



8th Grade Science Choice Board

Week of September 28, 2020

DUE:

Textbook Reference Pages: 16-19

Directions: Choose **ONE** of **EACH** category (read, practice, and practice). Your work may be on paper or online in Schoology, but **MUST** be turned in at the **BEGINNING** of your next class. Full credit is awarded for **COMPLETE** assignments that follow **ALL** directions below!

READ

(Choose one)

Paper: Read the article Balanced and Unbalanced Forces. Answer the "questions to Check Your Understanding."

Online: Read the article Balanced and Unbalanced Forces. Answer the "questions to Check Your Understanding."

PRACTICE

(Choose one)

Paper: Complete the worksheet Net Force Practice. Include all necessary diagrams.

Online: Complete the activity Net Force Practice.

PRACTICE

(Choose one)

Paper: Complete the practice problems and word problems on the worksheet, Balanced and Unbalanced Forces.

Online: Complete the Net Force Comprehension Check on Schoology.

IMPORTANT NOTES:

- To turn in the **textbook** assignments, you may bring the whole textbook to class, take a picture of the page **with your name on each page** and show it/email it to the teacher, or tear out the page.
- You may mix up the use of paper/online assignments as you choose.
- If you have any technical difficulties, you may email the teacher **OR** complete the paper assignment- one assignment **MUST** be completed!

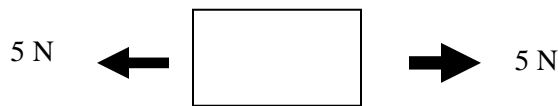
Balanced Forces and Unbalanced Forces

Read the summary and the underline main ideas and key terms.

All forces act on objects. A force is defined as a push or a pull on an object. In science, we say that forces are vectors, meaning that forces have both magnitude (strength) and direction. To measure the amount of force acting on an object, scientists use a tool called a spring scale. The spring scale measures the amount of force in units called Newtons (N), after Sir Isaac Newton, who developed Newton's Three Laws of Motion to describe how forces affect an object's motion.

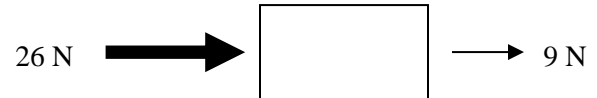
When two or more forces are acting on an object, the total force is called the net force or cumulative force. When forces act in the same direction, then you add up the forces to find the total. For example, if two people are working together to move a table to the right, then you would combine their forces to find the net force. However, when forces act in the opposite direction, then you would subtract the forces to find the total. For instance, if two people are fighting over a bag of chips, then you would subtract their forces since they are not working together. There are two types of net forces, balanced forces and unbalanced forces. When the net force is balanced, that means that the total force is equal to 0 Newtons. When net forces equal to 0 N, then it will not change an object's motion. For example, an object at rest will remain at rest and an object in motion will continue to move at a constant velocity. This refers to Newton's First Law of Motion. On the other hand, when the net forces are greater than 0 Newtons, then the net force is considered to be unbalanced. Unbalanced forces will affect the object by changing its velocity. The object might speed up, slow down, or change directions. This refers to Newton's Second Law of Motion.

Balanced Forces:



Net force: 5 N left- 5 N right= 0 N

Unbalanced Forces:



Net force: 26 N right - 9 N left= 17 N right

Questions to Check for Understanding

1. What is the definition of force?
2. Why is force considered to be a vector?
3. The unit used to describe force is a Newton (N). It takes about 4.4 Newtons to lift 1 pound (or 0.45 kilograms).
 - A. How many Newtons would it take to lift 2 pounds?
 - B. How many Newtons would it take to lift 100 pounds?

4. The cumulative or net force represents the total amount of force.

A. When would you add the forces acting on an object?

B. When would you subtract the forces acting on an object?

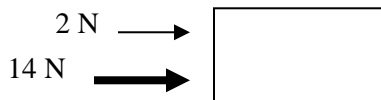
5. What are two characteristics of net forces that are balanced?

6. What are two characteristics of net forces that are unbalanced?

Balanced and Unbalanced Forces: Practice Problems

Directions: For each problem, find the net force and include both the magnitude and direction in your answer. Then, look at your answer and determine whether the net force is balanced or unbalanced.

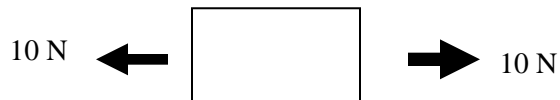
Problem #1



Net force: _____

Balanced or Unbalanced: _____

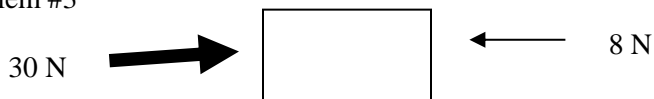
Problem #2



Net force: _____

Balanced or Unbalanced: _____

Problem #3



Net force: _____

Balanced or Unbalanced: _____

Problem #4



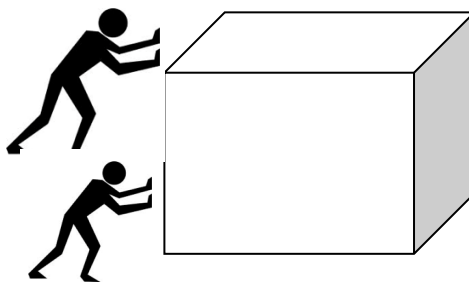
Net force: _____

Balanced or Unbalanced: _____

Part TWO: Word Problems

Word Problem #1: Two boys, Adam and Bob are pushing a box. They want to move the box to the right. Adam exerts a force of 100 Newtons on the box and Bob exerts a force of 150 Newtons in the same direction.

A. Draw arrows showing the magnitude and direction of the forces.



B. Are the forces working in the same or opposite direction? _____

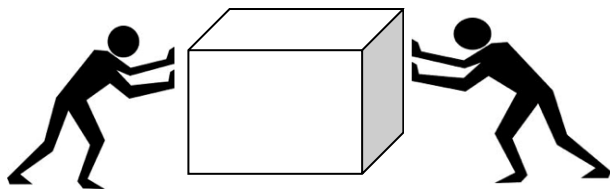
C. Do you add or subtract the forces? _____

D. What is the combined force (net force) on the box? _____

E. Are the forces balanced or unbalanced? _____

Word Problem #2: Two boys are arguing over where to move the box. Jacob exerts a force of 210 Newtons to the right and Erick exerts a force of 260 Newtons to the left, pushing in the opposite direction.

A. Draw arrows showing the individual and combined forces of the box in #2.



B. Are the forces working in the same or opposite direction? _____

C. Do you add or subtract the forces? _____

D. What is the combined force (net force) on the box? _____

E. Are the forces balanced or unbalanced? _____

Net Force Practice

The force that results from all the combined forces acting on the object is called the **net force**. Calculate the net force acting on the box in the following problems.

Be sure to include the direction of the net force (left or right)!

1.



Net Force:

2.



Net Force:

3.



Net Force:

4.



Net Force:

5.



Net Force:

6.



Net Force:

Draw a

free body diagram and calculate the net force for the following problems:

11. A boy pulls a wagon with a force of 6N east as another boy pushes it with a force of 4N east. What is the net force?

12. Mr. Smith and his wife were trying to move their new chair. Mr. Smith pulls with a force of 30 N while Mrs. Smith pushes with a force of 25 N in the same direction. What is the net force?

13. The classes are playing tug of war. Ms. Peacock's class pulls with a force of 50 N. Mrs. Hamlett's class pulls with a force of 45 N in the opposite direction. What is the net force, and who wins the game?