WHODUNNIT?
FACT FINDERS

Speed, Velocity & Acceleration

Whodunnit?
Speed, Velocity & Acceleration

Topic:	One-Dimensional Force	Time Range:	10-20 Minutes	Supplies:	Pencil & Paper

General Procedures:

A.) Give students a *Whodunnit Worksheet*. Students will need to answer the 10 multiple choice questions about the topic. Each correct answer will result in a clue. Students will check off the Players, Last Known Whereabouts and Methods that are accounted for. The one remaining from each column is the correct solution. In this case it should be:

"Coach Physics stubbed the victim's toe in the atrium."

B.) Print out the "Clues" and cut them out. I suggest you laminate them for future use. Spread them in different locations in the classroom and turn the students loose. Have teams of 2-3 circulate and attempt to figure out the clues. They can record the answers on the handout. You can require they write complete sentences. Once they think they have all the pieces, they can come to you to check their answer. If they are wrong, let them figure it out ☺

An alternative "Clue 10" is provided in the event you want a different result for different class periods.

Whodunnit?

Name:_____

Six contestants on a reality TV show were stunned to find their lowest scoring colleague was "injured." They must figure out the crime before the bell rings. The question is *Whodunnit*? And how... The Player, Last Known Whereabouts and Method that are left unaccounted for -- is the solution.

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.

Who is the "Criminal"?

(The three boxes left unchecked will reveal the crime. If you cannot figure it out, you may be next.)

The Players		The Last Known Whereabouts		The Method	
Professor Astro		Atrium		Chemical Poisoning	
Mrs. Bio		Gym		Cougar Attack	
Mr. Chem		Kitchen		Electrocution	
Dr. Earth		Library		Fallen Object	
Coach Physics		Movie Theater		Stubbed Toe	
Miss Zoo		Pool		Venomous Bite	

Clue #1

WHODUNNIT?

What does speed measure?

How far away an object is	*Mrs. Bio was drinking a sports drink in the kitchen.*
How high up an object is	*The victim did not have a venomous bite.*
How fast an object is moving	*Dr. Earth was shelving books in the library.*
How heavy an object is	*The victim did not stub a toe.*

WHODUNNIT?

Clue #2

The difference between velocity and speed is that velocity also includes _____.

distance	*Mr. Chem was playing X-Box in the movie theater.*
direction	*The victim was not poisoned by a chemical.*
time	*Professor Astro was stretching in the gym.*
height	*The victim was not attacked by a cougar.*

Clue #3

How is average speed calculated?

distance x time	Coach Physics was making a list in the kitchen.
displacement ÷ time	The victim was not electrocuted.
displacement x time	The victim was not poisoned with a chemical.
distance ÷ time	Professor Astro was playing underwater rugby by the pool.

Clue #4
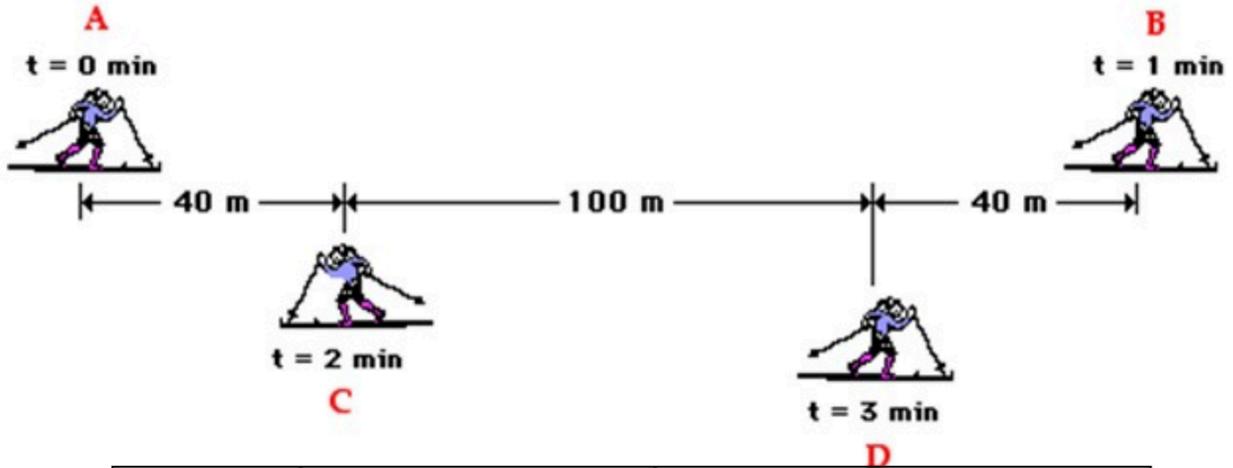
Acceleration occurs when there is a change in _____.

time	The victim was not attacked by a cougar.
speed	The victim was not electrocuted.
position	Coach Physics was doing a circuit in the gym.
velocity	Mrs. Bio was sweeping in the movie theater.

Clue #5

A
t = 0 min

B
t = 1 min

$\longleftarrow$ 40 m $\longrightarrow$ $\longleftarrow$ 100 m $\longrightarrow$ $\longleftarrow$ 40 m $\longrightarrow$

t = 2 min
C

t = 3 min
D

	Distance (m)	Displacement (m)
AB	180	+180
BC	140	-140
CD	100	+100
TOTAL	420	+140

What is the average velocity of the skier in the image?

47 m/min	*The victim did not have a venomous bite.*
140 m/min	*The injury was not caused by chemical poisoning.*
35 m/min	*Professor Astro was browsing Instagram by the pool.*
60 m/min	*Mr. Chem was repairing the drain in the kitchen.*

Clue #6

At which point(s) will acceleration occur during the roller coaster ride shown in the image?

A, C, and D	*Dr. Earth was weightlifting in the gym.*
A and D	*A venomous snake did not bite the victim.*
D only	*Miss Zoo was playing dominos in the library.*
At all points	*The victim was not electrocuted.*

Clue #7

Which of the following best describes how to calculate acceleration?

Multiply the change in velocity by the time traveled.	*The victim did not stub a toe.*
Subtract initial velocity from final velocity and divide by time traveled.	*Miss Zoo was watching a documentary in the kitchen.*
Subtract the initial position from the final position and divide by time traveled.	*The injury was not an electrocution.*
Multiply speed by time traveled and use a positive or negative sign to indicate the type of acceleration.	*Professor Astro was splashing in the pool.*

Clue #8

Which of the following is true of an object when it moves uniformly around a circle?

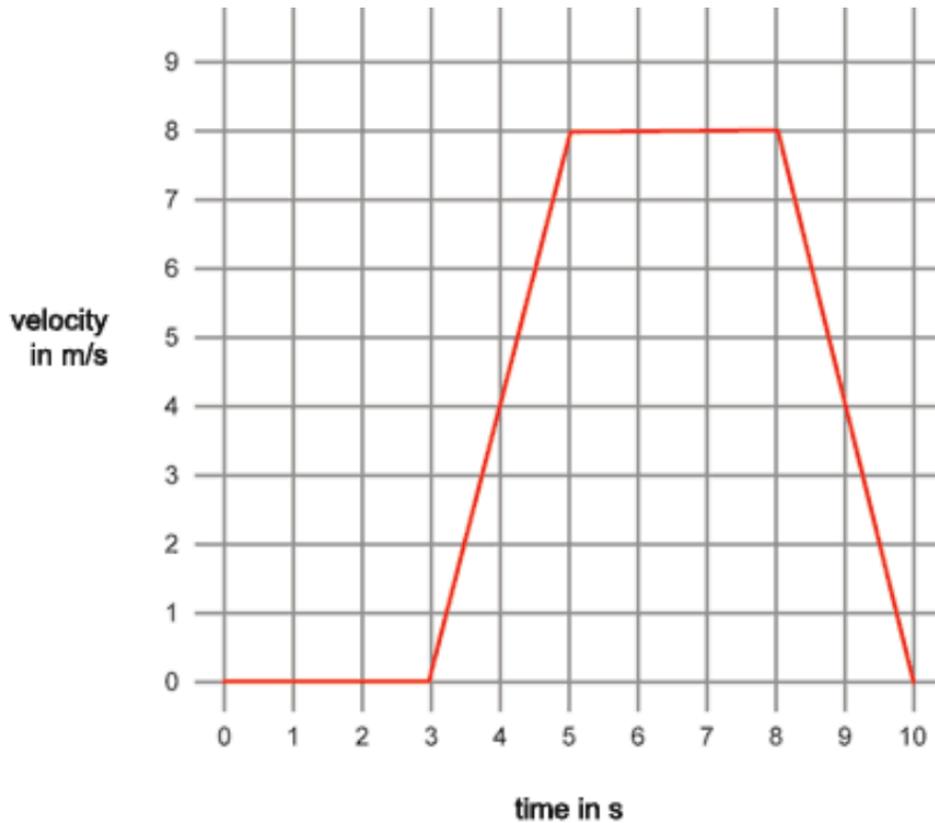|	
Its velocity changes, but its acceleration remains the same.	*Dr. Earth was making a dessert in the kitchen.*
Its speed changes, but its velocity and acceleration remain the same.	*The victim was not electrocuted.*
Its speed, velocity, and acceleration all remain the same.	*Mrs. Bio was playing a video game in the movie theater.*
Its velocity changes, but its speed remains the same.	*The victim was not mauled by a cougar.*

Clue #9

Which measure(s) is a vector quantity?

Velocity and speed	*The injury was not because of a fallen object.*
Velocity and acceleration	*Mr. Chem was doing yoga in the gym.*
Speed	*The victim was not chemically poisoned.*
Speed, velocity, and acceleration	*Coach Physics was in the atrium reading The Plant That Ate Dirty Socks.*

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Clue #10

WHODUNNIT?

According to the velocity-time graph, during which
time interval is there negative acceleration?

Between 8 and 10 seconds	*A fallen object was not the cause of injury.*
Between 0 and 3 seconds	*Mr. Chem was learning French in the atrium.*
Between 3 and 5 seconds	*Coach Physics was in the gym working out.*
Between 4 and 8 seconds	*The injury was not a stubbed toe.*

Alternate Ending

WHODUNNIT?

"Coach Physics used a fallen object on the victim in the atrium."

WHODUNNIT?

Clue #10

Which measure(s) is a scalar quantity?

Speed	*The injury was not a stubbed toe.*
Velocity and acceleration	*Mr. Chem was learning French in the atrium.*
Velocity and speed	*Coach Physics was in the gym working out.*
Speed, velocity, and acceleration	*A fallen object was not the cause of injury.*

Clue #1

WHODUNNIT?

What does speed measure?

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time	*Professor Astro was stretching in the gym.*
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??? WHODUNNIT?

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WHODUNNIT?

Clue #4

Acceleration occurs when there is a change in _____.
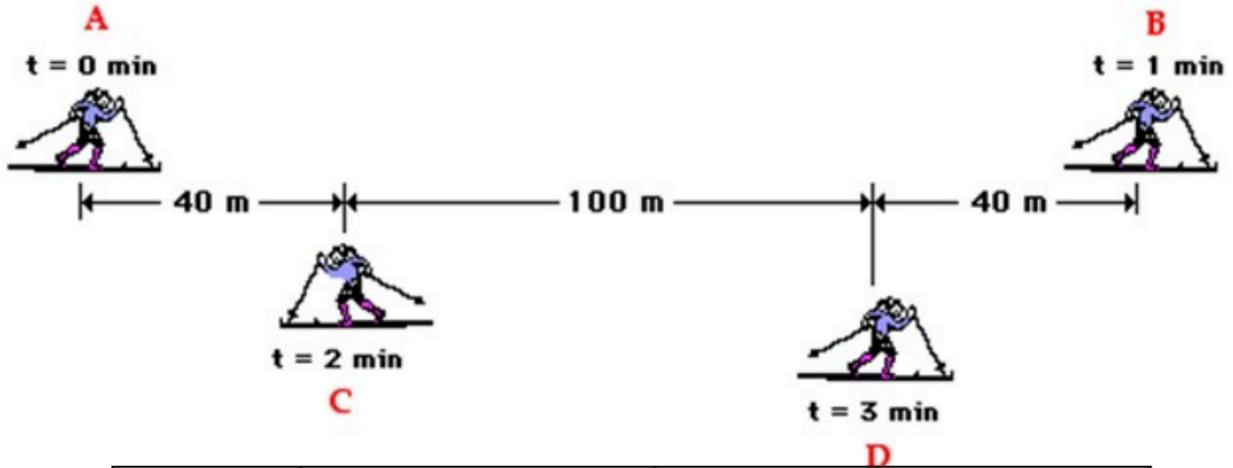
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position	*Coach Physics was doing a circuit in the gym.*
velocity	*Mrs. Bio was sweeping in the movie theater.*

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Clue #5

???

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Clue #7

WHODUNNIT?

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Subtract initial velocity from final velocity and divide by time traveled. (highlighted)	*Miss Zoo was watching a documentary in the kitchen.* (highlighted)
Subtract the initial position from the final position and divide by time traveled.	*The injury was not an electrocution.*
Multiply speed by time traveled and use a positive or negative sign to indicate the type of acceleration.	*Professor Astro was splashing in the pool.*

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Clue #8

Which of the following is true of an object when it moves uniformly around a circle?

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Its speed changes, but its velocity and acceleration remain the same.	*The victim was not electrocuted.*
Its speed, velocity, and acceleration all remain the same.	*Mrs. Bio was playing a video game in the movie theater.*
Its velocity changes, but its speed remains the same. (highlighted)	*The victim was not mauled by a cougar.* (highlighted)

???

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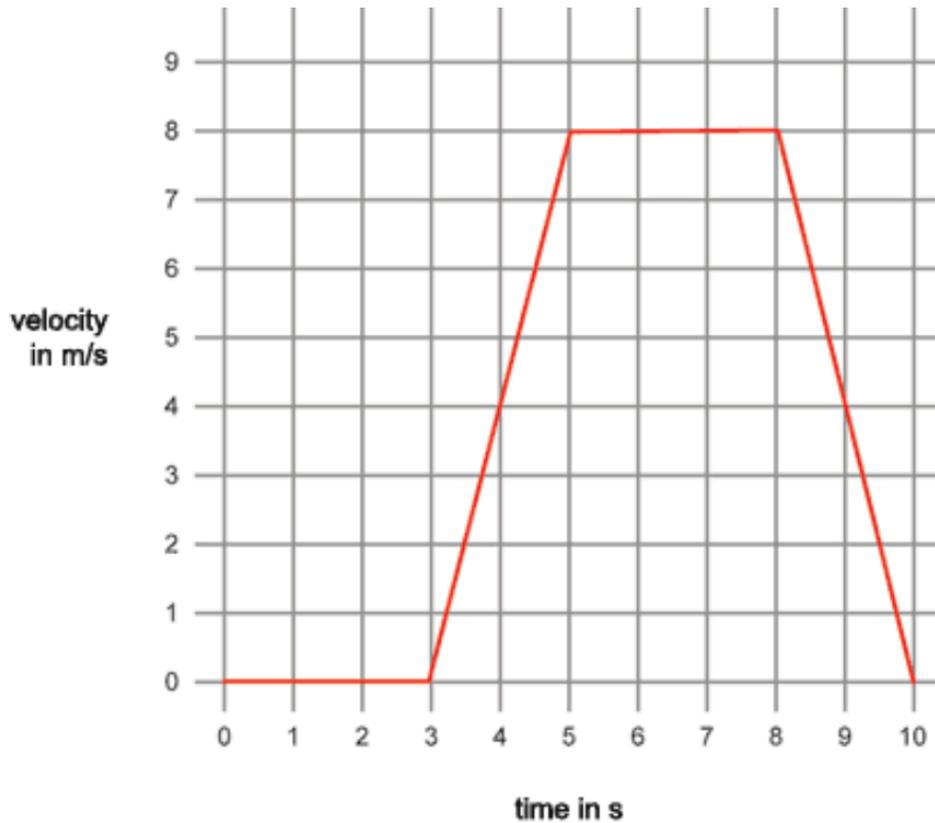
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Alternate Ending

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WHODUNNIT?   # Clue #10

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==Speed==	==*The injury was not a stubbed toe.*==
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