

Name: _____

Period: _____

Vector Worksheet

Drawing Forces

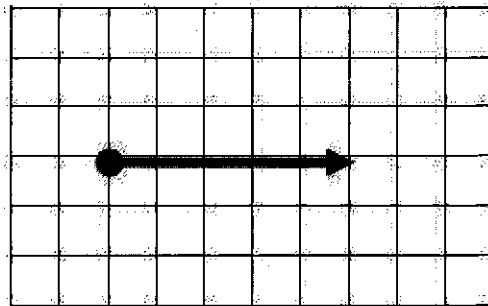
Velocity, Acceleration and Forces can be shown with a **vector**. A **vector** is a quantity that is fully described by both magnitude and direction.

Rules for drawing vectors:

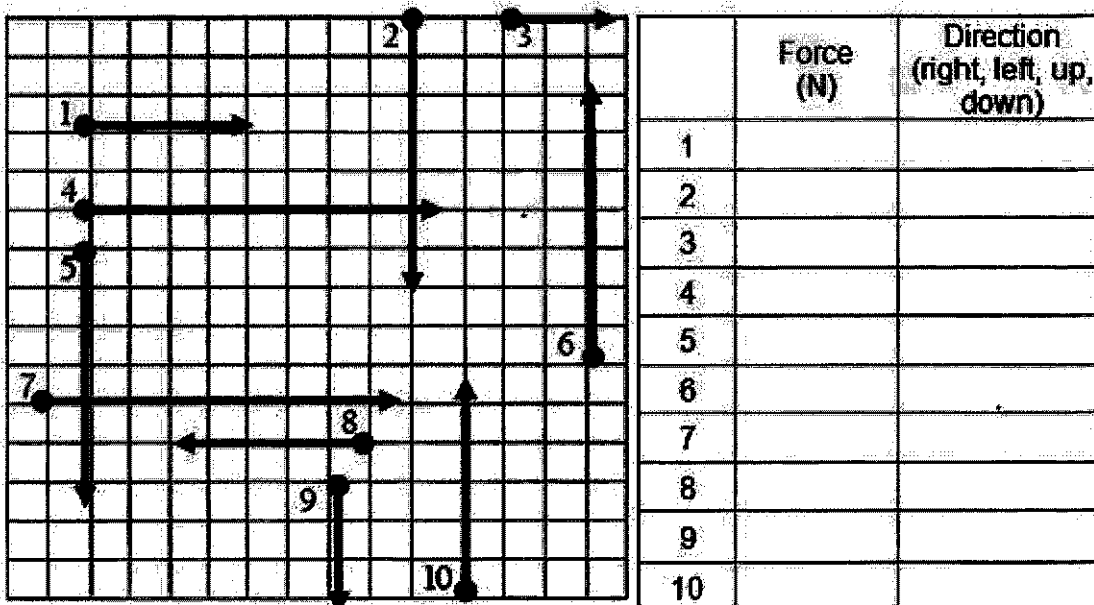
- The dot shows where the force begins
- The length of the arrow shows the amount of force (aka magnitude)
- The arrow shows the direction of the force

Example:

Each square represents a force of ONE NEWTON. This vector shows a 5 N force to the right.

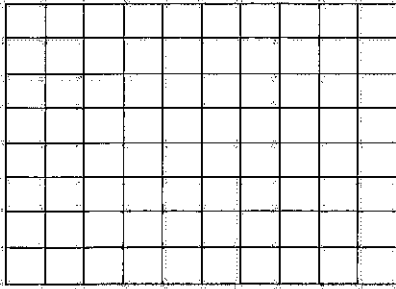


1. Fill in the chart on the right with the information found in the figure on the left. Each square represents 1N of force.

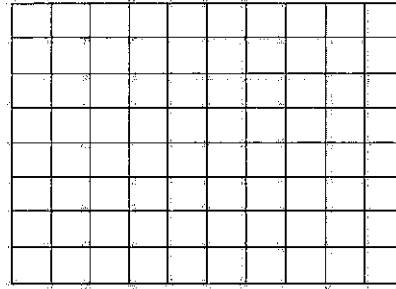


2. Draw each vector described below on the chart. Each square represents 1 N of force. Remember to start each vector with a dot.

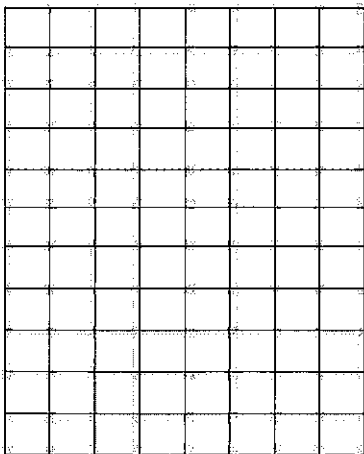
a. 7 N force to the right



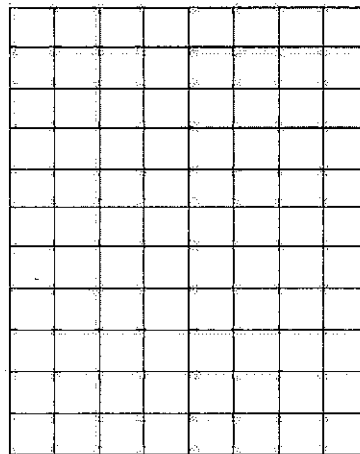
b. 5 N force to the left



c. 10 N force upwards



d. 3 N of downwards force



Vector Addition:

More than one force can act on an object at the same time. These forces can both push the object, both pull the object or one force can push while the other pulls.

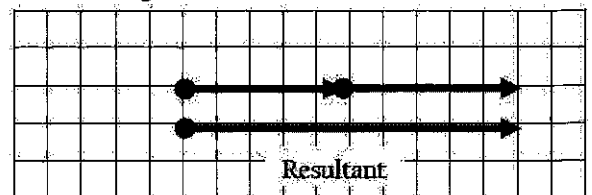
When multiple forces act on an object the **net force (resultant)** depends on:

- The magnitude of the forces (how strong the forces are)
- The direction of the various forces.

The figure to the right shows two forces in the same direction:

- Each vector has a force of 5 N to the right.
- Because they are in the same direction we can **ADD** the forces together.

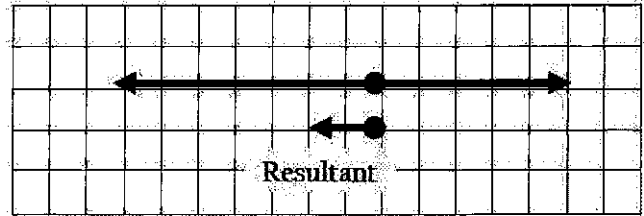
- The resultant is a vector with a force of 10 N to the right.



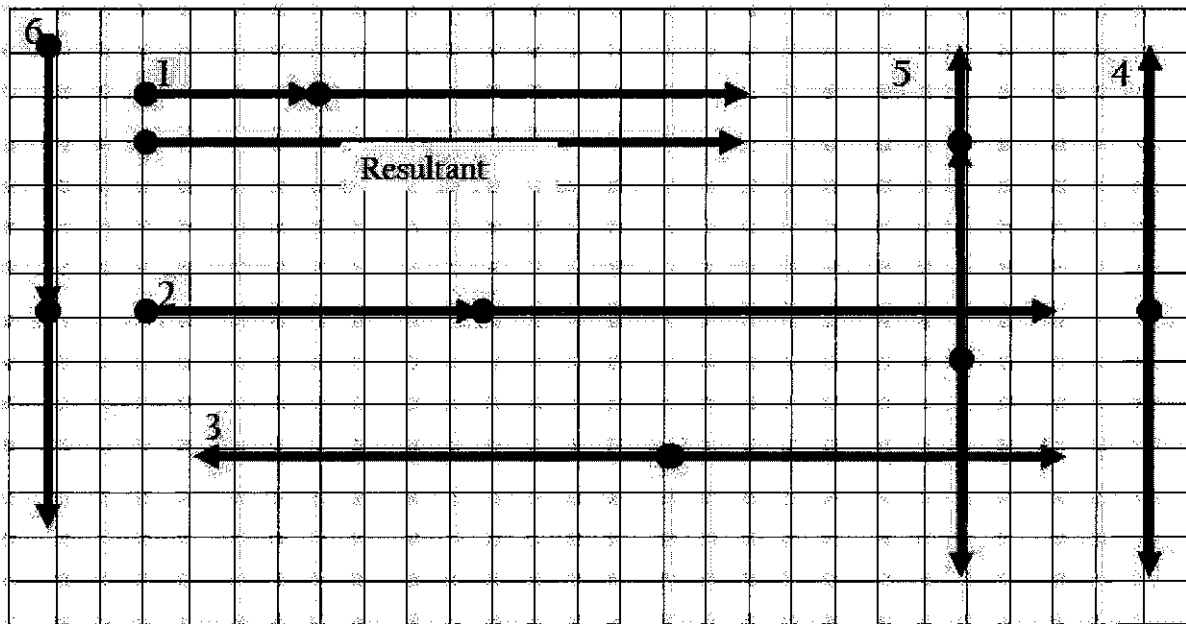
This figure shows two forces acting in opposite directions:

- There is a vector with a force of 5 N to the right.
- There is another vector with a force of 7 N to the left.
- Because the two vectors are moving in exactly opposite directions we can **SUBTRACT** the two forces.

- The resultant is a vector with a force of 2 N to the left.



3. Six sets of vectors are shown below. Draw the **resultant** vector next to each set. Start at the dot. The first one has been done for you.



Use the above information to fill in the chart below:

| | Total number of force vectors | Force (N) of each vector | Direction of resultant vector (right, left, up, down) | Magnitude of resultant vector | Balanced or Unbalanced? |
|---|-------------------------------|--------------------------|---|-------------------------------|-------------------------|
| 1 | 2 | 4 N + 10 N | Right | 14 N | Unbalanced |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |

