

1. An ideal spring can be stretched by a force acting on only one end. True or **False**?

2. A force can be generated without an object to act on. True or **False**?

3. Can an object generate and be acted on by the same force? **NO**

4. What does the length of a force vector arrow represent? **Magnitude of the force**

What does the direction of the arrow represent? **Direction of the force**

5. Copy a statement of Newton's third force law from the text.

Forces involve two objects; the *action* force of the 1st acting on the 2nd, is always paired with a *reaction* force with equal magnitude and opposite direction, of the 2nd on the 1st.

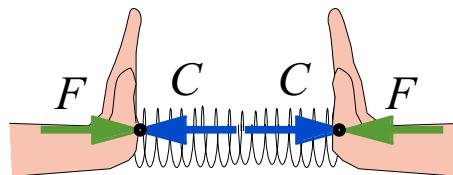
6. In general, one can find an action - reaction pair of forces acting at these three locations

a) at a contact point between two objects

b) at a point where an object can be split into two pieces

c) acting on the two objects affected by an ideal spring (or by gravity)

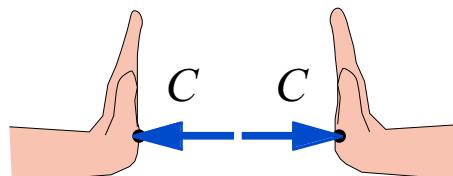
7. a) Shown below are two hands holding a compressed spring. Draw the hand forces *acting on* the spring, and compression forces of the spring *acting on* the hands. Include the point of action dot (•).



b) Shown below is just the compressed spring. Draw the hand force vectors acting on the ends of the spring.



c) Shown below are just the hands that compress spring. Draw the spring compression force vectors acting on the hands.



8. There are three action – reaction force pairs in problem 7a. For each action – reaction force pair identify the two objects they act on.

- i) Object 1: Left Hand Object 2: Spring's left side
- ii) Object 1: Right Hand Object 2: Spring's right side
- iii) Object 1: Left Hand Object 2: Right Hand

9. For Newton's 3rd force law to hold, what must be the state of motion of the two objects involved?

- a) both at rest
- b) both moving at constant speed
- c) both moving in a constant direction
- d) both moving with changing speed and direction
- e) any of the above

10. In an action – reaction pair of forces, it is never possible to determine which force is the action force and which is the reaction force. True or False?