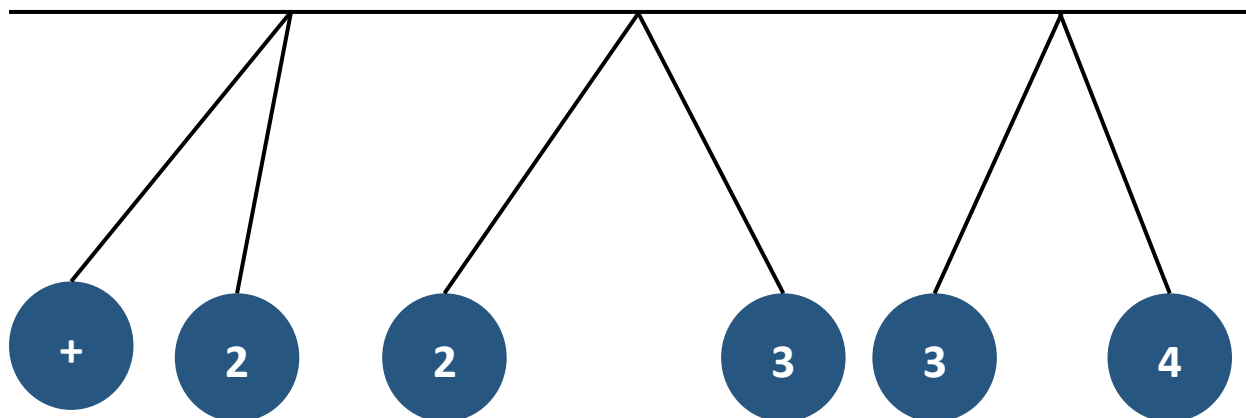


TEACHER GUIDE PRACTICE PROBLEMS



1. Object two is attracted to the object on the left. Object 3 is repelled by both objects 2 and 4. What is the sign of object 4? Explain how you know by stating specific laws or concepts required to arrive at your answer.

If object 2 is attracted to the positive then it must be negative. Object 3 is repelled by object 2 so it is negative. Object 4 is repelled by object 3 then it is also negative. The Law of Attraction is necessary to determine the charges for each unknown object. The Law of Attraction states if two objects have the same sign for charge then they will repel but if the signs for charge are opposite then they will attract.

2. Two charged objects have the same sign and same amount of charge. They exert a force, F , on one another.
 - a. If one object has double the charge, how is the force affected?
 - b. How is the force affected if the distance is doubled but the objects have equal amounts of charge and opposite signs?

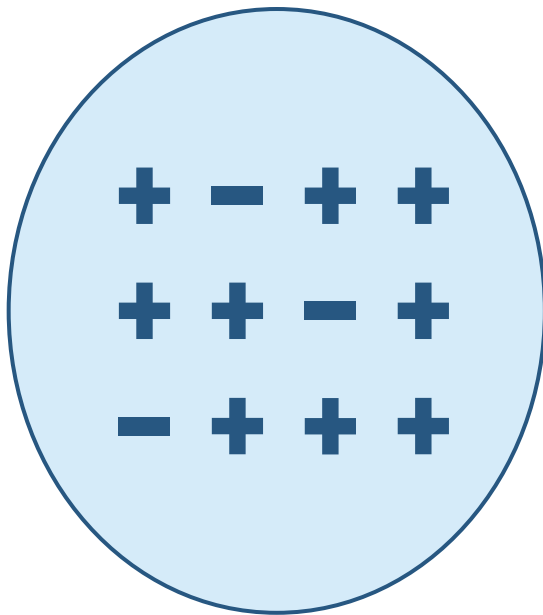
The force is reduced by a factor of four.



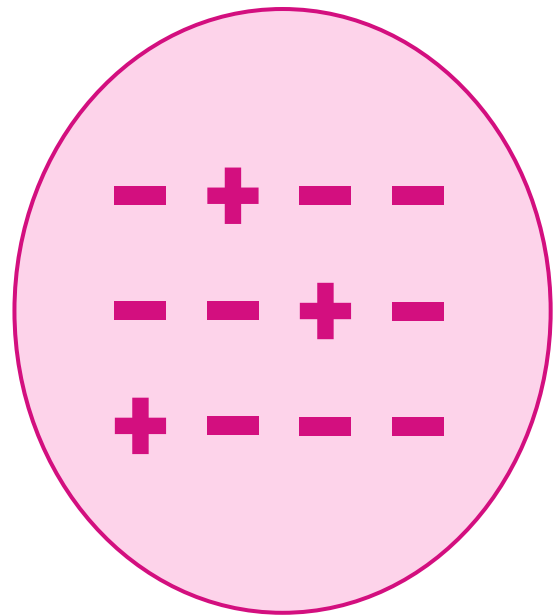
- c. How is the force affected if both charges are positive and the distance is halved, but one object has 4 times the charge as the other object?

The force is increased by a factor of 16.

3. Two neutral objects of the same materials have been vigorously rubbed together and the pictures below show the charge distribution for object 1. Draw the charge distribution for object 2. Justify your answer by stating laws or concepts required to arrive at your answer.



Object 1



Object 2

4. Why does your hair stand up when rubbed vigorously with a balloon? Draw a picture supporting your response.

Your hair stands up because it has a charge and is attracted to the ions in the air or the balloon if it is still near the hair. The balloon steals electrons from your hair leaving your hair with an overall positive charge and the balloon with a negative charge. Student pictures should show a person's head with hair positioned away from the head. A balloon near the head should show a negative charge and the hair should have a positive charge.