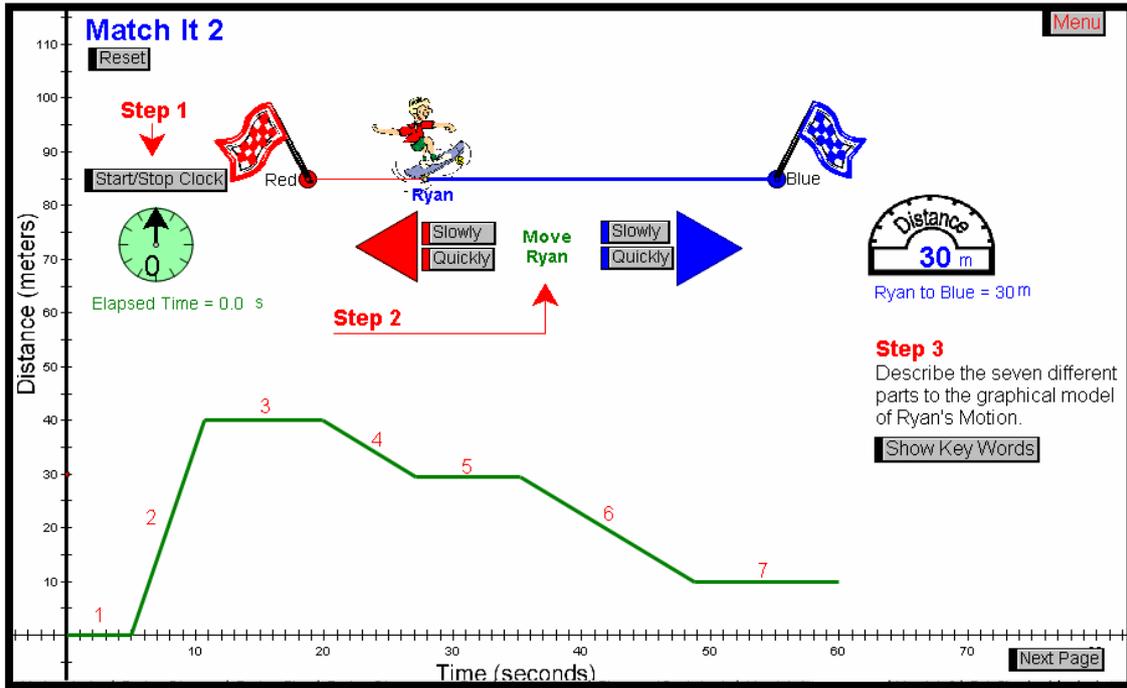
LEARNING CHECK IN

Describe the five different parts to graphical model of Ryan's motion between the red and blue flags.

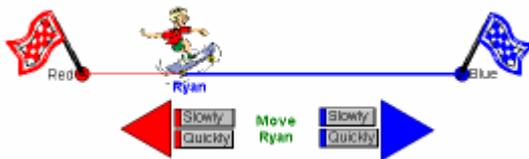
Key words to include in your explanation are:

- distance
- steepness
- direction of motion
- faster
- slower
- stopped
- time

Motion Musing



Match the graph using the red and blue buttons to move Ryan between the flags. Follow the on-screen steps.



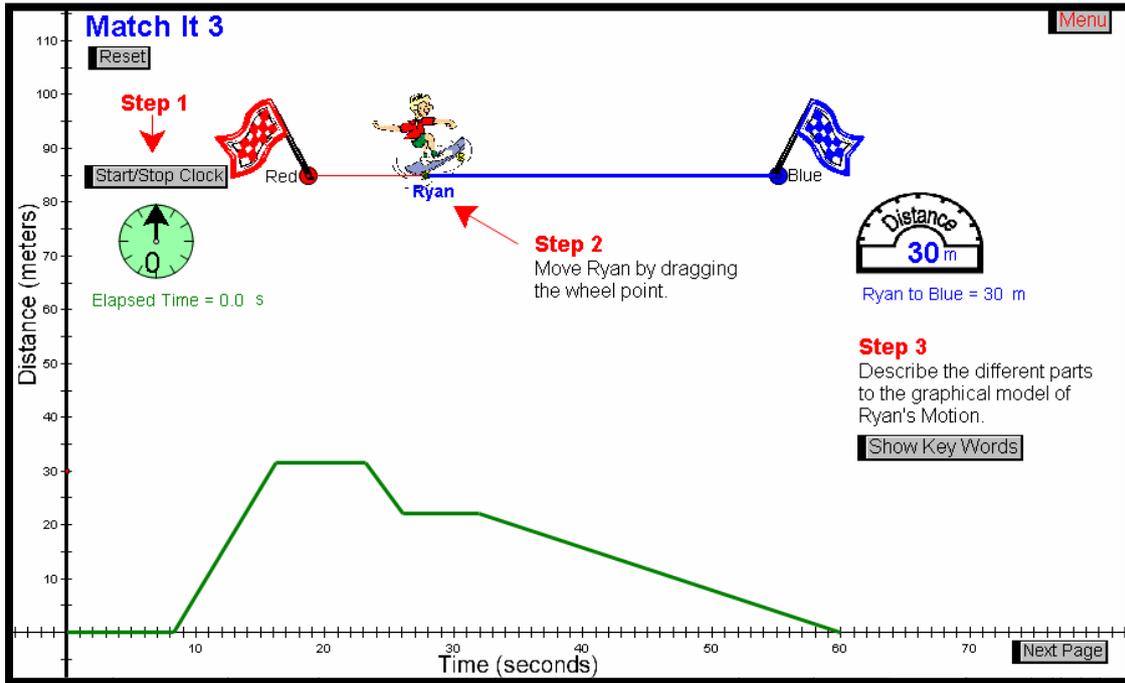
LEARNING CHECK IN

Describe the seven different parts to graphical model of Ryan's motion between the red and blue flags.

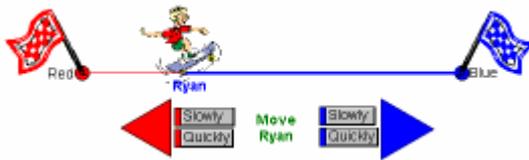
Key words to include in your explanation are:

- distance
- steepness
- direction of motion
- faster
- slower
- stopped
- time

Motion Musing



Match the graph using the red and blue buttons to move Ryan between the flags. Follow the on-screen steps.

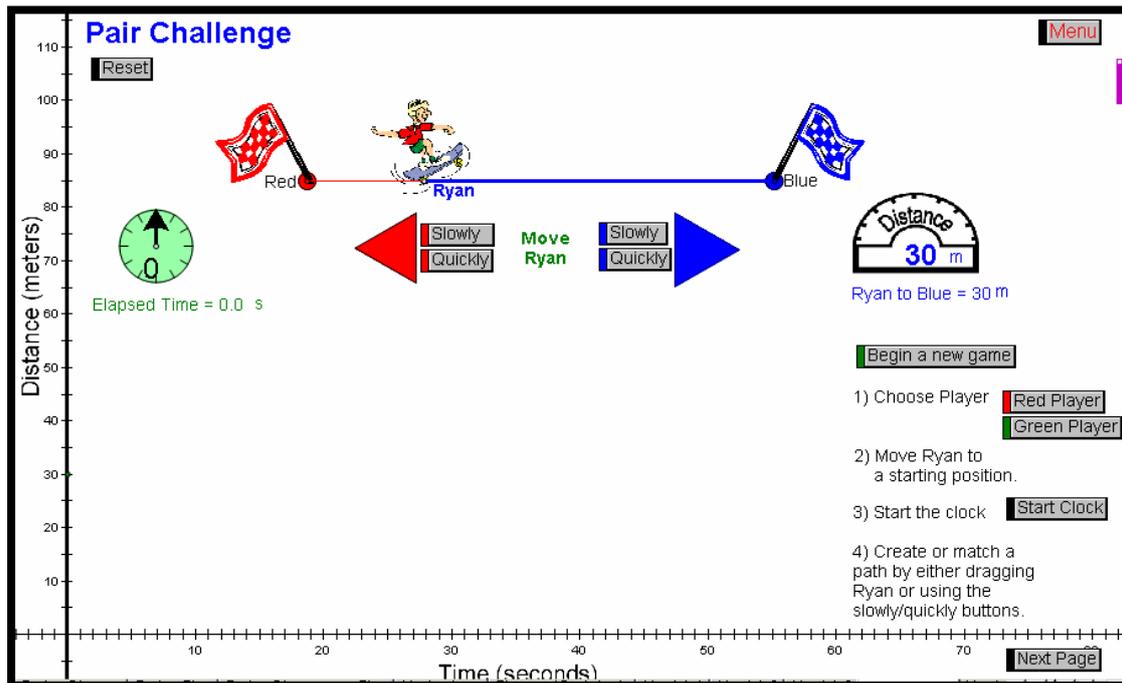


LEARNING CHECK IN

Describe the different parts to graphical model of Ryan's motion between the red and blue flags.

Key words to include in your explanation are:

- distance
- steepness
- direction of motion
- faster
- slower
- stopped
- time



Pair Challenge is a game for two players. The object of the game is to challenge your partner to match the motion story that you create by moving Ryan between the red and blue flags.

There are a variety of ways to play this game. For example:

- The first player moves Ryan while the challenge player views the screen.
- The first player moves Ryan and the challenge player can't view the screen.
- Both players write a motion story. For example: Ryan stands still for 10sec, at a position 10 metres from the red flag. He travels toward the blue flag at a constant pace for the next 10 seconds. Players create the motion by dragging Ryan between the red and blue flag. The player with the closest match is declared the winner.

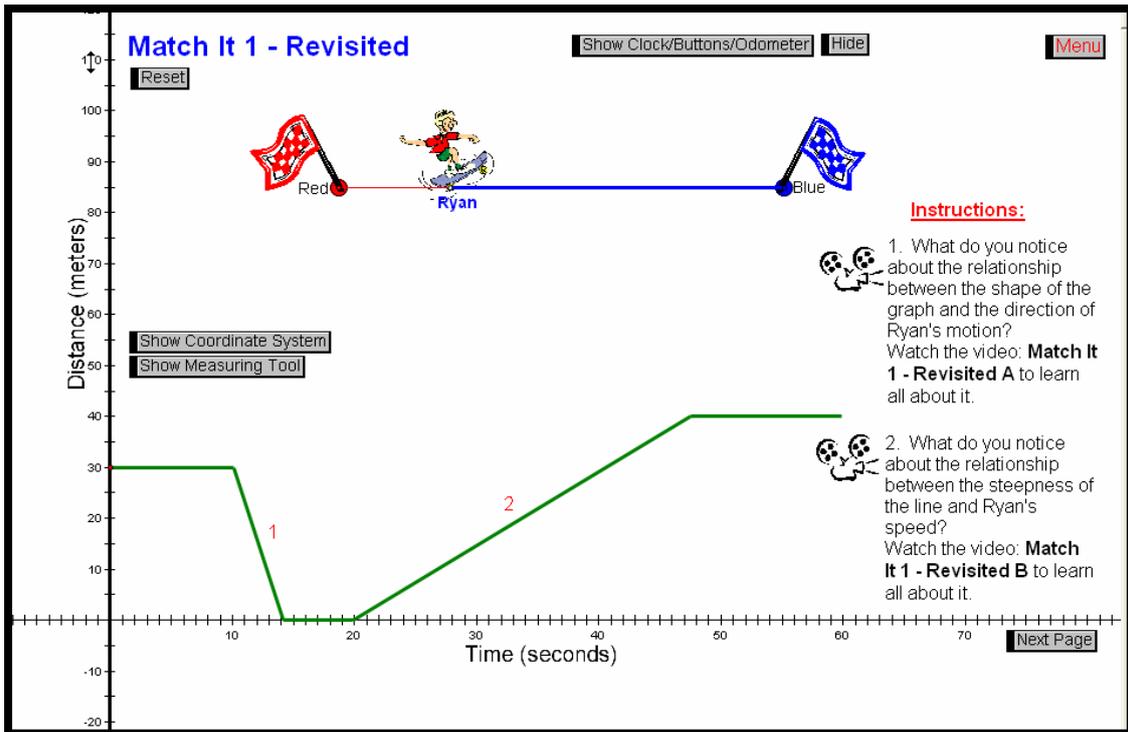
LEARNING CHECK IN

Describe the different parts to one of the graphical models of Ryan's motion between the red and blue flags.

Key words to include in your explanation are:

distance
steepness
direction of motion
faster
slower
stopped
time

Motion Musing



Explore the relationship between the shape of the graph and the direction and speed of Ryan's motion. Follow the on-screen instructions and view the video demonstrations to learn all about it..



1. What do you notice about the relationship between the shape of the graph and the direction of Ryan's motion? Watch the video: **Match It 1 - Revisited A** to learn all about it.

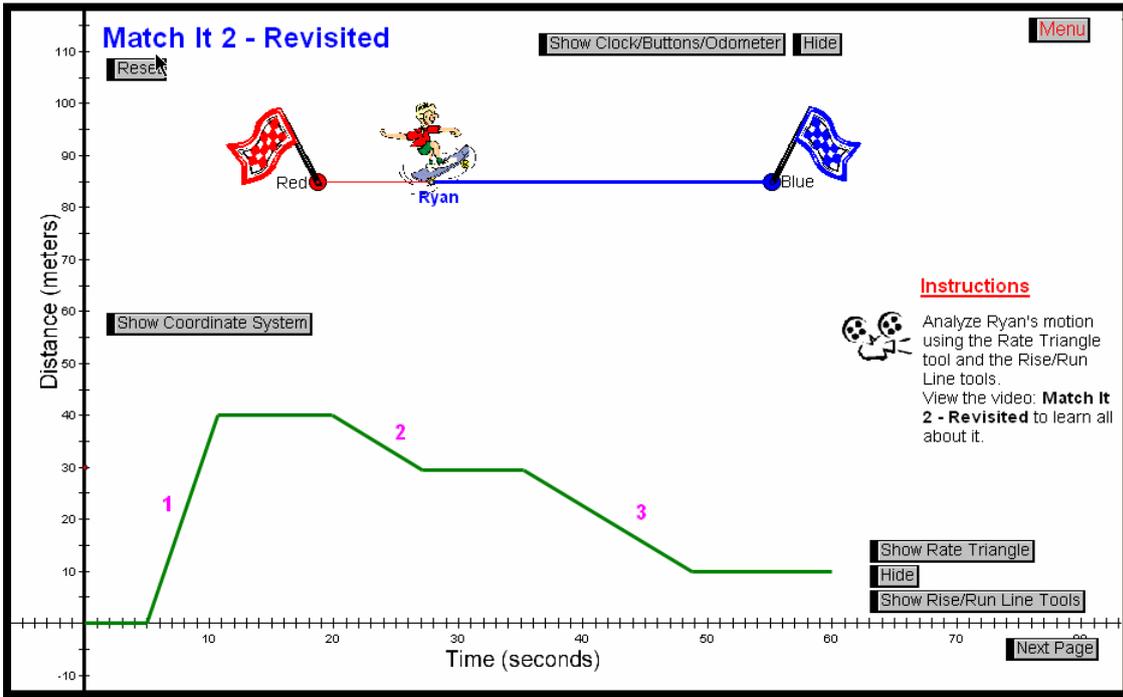


2. What do you notice about the relationship between the steepness of the line and Ryan's speed? Watch the video: **Match It 1 - Revisited B** to learn all about it.

LEARNING CHECK IN

1. What do you notice about the relationship between the shape of the graph and the direction of Ryan's motion?
2. What do you notice about the relationship between the steepness of the line and Ryan's speed? Watch the video: Match It 1 - Revisited B to learn all about it.

Motion Musing



Analyze Ryan's motion by calculating the slope of a line segment. Follow the on-screen instructions and view the video.



Analyze Ryan's motion using the Rate Triangle tool and the Rise/Run Line tools. View the video: **Match It 2 - Revisited** to learn all about it.

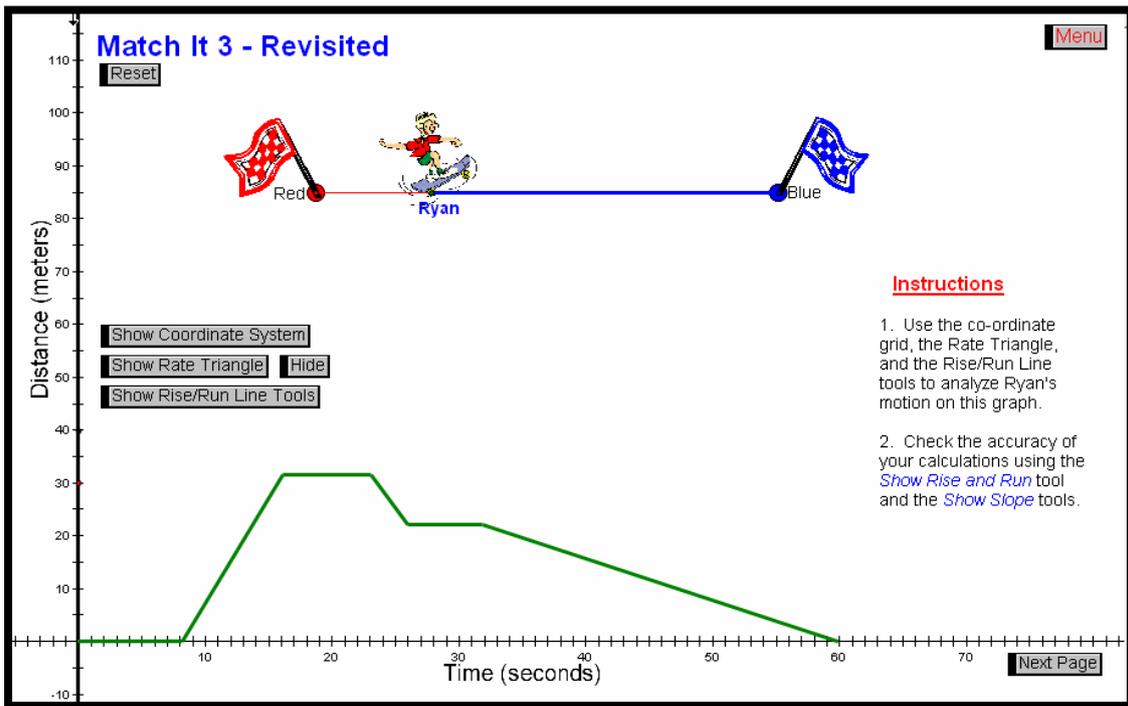
LEARNING CHECK IN

How does the slope of the line represent the shape of the graph?

Key words to use in your explanation:
negative

- steepens
- faster
- slower
- positive
- negative
- large numbers
- small numbers
- distance
- direction of motion
- time

Motion Musing



Practice analyzing Ryan's motion and calculating his speed using the rate triangle and the Measure Menu.

LEARNING CHECK IN

How does the slope of the line represent the shape of the graph?

Key words to use in your explanation:

negative

steepens

faster

slower

positive

negative

large numbers

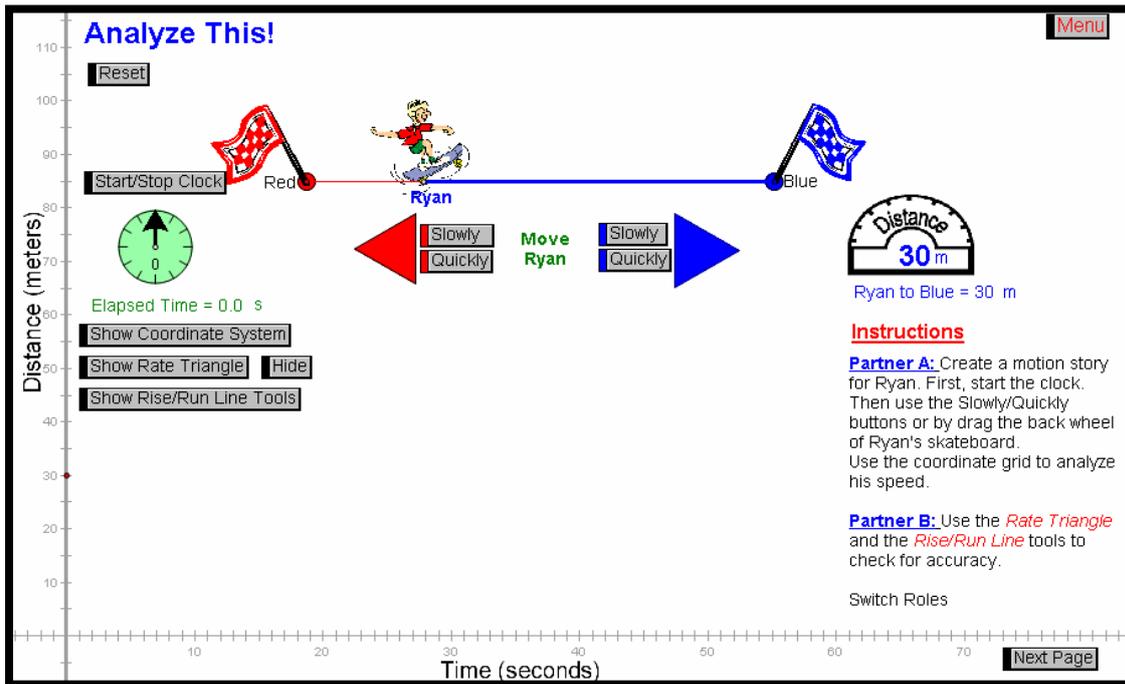
small numbers

distance

direction of motion

time

Motion Musing



This is a game for 2 players. The object of the game is to analyze Ryan's speed using the co-ordinate grid. Partner A determines his speed using the co-ordinate grid. Partner B checks for accuracy using the Rate Triangle and Rise/Run Line Tools.

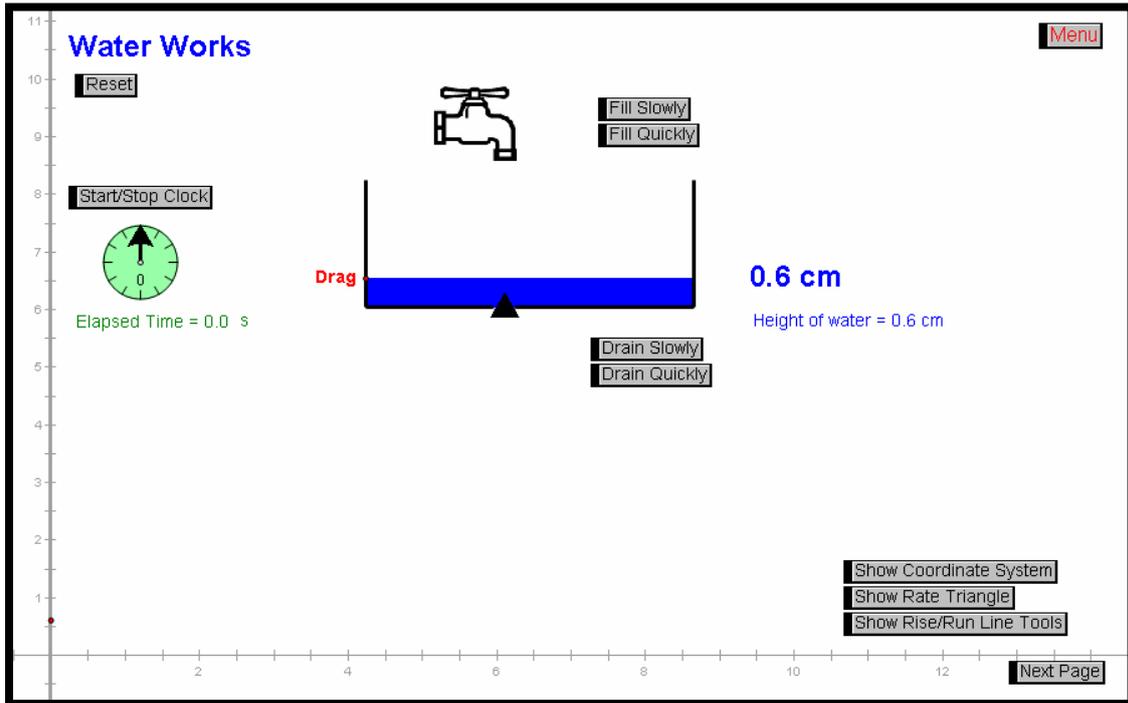
LEARNING CHECK IN

Reflect on your learning using the following prompts:

1. *I am really good at:*
2. *I am getting better at:*
3. *I need to know more about:*



Motion Musing



Use the on-screen tools to analyze filling and draining a tank of water in the same way that you analyzed Ryan's motion.

LEARNING CHECK IN

1. Describe how the graph represents filling and emptying the tank.

Key words to include in your explanation:

full
empty
stopped
steepens
faster
slower
height
time

2. Analyze the graph using the co-ordinate grid. Check the accuracy of your calculations using the Rate Triangle and Rise/Run Line Tool

Key words to use in your analysis:

full
empty
stopped
steepens
faster
slower
positive
negative
large numbers
small numbers
height
time

Motion Musing

Author a Motion Story

Menu

Reset
Erase traces

1. Choose a context with two variables.
2. Choose the scales.
3. Create a motion story.
4. Drag the blue point to tell your story.
5. Print your story and graph.

See Example

Motion Story

Type your story in this text box.

Return to Beginning

	<p>Brainstorm a list of contexts with 2 variables then select one context for your motion story.</p>
	<p>Choose a scale that is appropriate for your context by moving the Adjust scale points and change origin point (if necessary)</p>
	<p>Create the motion story in words and type it into the on screen text box</p>
	<p>Drag the blue point to create a graphical representation of your story. Click on see example to view one possibility.</p>
	<p>Print this screen to save your story and graph.</p>