

Dear University of Colorado,

I would like to talk to you about your molecule computer Lab on your website. We used your website during Science class. One of our tasks were to heat the Argon molecule to 1600 plus degrees. As you know the lid was suppose to pop off and the molecules were suppose to escape. Then I got a little curious and wanted to freeze the atoms. So, I clicked the liquid button. The lid was still off the container but the atoms were escaping from the container. Then I started to think if a glass of liquid was sitting there it will not magically rise out from the container. So that is why I am writing this letter to you.

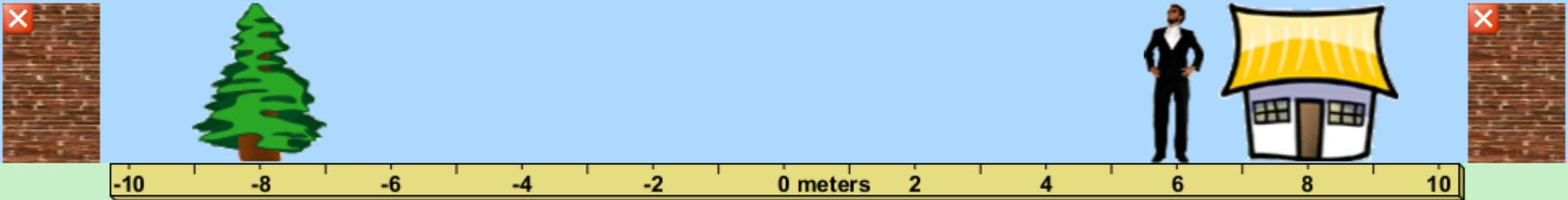
From,

A student from Durant Road Middle, NC

**Speed, acceleration, friction,
inertia, force, gravity**

2/10/16

59.5 seconds



Position

6.00 m



Velocity

0.00 m/s



Velocity Vector

Acceleration

0.00 m/s²



Acceleration Vector

Speed and Acceleration

- Which car has a higher speed?

A



B



C. Not enough information

Speed and Acceleration

- Which car has a higher speed?

A



B



C. Not enough information

Speed and Acceleration

- Which car has a greater acceleration?

A



B



C. Not enough information

Speed and Acceleration

- Which car has a greater acceleration?

A



B



C. Not enough information

Acceleration

Rate of change of speed

If a car accelerates at 20 miles/hour/second it means that every second the car speeds up by 20 miles/hour

Starts at 20 miles per hour.

1 second later it is going

A. 40 miles/hour

B. 30 miles/hour

C. 22 miles/hour

D. 60 miles/hour

Acceleration

Rate of change of speed

If a car accelerates at 20 miles/hour/second it means that every second the car speeds up by 20 miles/hour

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C. 22 miles/hour

D. 60 miles/hour

Acceleration

Rate of change of speed

If a car accelerates at 20 miles/hour/second it means that every second the car speeds up by 20 miles/hour

Starts at 20 miles per hour.

2 seconds later it is going

A. 40 miles/hour

B. 30 miles/hour

C. 24 miles/hour

D. 60 miles/hour

Acceleration

Rate of change of speed

If a car accelerates at 20 miles/hour/second it means that every second the car speeds up by 20 miles/hour

Starts at 20 miles per hour.

2 seconds later it is going

A. 40 miles/hour

B. 30 miles/hour

C. 24 miles/hour

D. 60 miles/hour

Acceleration

Rate of change of speed

Often you'll see m/s^2

Just means meters/second/second

1 m/s^2 is equal to

- A. traveling 1 meter every second
- B. A speed of 1 meter/second
- C. Speeding up 1 meter/second every second

Acceleration

Rate of change of speed

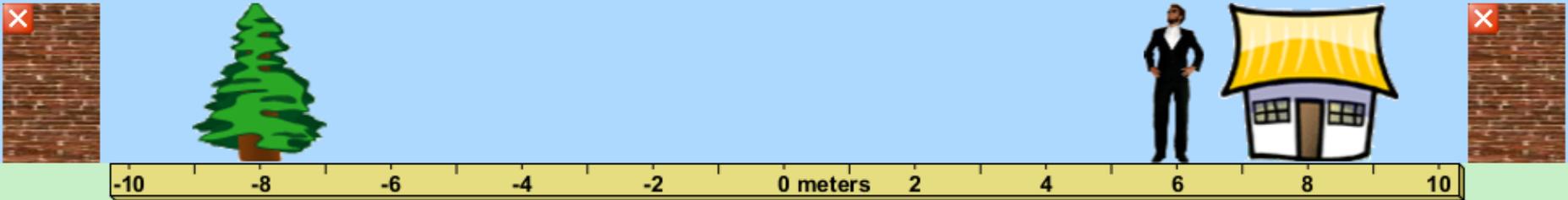
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59.5 seconds



Position

6.00 m



Velocity

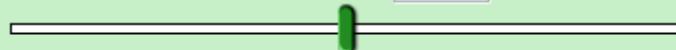
0.00 m/s



Velocity Vector

Acceleration

0.00 m/s²



Acceleration Vector

Natural Motion

- Sitting still
- Constant speed

Natural Motion = No acceleration,
no change in speed

Newton's First Law

If an object has no force acting on it,

If it is at rest, it will remain at rest;

If it is moving, it will continue to move in a straight line at a constant speed.

The natural state of an object - its behavior if free of external influences - is *uniform motion* with constant speed!

“If it is moving, it will continue to move in a straight line at a constant speed.”

Then, why do things slow down?

- A. Natural motion
- B. Friction
- C. Newton was wrong!

“If it is moving, it will continue to move in a straight line at a constant speed.”

Why do things slow down?

A. Natural motion

B. Friction

C. Newton was wrong!

Youtube [link](#)



0:02 / 1:58

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Inertia

- Harder to get heavier objects going.
 - Takes more force



At rest stays at rest



Inertia

- Harder to stop heavier objects.
 - Takes more force.



In motion stays in motion!

Natural Motion

- Sitting still
- Constant speed

Natural Motion = No acceleration,
no change in speed

Violent Motion

What around us causes natural motion to change?

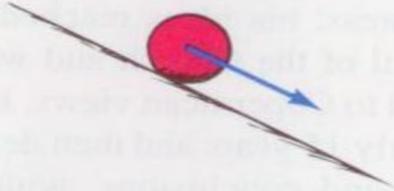
- Friction
- Gravity
- Pushing
- Pulling

FORCES

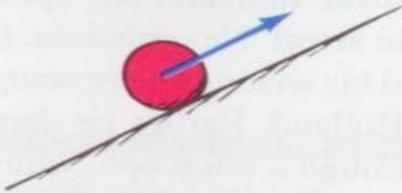
Gravity

Galileo's Inclined Planes

Slope downward—
Speed increases



Slope upward—
Speed decreases



No slope—
Does speed change?



No slope –
Does speed change?

A. No

B. Yes

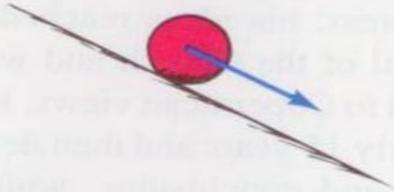
C. Yes, only if other force involved

D. Not sure

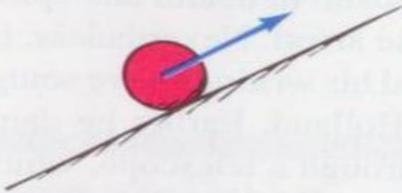
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Slope downward—
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No slope—
Does speed change?



No slope –
Does speed change?

A. No

B. Yes

C. Yes, only if other force involved

D. Not sure

Which ball wins?

- A. High Road
- B. Low Road
- C. Tie

