

8. When they are uncharged, the metal foil leaves of the electroscope at left hang straight down. Suppose the following steps are performed:

- i. A positively charged rod is brought very near but not touching the metal knob at the top.
- ii. A student touches her finger to the knob for a few seconds.
- iii. The student takes her finger away.
- iv. The charged rod is taken away.

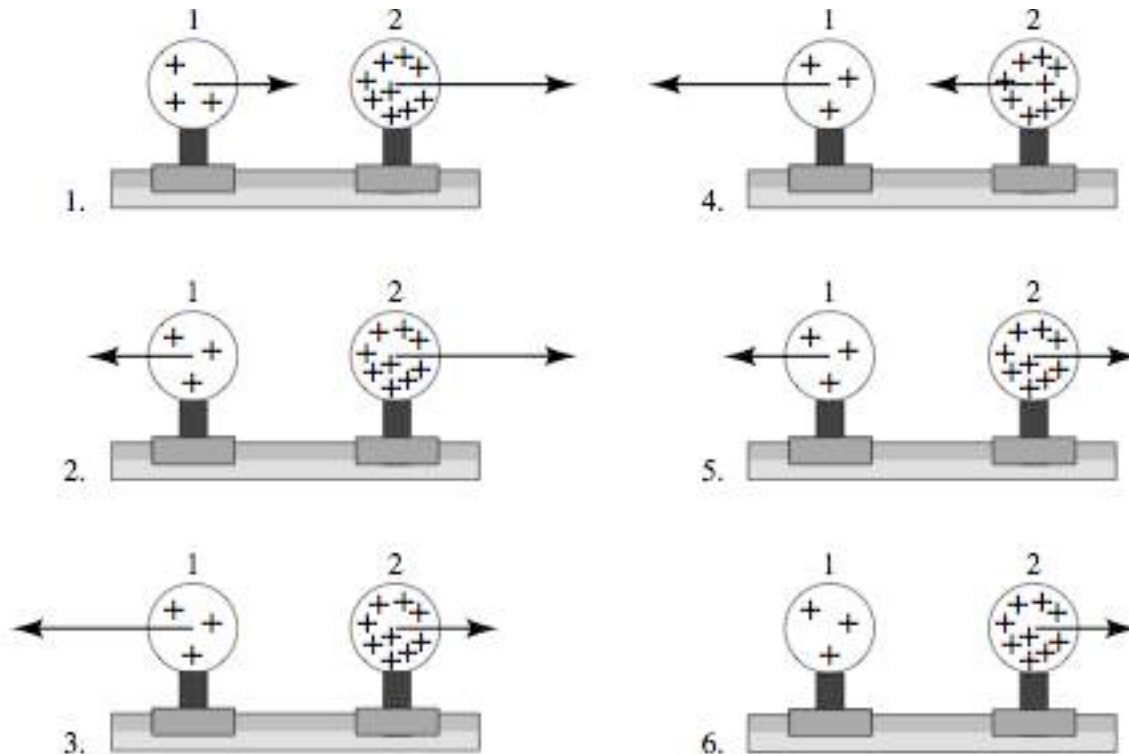


At the end of step **iv**, the leaves \_\_\_\_\_

- A. are separated because they are positively charged.
- B. hang straight down because they are neutral.
- C. are separated because they are negatively charged.
- D. hang straight down because they are oppositely charged.



Two uniformly charged spheres are firmly fastened to and electrically insulated from frictionless pucks on an air table. The charge on sphere 2 is three times the charge on sphere 1. Which force diagram correctly shows the magnitude and direction of the electrostatic forces



Three pithballs are suspended from thin threads. Various objects are then rubbed against other objects (nylon against silk, glass against polyester, etc.) and each of the pithballs is charged by touching them with one of these objects. It is found that pithballs 1 and 2 repel each other and that pithballs 2 and 3 repel each other. From this we can conclude that

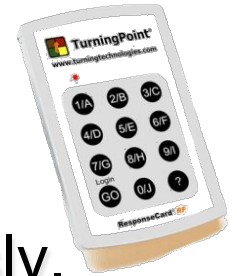


1. 1 and 3 carry charges of opposite sign.
2. 1 and 3 carry charges of equal sign.
3. All three carry the charges of the same sign.
4. One of the objects carries no charge.
5. We need to do more experiments to determine the sign of the charges.

Three pithballs are suspended from thin threads. Various objects are then rubbed against other objects (nylon against silk, glass against polyester, etc.) and each of the pithballs is charged by touching them with one of these objects. It is found that pithballs 1 and 2 attract each other and that pithballs 2 and 3 repel each other. From this we can conclude that



1. 1 and 3 carry charges of opposite sign.
2. 1 and 3 carry charges of equal sign.
3. All three carry the charges of the same sign.
4. One of the objects carries no charge.
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In each of the four cases shown below, a particle of charge  $+q$  is placed a distance  $d$  from a particle of charge  $+4q$ . The particles are then released simultaneously. The masses of the particles are indicated in the diagram. Which case has the largest magnitude of the acceleration of the RIGHT HAND particle just after it is released? (Click all if there are more than one.)

- A. Case 1
- B. Case 2
- C. Case 3
- D. Case 4

