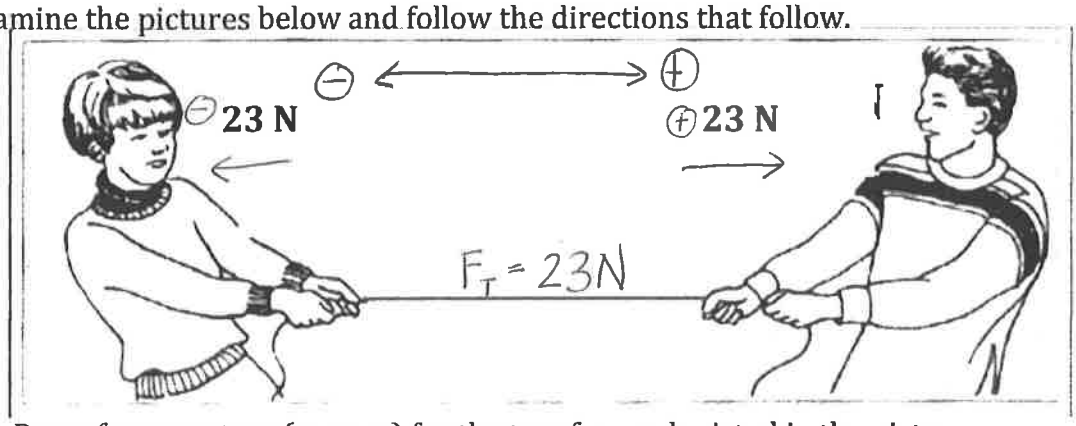
Name Physical Science - Energy Block P.5 Date Spring 2019 (1)

Newton's First Law of Motion

Why?
All motion on earth, and throughout the universe can be explained using Isaac Newton's three laws of motion. They can be used to a) describe the interactions and resulting forces between objects and b) predict the motion of objects. Forces and motion are an integral factor in our lives from transportation safety to sports to simply walking down the street.

Examine the pictures below and follow the directions that follow.

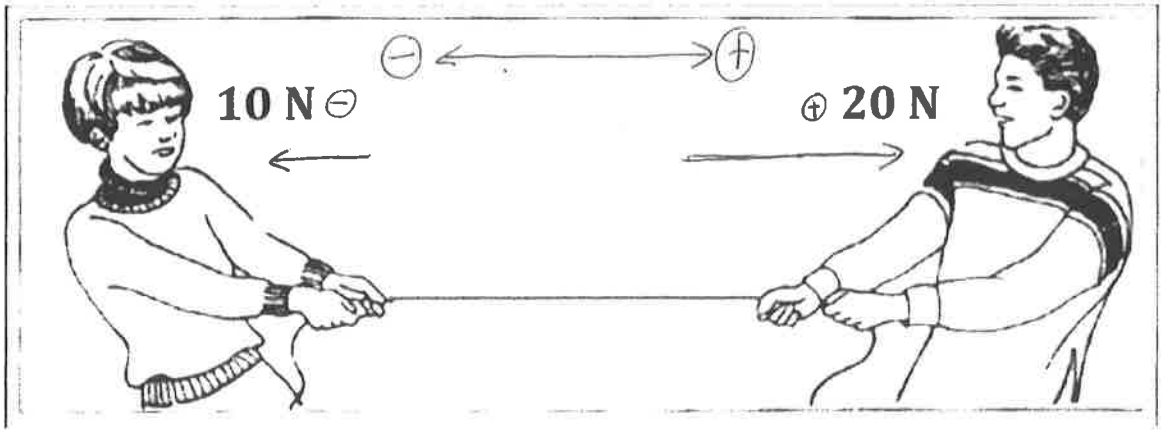


A1. Draw force vectors (arrows) for the two forces depicted in the picture.

A2. What is the net force? $\Sigma F = 0N = +23N + -23N = 0N$

A3. What kind of force is this? Circle one. (balanced) unbalanced — in equilibrium

A4. Is there a change in motion? no If so, in what direction? (at rest) or moving at a constant speed



B1. Draw force vectors (arrows) for the two forces depicted in the picture.

B2. What is the net force? 10N $\Sigma F = 20N + -10N = 10N$

B3. What kind of force is this? Circle one. balanced (unbalanced)

B4. Is there a change in motion? yes If so, in what direction? to the right or in ⊕ direction

B5. Based on Part A and B, what kind of force is required to create a change in motion?

Circle one. balanced (unbalanced)

Examine the following comic. Fill in the blanks with the appropriate scientific terms used to describe motion and forces. A young Albert Einstein places a soccer ball on a brick wall.

This comic can be read in full at:
http://Pixton.com/ic:RKERHD3D
Created by DragonRider324

C1. What was required to set the ball in motion? a gentle push

C2. In scientific terms, a push is an example of a forte.

C3. What was the initial velocity of the ball? Ø m/s

C4. Was the velocity after the push greater than 0 m/s? yes

C5. Did the ball accelerate as a result of the push? yes - it's velocity changed

Newton's First Law

Newton's first law states that an object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction unless acted upon by an unbalanced force.

Another way to state this is to say that if the net forces acting on an object are zero, then an object will continue to do what it was doing (have the same motion). If the net force is greater than zero, then an objects motion will change.

For example, when you are standing the force of gravity is balanced by the force of the floor holding you up.

D1. Does the case of our soccer ball sitting on the wall follow Newton's first law? yes

D2. After young Einstein pushed the ball, it was set in motion. According to Newton's first law, the ball should continue to move (stay in motion) till an unbalanced force acts on it. You know from experience, that a soccer ball eventually comes to rest. Is an unbalanced force acting upon the soccer ball?

(Yes) No

D3. What direction is the ball moving in? Circle one. left (right)

D4. What is the wall made of? brick

D5. Does friction exist between the ball and the wall? yes If so, which direction? to the left

D6. Since the ball slowly comes to a stop, what does that mean about the acceleration of the ball? Circle one.

A. The ball has positive acceleration (it speeds up).
(B.) The ball has negative acceleration (it slows down).

D7. Since the ball slowly comes to a stop, what does that mean about the net force on the ball as it rolls?

The net force is decreasing (increasing or decreasing) and acts in the left (left or right) direction.

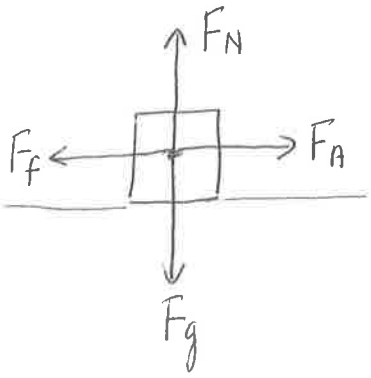
ball $\vec{v}$ →
← F_f

as the ball approaches rest (or ØN) the net force is decreasing

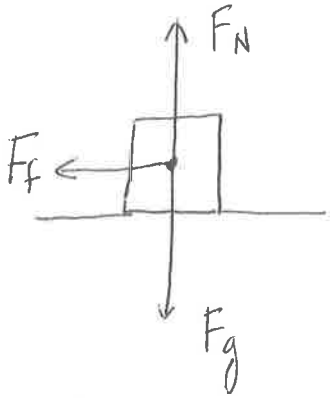
D8. Fill in the blanks for Newton's first law here:

An object at rest tends to stay at rest and an object in motion tends to stay in motion with the same magnitude and direction unless acted upon by an unbalanced force.

D9. Explain why the ball eventually comes to a stop. Use complete, grammatically correct sentences. Include and underline the words: motion, force, unbalanced, friction, direction.



At 1st push...



After initial push...