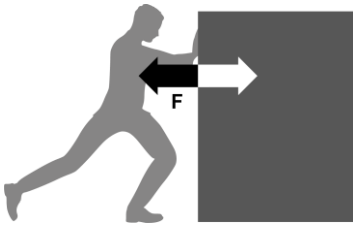
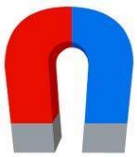
Forces

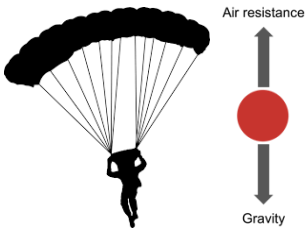
1. A force is an interaction (e.g. a push, pull or twist) between 2 objects.
2. A force can change an object's shape, speed or direction.
3. Forces are either contact or non-contact
4. **Contact forces** need the objects to be touching.
5. Examples of contact forces include: drag forces, friction, air resistance, tension and normal contact forces.



6. **Non-contact forces** can act at a distance. They do not need the objects to be touching.
7. Examples of non-contact forces include: gravity, electrostatic attraction and magnetism.



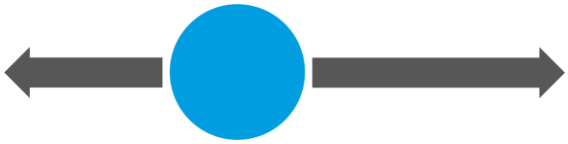
8. Forces have size and direction.
9. Forces acting on one object are represented by **free-body force** diagrams using arrows to show the direction and size



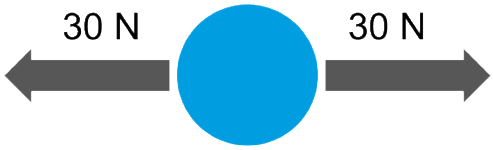
Balanced and Unbalanced forces

10. Forces are **balanced** *only* when forces acting on the same object are equal in size but opposite in direction.

11. An object's motion or shape does not change if the forces are balanced.
12. **Unbalanced** forces change an object's shape, speed or direction.

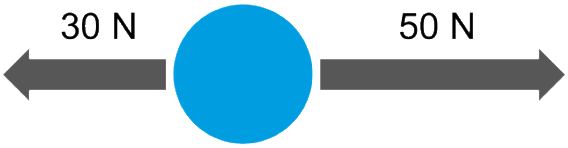


13. The unit of force is **Newton (N).**
14. The **resultant force** on an object is the net force or the overall effect of all the forces acting on an object.
15. When forces are balanced the resultant force is 0N.



Resultant force = 30 N - 30 N = **0 N**

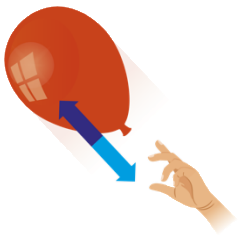
16. When the forces are unbalanced the resultant force is *not* 0N.



Resultant force = 50 N - 30 N = **20 N right**

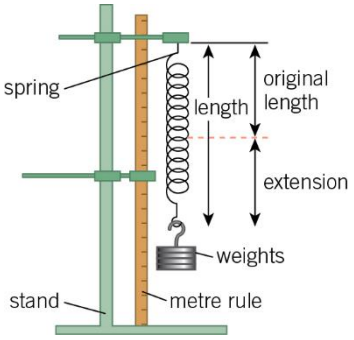
Interaction Pairs

17. Forces *always* act in interaction pairs.
18. Interaction pairs act on 2 different objects.
19. If A exerts a force on B, then B exerts a force on A. The forces are equal in size but opposite in direction.



Deformation

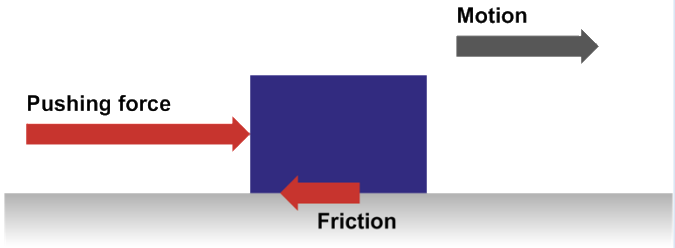
20. Changing the shape of an object can be called deformation.
21. The **extension** of a spring is an example of deformation.
22. The extension of a spring = final length- original length.
23. The extension of spring can be measured when different weights are added.
24. The extension is larger when more weight is added.

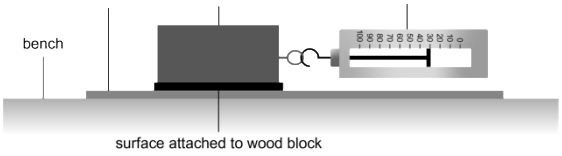


25. If too much force is added, then a spring does not return to its original shape. The spring has reached its **elastic limit.**

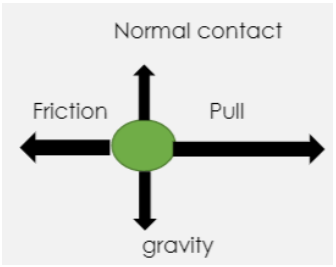
Drag Forces and friction

26. Drag forces occur in **fluids**.
27. Fluids are liquids and gases.
28. Drag forces include water resistance and air resistance.
29. Friction occurs between solids.
30. Drag forces and friction are caused by interaction of 2 objects moving or trying to move over one another.
31. Drag forces and friction act in the opposite direction to motion.





32. To move a block along a surface, the forces need to be unbalanced. The pulling force needs to be just bigger than friction.



33. Rougher surfaces generate more friction than smoother surfaces.

    Friction is reduced by adding a **lubricant.**