PhyzJob: Balancing Charges 1

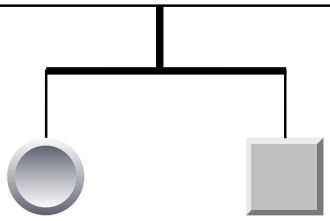
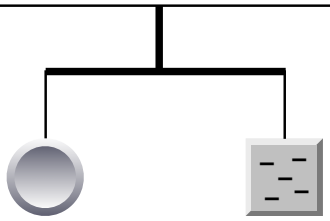
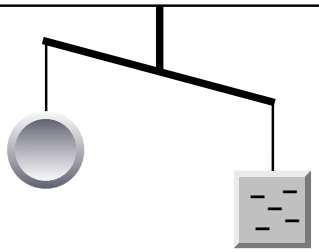
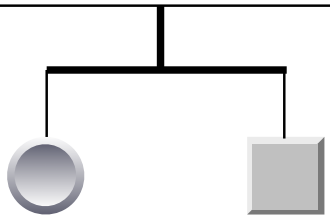
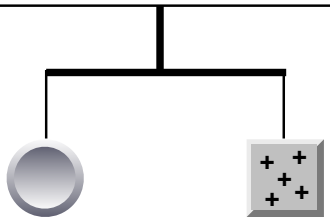
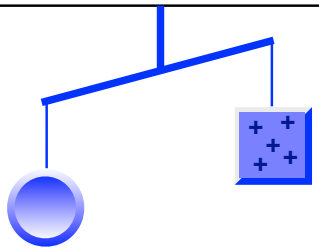
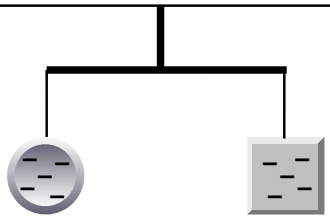
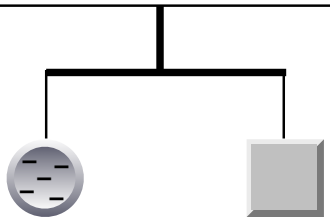
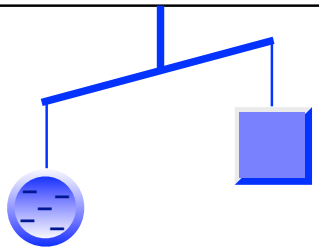
Felix

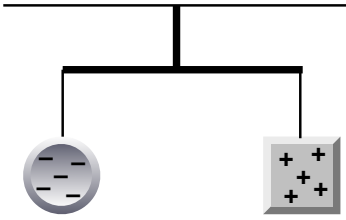
DISCUSSION

Ben Franklin set the convention—still in use today—of positive and negative electric charge. His model of an electric fluid has been replaced with the understanding that subatomic particles carry electric charge. Protons carry a positive charge; electrons carry negative charge. (The signs of the charge on the proton and electron were given to be consistent with what Franklin called positive and negative.) Protons are relatively massive and remain fixed in the nucleus. They jiggle about within the nucleus, to be sure, but they tend to remain in the nucleus. Electrons are less massive and dance about in clouds surrounding the nucleus. It is electrons that move when objects get an electric charge. A surplus of electrons makes an object negative; a deficit of electrons makes an object positive.

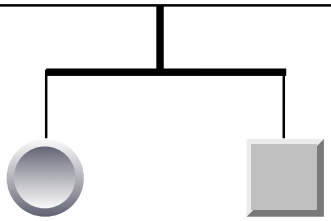
INSTRUCTIONS

In each case shown that follows, two bodies are shown in *delicate* balance. Next, something happens to them. **Show and describe** the result in terms of charge and in terms of the balance of the system.

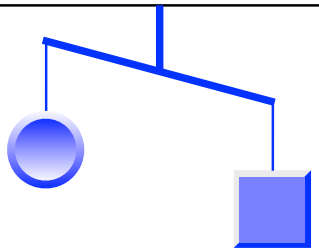
INITIAL BALANCE	ACTION	RESULT
		
Ex. Two neutral objects.	The square is given a negative charge.	The square now weighs more!
		
1. Two neutral objects.	The square is given a positive charge.	The square now weighs less!
		
3. Two neutral objects.	The square is neutralized.	The square now weighs less!



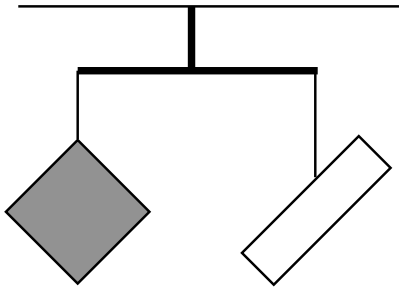
3. Negative and positive object.



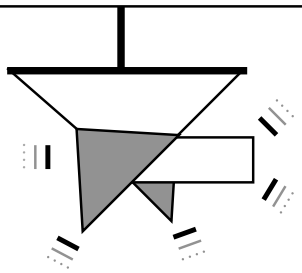
Both are neutralized.



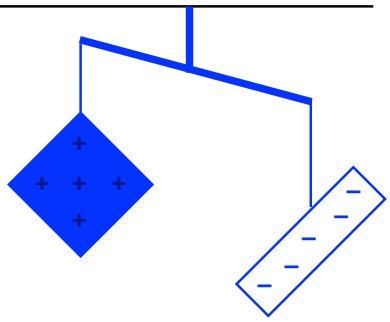
The square now weighs more!



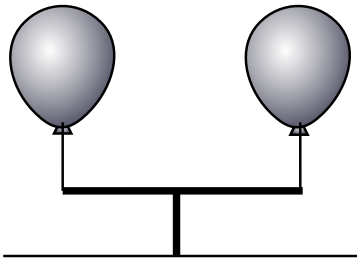
4. Wool cloth and vinyl strip—both neutral.



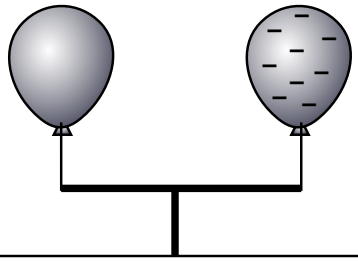
The materials are rubbed together.



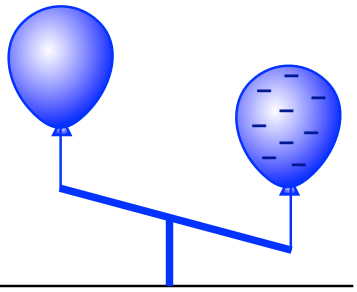
Wool becomes positive; vinyl becomes negative. Strip weighs more.



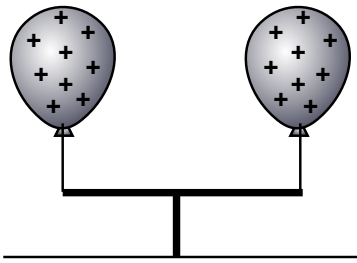
5. Two neutral, helium-filled balloons with equal weight and with equal buoyant force.



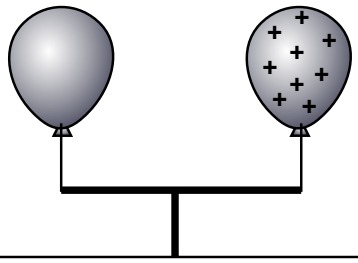
The one on the right is given a negative charge.



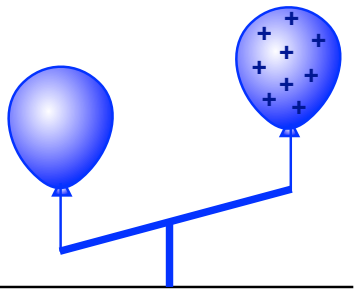
The negative balloon weighs more.



6. Two positive, helium-filled balloons with equal weight and with equal buoyant force.



The one on the left is neutralized.



The neutralized balloon weighs more.