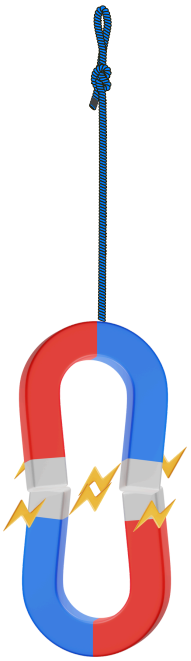
Contact and non-contact forces



A magnet is held by another magnet as shown.

1. Draw a free-body diagram for the top magnet.
The free-body diagram should include labels for:

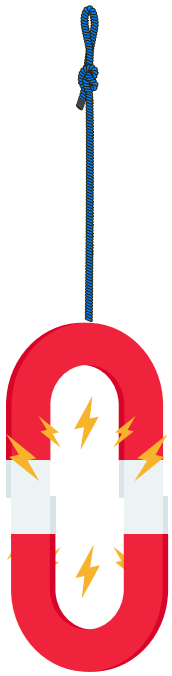
- The type of force (normal, gravitational, etc.)
- The object on which the force is exerted
- The object exerting the force

2. Draw a free-body diagram for the bottom magnet.
The free-body diagram should also include labels for:

- The type of force (normal, gravitational, etc.)
- The object on which the force is exerted
- The object exerting the force

3. Suppose that the magnets were replaced by stronger magnets of the same mass.

If this changes the free-body diagram for the top magnet, sketch the new free-body diagram and describe how the diagram changes. (Label the forces as you did in part 1 above.) If the free-body diagram for the top magnet does not change, explain why it does not.

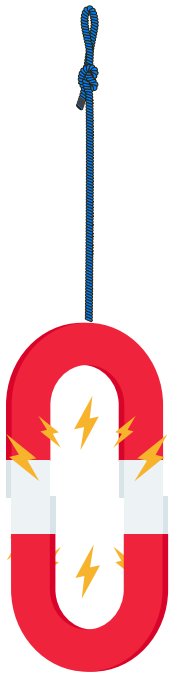


STRONGER B

Do the same for the bottom magnet. If this changes the free-body diagram for the bottom magnet, sketch the new free-body diagram and describe how the diagram changes. If the free-body diagram for the bottom magnet does not change, explain why it does not.

How do the magnitudes of the forces on the top magnet compare to the first part?

How do the magnitudes of the forces on the bottom magnet compare to the first part?

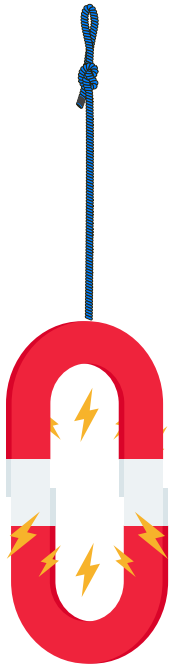


STRONGER B

4. Can a magnet exert a non-contact force on another object?

Can a magnet exert a contact force on another object?

Describe how you can use a magnet to exert *both* a contact force and a non-contact force on another object.



5. To ensure that you have accounted for all of the forces acting on the top and bottom magnets in the earlier parts:

List all the non-contact forces acting on the top magnet.

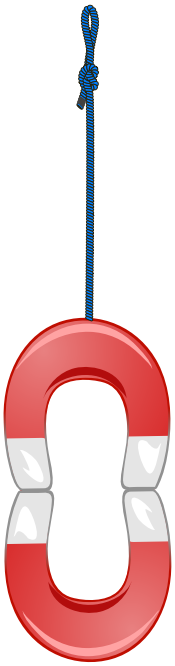
STRONGER B

List all the contact forces acting on the top magnet. (*Hint*, which objects are in *contact* with the top magnet?)

List all the non-contact forces acting on the bottom magnet.

List all the contact forces acting on the bottom magnet.

6. Now imagine the situation where the strengths of the magnets becomes weaker and weaker.



WEAKER B

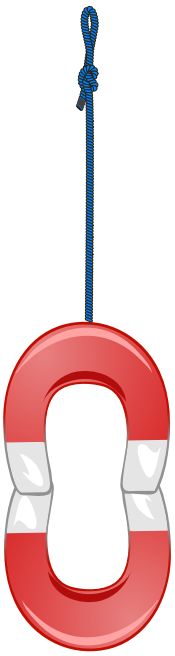
If the free-body diagram for the top magnet changes, draw the new free-body diagram. Label all of the forces like you did in the previous parts.

If the free-body diagram for the bottom magnet changes, draw the new free-body diagram. Label all of the forces like you did in the previous parts.

How do the magnitudes on the top magnet compare to the previous parts?

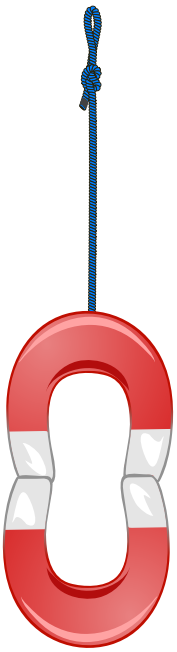
How do the magnitudes on the bottom magnet compare to the previous parts?

7. Now imagine the situation where the strengths of the magnets is 0.



B = 0

If the free-body diagram for the top magnet changes, draw the new free-body diagram. Label all of the forces like you did in the previous parts.



If the free-body diagram for the bottom magnet changes, draw the new free-body diagram. Label all of the forces like you did in the previous parts.

$B = 0$

How do the magnitudes on the top magnet compare to the previous part?

How do the magnitudes on the bottom magnet compare to the previous part?