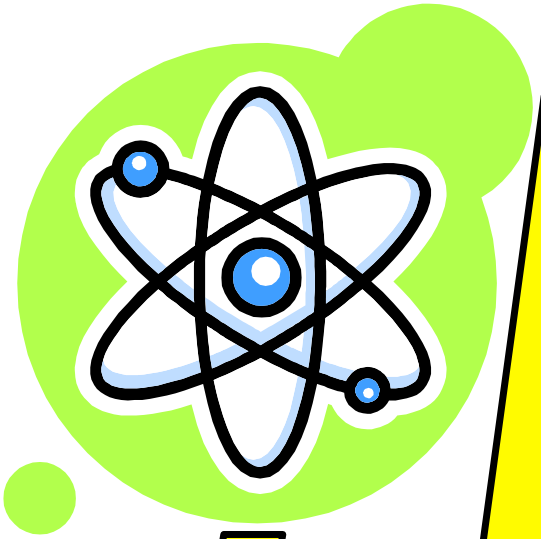
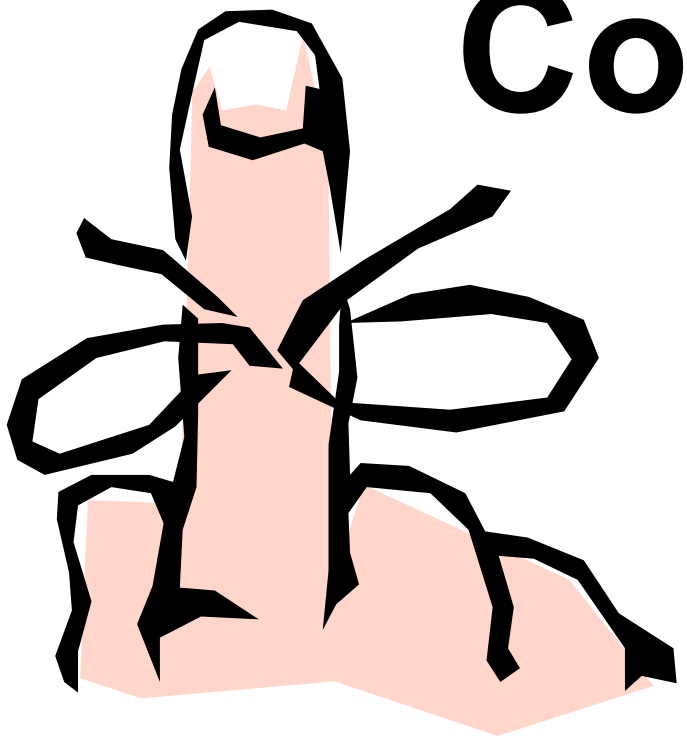


Forces Jeopardy

Adapted by T. Trimpe http://sciencespot.net/



Contestants Don't Forget...

RULES

1. You should NOT write your answers in the form of a question.

2. You DO need to keep track of your score. You do NOT lose points if you answer incorrectly.

RULES

3. Your team should answer EACH question on your whiteboard.

4. We will rotate who has control of the board, choosing the question.

Motion	Name that Force	Units	Newton's Laws	Calculate this force
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Motion for $100

Velocity or Acceleration change when….

(name all possibilities)

- Speed changes
- Direction changes
- Both speed AND direction change

Back to Game

Motion for $200

What is the acceleration of gravity?

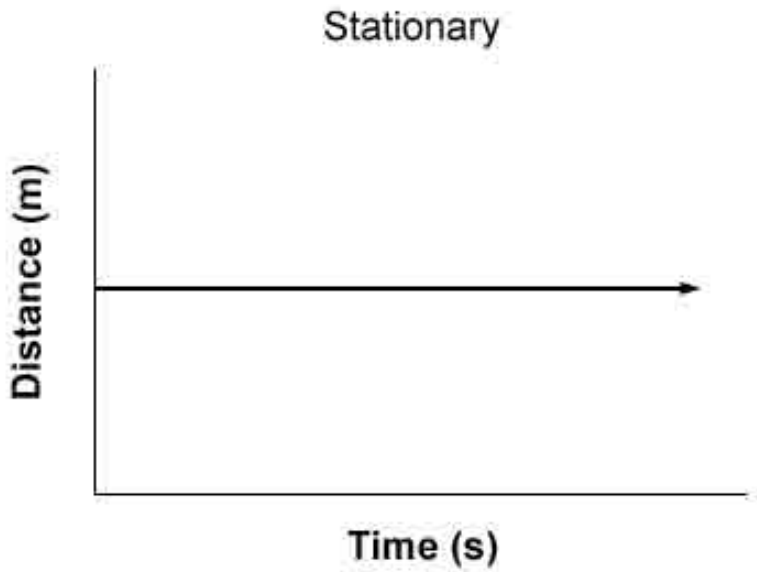
$9.8\ m/s^2$

Back to Game

Motion for $300

Draw a distance versus time graph for a stationary object

(Label X & Y axis)



Back to Game

Motion for $400

If equal and opposite forces cause no acceleration they are said to be…

Balanced

Back to Game

Daily Double!!

(Worth 1000 points!)

How are mass and weight different?

- **Mass** is how much matter an object is made of. It cannot change

- **Weight** is a force representing the pull of gravity on an objects mass. Weight is variable.

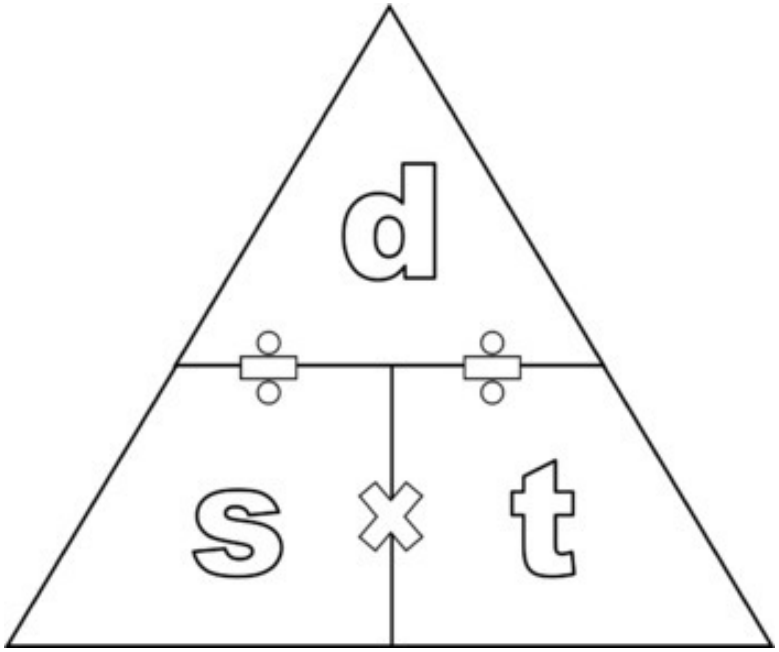
Back to Game

Name that force for $100

I’m looking to solve for how fast something is traveling, how long it took or how far it went.

What formula do I use?

S = d / t



Back to Game

Name that force for $200

I push and push but this force stops the object from going anywhere, how frustrating!

Friction

Back to Game

Name that force for $300

Newton, a famous physicist discovered this force while sitting in an orchard. An apple just fell on his head.

Gravity

Back to Game

Name that Force for $400

Playing tug of war with my friends you can see this force in action.

Tension

Back to Game

Name that force for $500

Our planets orbit around the Sun because of this (these) force(s)

Centripetal Force

&

Gravity

Back to Game

Units for $100

What does “m/s” mean?

AND

What is it a unit of?

Meters per second

It is the unit for:

SPEED

Back to Game

Units for $200

What does “m” mean?

AND

What is it a measure of?

Meters

It is a unit of:

Distance

Back to Game

Units for $300

What does “kg” mean?

AND

What is it a unit of?

Kilograms

It is a unit of:

Mass

Back to Game

Units for $400

What does "m/s^2" mean?

AND

What is it a unit of?

Meters per second squared

It is a unit of:

Acceleration (velocity)

Back to Game

Units for $500

What does “N” mean?

AND

What is it a unit of?

Newtons

It is a unit of:

Force (weight too)

Back to Game

Newton's Laws for $100

The harder you pedal a bicycle the faster it will go is which of Newton's laws?

Newton's 2nd Law

Force=mass / acceleration

Back to Game

Newton's Laws for $200

The main reason a person can jump off the ground is which of Newton's laws?

Newton's 3rd Law

Every action has an equal and opposite reaction

Back to Game

Newton's Laws for $300

A hockey puck will slide on the ice for a long time when hit until…

(finish the sentence & tell me the law)

Newton's 1st Law

An object stays in motion unless acted upon by an outside force

Back to Game

Newton's Laws for $400

Newton's 2nd Law of Motion

$$F = m \times a$$

Back to Game

Newton's Laws for $500

What is the weight of a person who has a mass of 40 kg?

Show your work
(you can use a calculator)

F = m x a OR weight = m x a

Weight = 40kg x 9.8 m/s^2

Weight = 392 N

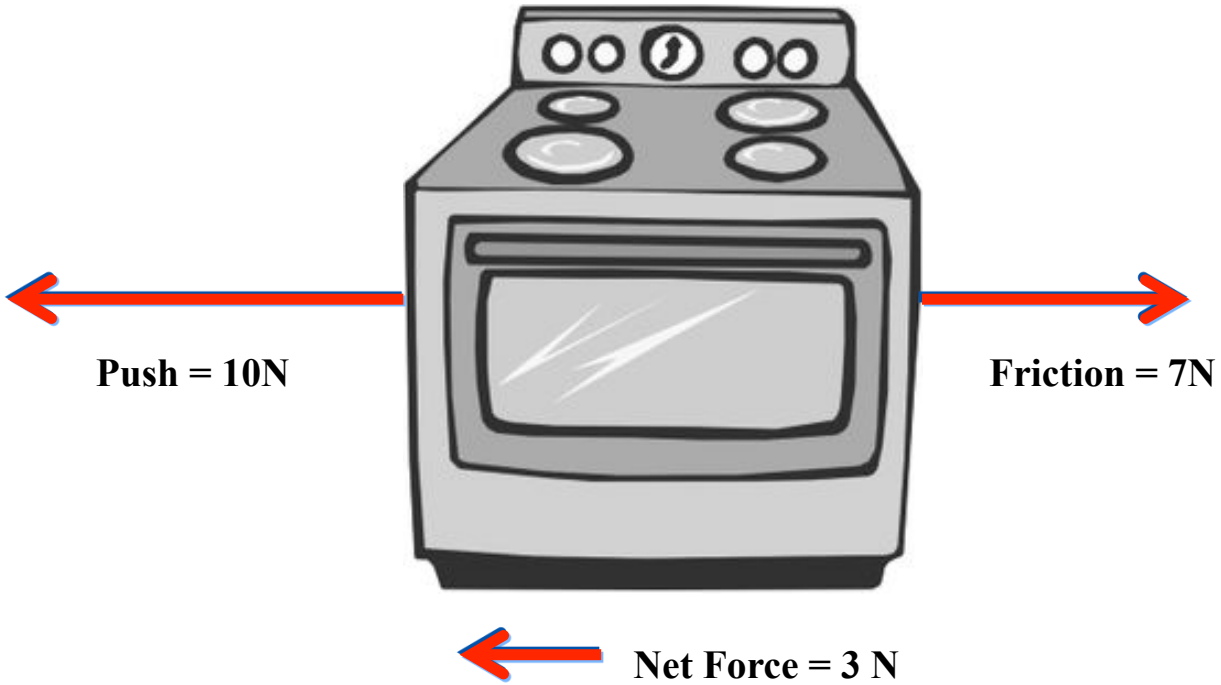
Back to Game

Calculate this Force for $100

Draw a free body diagram for a person pushing a large oven to the left with a push of 10N and a friction force of 7N.

SOLVE FOR THE NET FORCE

Label all of the forces acting on the "box" using arrows of the correct length.



Back to Game

Calculate this Force for $200

An object is falling toward the Earth at 9.3 m/s^2.

Why is the object NOT falling at 9.8 m/s^2?

(Hint: What forces resist an object's motion in the opposite direction?)

Air Resistance

Friction

Back to Game

Calculate this Force for $300

What is the acceleration of a 50 kg object pushed with a force of 500 Newtons?

$$F = m \times a$$

$$F = 500N$$

$$m = 50\ kg$$

Acceleration = $10\ m/s^2$

(your units must be correct!)

Back to Game

Calculate this Force for $400

A paratrooper jumps from an airplane and waits 3 seconds before releasing his parachute.

How far did he fall in those 3 seconds?

Distance = .5gt^2

$$g = 9.8$$

$$t = 3$$

$$.5\ (9.8)\ (3^2)$$

$$D = 44.1\text{m}$$

Back to Game

Calculate this Force for $500

A 60 kg Gila monster on a merry-go-round is traveling in a circle with a radius of 3 m at a speed of 2m/s What is it's centripetal force?

$$F_c = m(v^2) / r$$

$$F_c = 60(2^2) / 3$$

$$F_c = 80N$$

Back to Game

Final Jeopardy

How many points do you want to risk?

Final Jeopardy

A cyclist turns a corner with a radius of 50m, a speed of 10m/s and a force of 240N.

What is the mass of the cyclist and his bike?

$$F_c = m(v^2) / r$$

$$240N = m\,(10^2) / 50$$

$$\textbf{Mass} = 120kg$$

And the winner is …