Friday, February 22, 2019

Your Learning Goal: After students learn the meaning of vectors and velocities, they will solve velocity problems with 100% accuracy.

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Velocity & Vectors– 35L + R

- **Catalyst (35L)**: Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

Homework:
Velocity & Vectors HW

Agenda:
1. Catalyst
2. Velocity/Vectors
3. Racing Vector Game

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Catalyst:

Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

Velocity & Vectors

35L

35R

Speed

Solved using the *equation*:

speed = distance/time

Velocity

* **Velocity** is the **speed** of an object <u>and</u> the **direction** that the object is traveling.
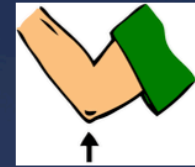
* **Speed** = 1.5 m/s

* **Velocity** = 1.5 m/s **north**

North

How do we change velocity?

There are 3 ways to change **velocity**. Turn to your elbow partner. What do you think the 3 ways are?

Hint: Think about what makes up **velocity**!

Velocity changes when. . .

* **Speed changes (Speeds up or slows down)**

* **Direction changes**

* **Both speed _and_ direction change**

Catalyst:

Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

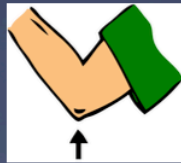## Velocity & Vectors

Velocity changes when:
1. Speed Changes
2. Direction Changes
3. Both (speed & direction change)

Velocity: Velocity is the speed of an object AND the direction that the object is traveling.

35L

35R

A vector is. . .

* A measurement that has direction.

* Vectors are represented by an arrow!

Now turn to your elbow partner. Which is a <u>vector</u> – velocity or speed??

Catalyst:

Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

35L

Velocity & Vectors

Velocity changes when:
1. Speed Changes
2. Direction Changes
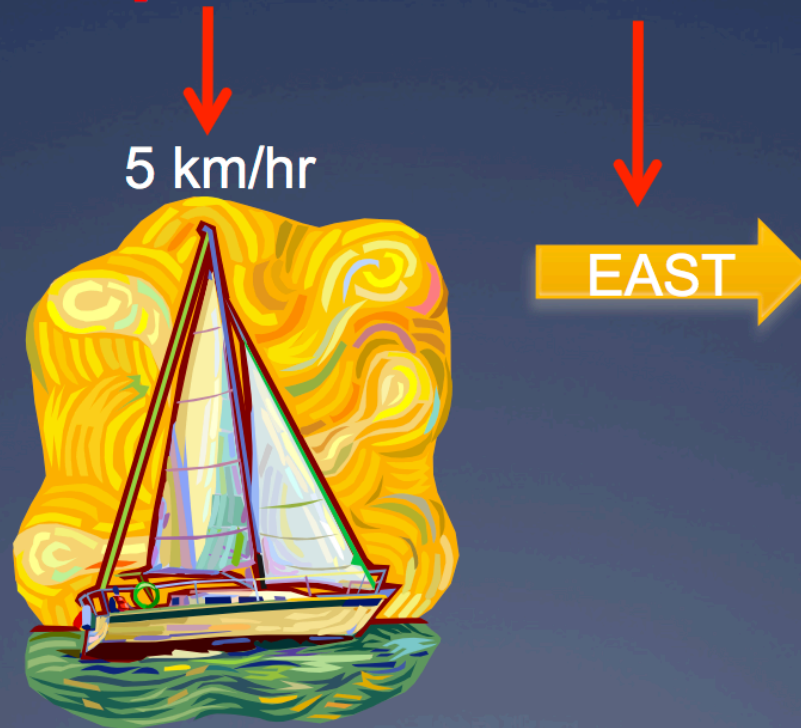3. Both (speed & direction change)

Velocity: Velocity is the speed of an object AND the direction that the object is traveling.

Vector: A measurement that has direction & magnitude. Vectors are represented by an arrow!

35R

Velocity is a vector because. . .

It measures speed AND DIRECTION.

5 km/hr

EAST

Catalyst:

Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

Velocity & Vectors

Velocity changes when:
1. Speed Changes
2. Direction Changes
3. Both (speed & direction change)

Velocity: Velocity is the speed of an object AND the direction that the object is traveling.

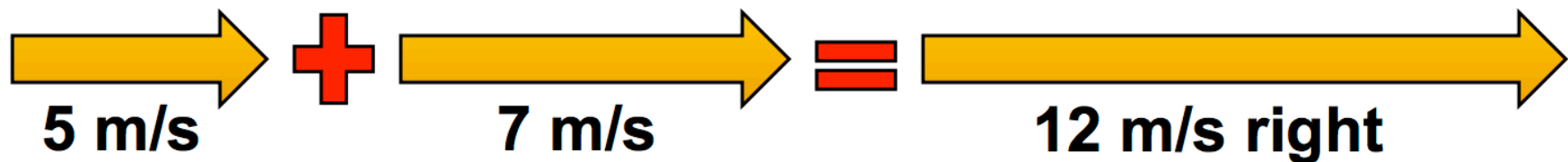**Vector:** A measurement that has direction. Vectors are represented by an arrow!

Velocity is a vector. It has BOTH a speed AND a direction
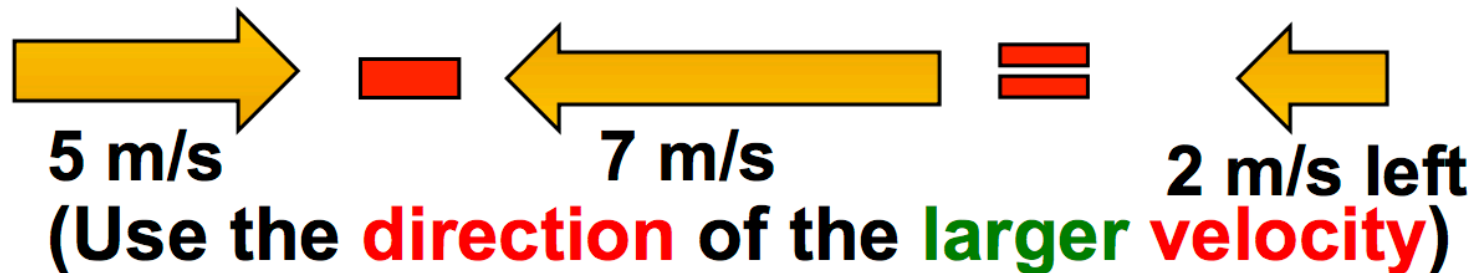
35L

35R

You Can Add or Subtract

* Depending on the **direction** they are going, **vectors** can add together or cancel each other out (on the same object).

* **Same Direction = Add together**

5 m/s + 7 m/s = 12 m/s right

* **Opposite Direction = Subtract them**

5 m/s − 7 m/s = 2 m/s left
(Use the **direction** of the **larger velocity**)

35 R

Catalyst:

Compare and contrast speed and velocity by doing a "Double Bubble" map or Venn Diagram.

35L

Velocity & Vectors

Velocity changes when:
1. Speed Changes
2. Direction Changes
3. Both (speed & direction change)

Velocity: Velocity is the speed of an object AND the direction that the object is traveling.

Vector: A measurement that has direction. Vectors are represented by an arrow!

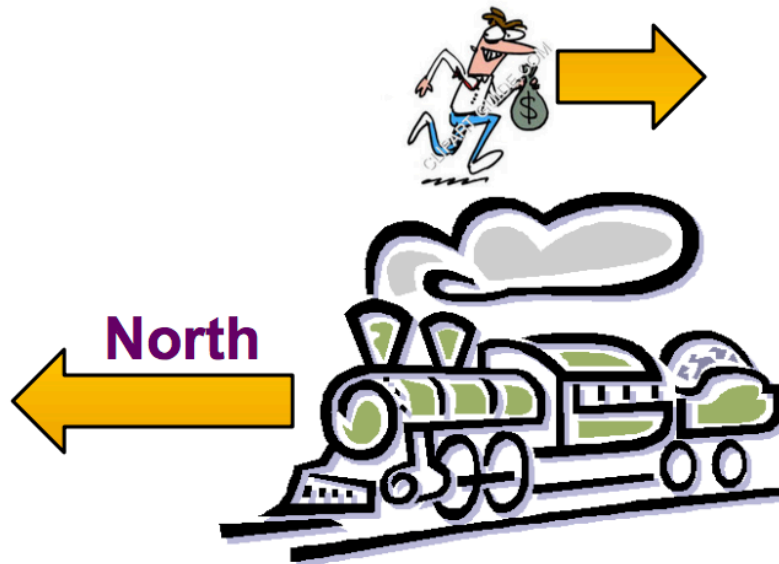Velocity is a vector. It has BOTH a speed AND a direction

Vectors may add together or cancel out (on the same object).

• Same Direction = Add
• Opposite Direction = Subtract (Use the direction of the larger velocity)

35R

Example

A train robber is running on top of a train **south** at **5 m/s**. The train is going **north** at **10 m/s**. What is the train robber's <u>velocity</u>?

North

A Little Practice!

1. The Goodyear Blimp is traveling **east** towards the Rose Bowl at **20 km/hr**. The wind is also blowing **east** at **5 km/hr**. What is the total **velocity** of the blimp?

2. A group on a raft is trying to paddle back up the river. If the people are paddling **upstream** at **7 km/hr** and the river is flowing **downstream** at **5 km/hr** what is the **velocity** of the raft?

3. A student is riding **south** on his bike **500 meters** to his house. If it takes him **10 minutes** what was his **velocity**?

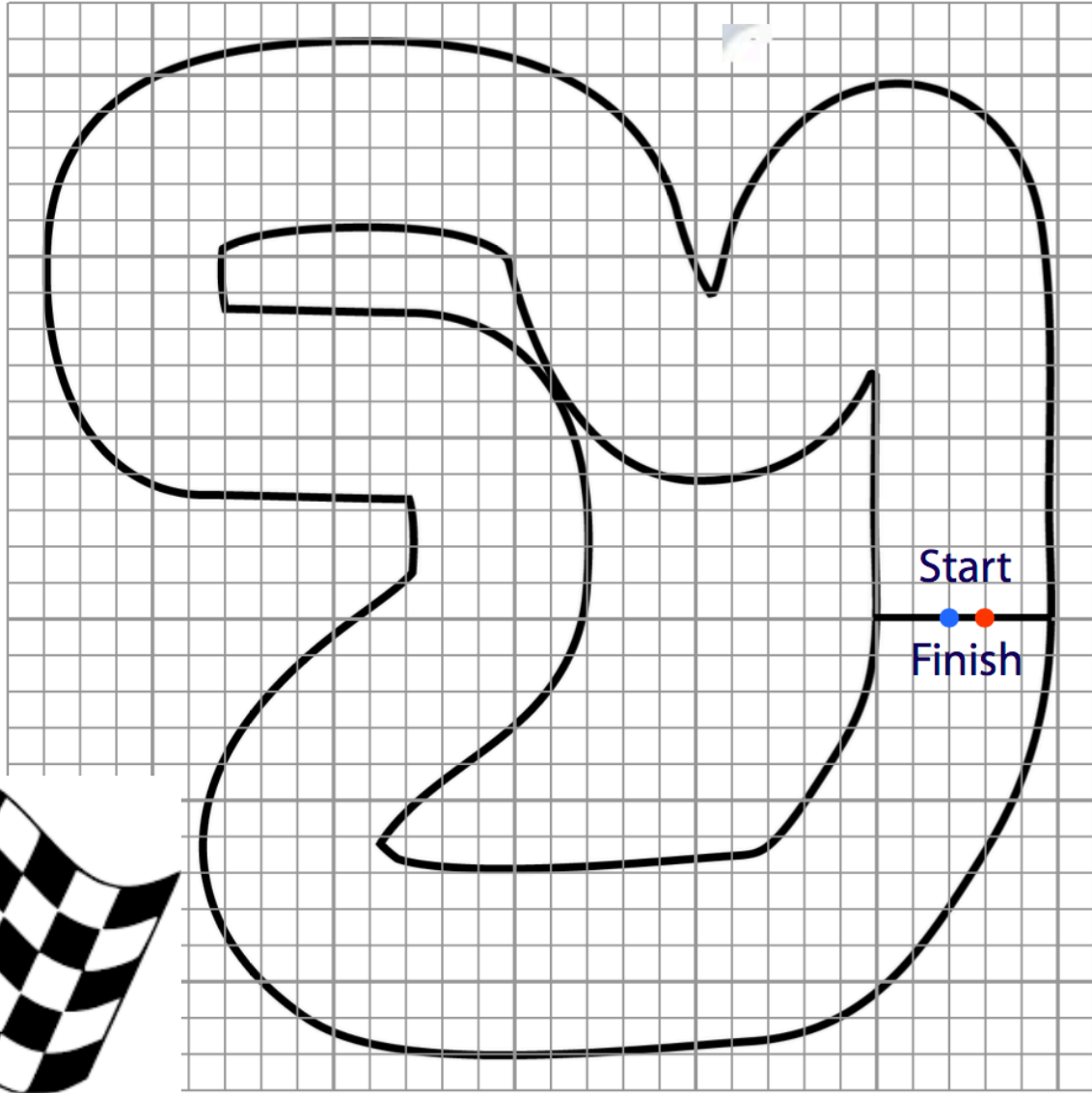**35 L**

Just a couple of more practice problems…

3. A student is riding south on his bike 500 meters to his house. If it takes him 10 minutes what was his velocity?

4. A family is going to the market and without slowing down, turns into the parking lot of the market. Did the velocity of the car and family change? Explain why or why not.

5. The MTA bus is traveling north on Vermont towards USC and stops at red light. Does the velocity of the bus change when it is stopping? Explain why or why not.

35 L

Let's Play a Vector Game!

* You will be playing in table groups

* Each person will take a turn rolling the dice telling you how many spaces to proceed. You decide on the direction.

* Draw your vector on the game board (distance + direction)

* You can team up OR gang up on another player by using your turn to add or subtract vectors.

* The person to first travel around the track WINS!

Start

Finish

Ready

Set

Go