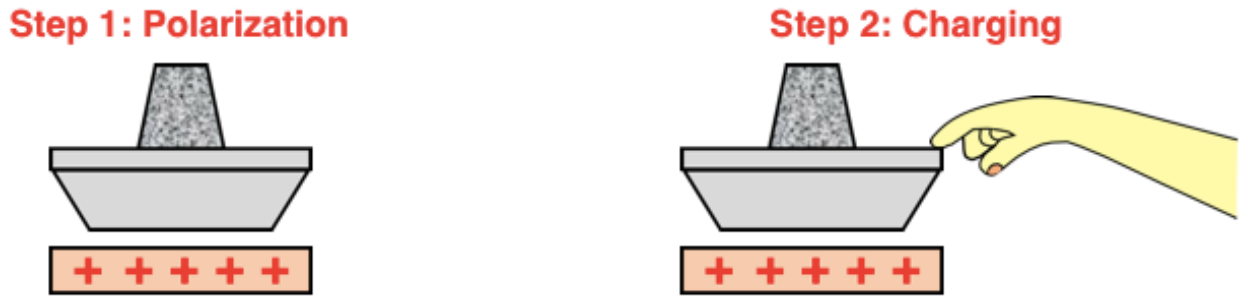
Charging by Induction

Question 1:

A neutral pie tin is **charged by induction**. **Step 1**: The neutral pie tin is brought near a positively-charged acrylic board. **Step 2**: While the pie tin is held near the board, it is touched by a finger. The result is that pie tin becomes charged.



How did the pie tin become charged? And what charge did it acquire?

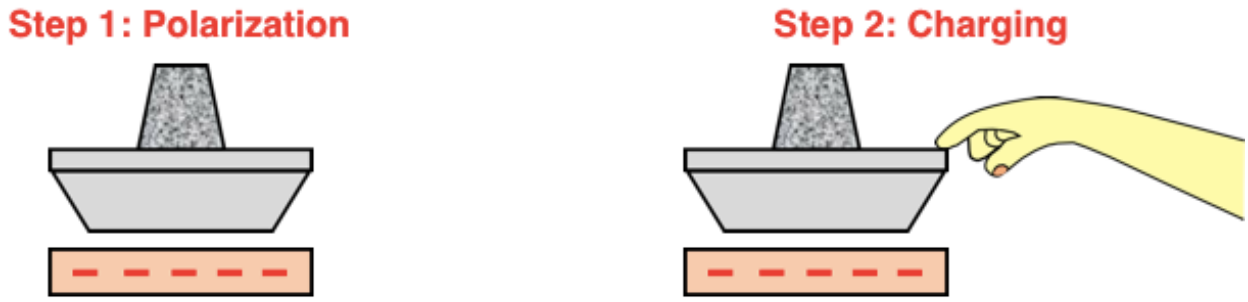
Step 1: Polarization Step

Protons move from the acrylic board to the pie tin.
Protons move from the pie tin to the acrylic board.
Electrons move from the acrylic board to the pie tin.
Electrons move from the pie tin to the acrylic board.
Protons in the pie tin move towards the acrylic board.
Electrons in the pie tin move towards the acrylic board.
Protons in the pie tin move away from the acrylic board.
Electrons in the pie tin move away from the acrylic board.

Step 2: Charging Step

Protons move from the pie tin to the finger. The pie tin becomes negative.
Protons move from the finger into the pie tin. The pie tin becomes positive.
Electrons move from the pie tin to the finger. The pie tin becomes positive.
Electrons move from the finger into the pie tin. The pie tin becomes negative.
Protons move from the acrylic board into the pie tin. The pie tin becomes positive.
Protons move from the pie tin into the acrylic board. The pie tin becomes negative.
Electrons move from the pie tin into the acrylic board. The pie tin becomes positive.
Electrons move from the acrylic board into the pie tin. The pie tin becomes negative.

Question 2:
A neutral pie tin is **charged by induction**. **Step 1**: The neutral pie tin is brought near a negatively-charged foam board. **Step 2**: While the pie tin is held near the board, it is touched by a finger. The result is that pie tin becomes charged.

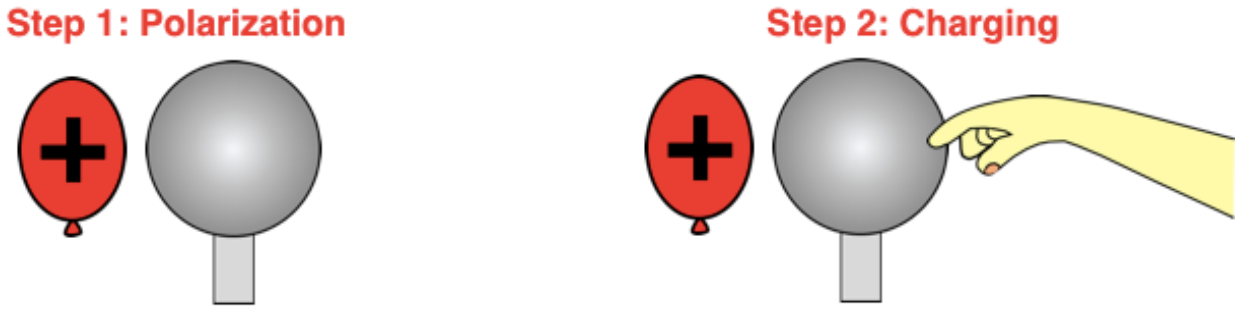


How did the pie tin become charged? And what charge did it acquire?

Step 1: Polarization Step
Protons move from the foam board to the pie tin.
Protons move from the pie tin to the foam board.
Electrons move from the foam board to the pie tin.
Electrons move from the pie tin to the foam board.
Protons in the pie tin move towards the foam board.
Electrons in the pie tin move towards the foam board.
Protons in the pie tin move away from the foam board.
Electrons in the pie tin move away from the foam board.

Step 2: Charging Step
Protons move from the finger into the pie tin. The pie tin becomes positive.
Protons move from the pie tin to the finger. The pie tin becomes negative.
Electrons move from the pie tin to the finger. The pie tin becomes positive.
Electrons move from the finger into the pie tin. The pie tin becomes negative.
Protons move from the foam board into the pie tin. The pie tin becomes positive.
Protons move from the pie tin into the foam board. The pie tin becomes negative.
Electrons move from the pie tin into the foam board. The pie tin becomes positive.
Electrons move from the foam board into the pie tin. The pie tin becomes negative.

Question 3:
A neutral metal sphere is **charged by induction**. **Step 1**: A negatively-charged balloon is brought near the neutral sphere. **Step 2**: While the balloon is held near, the sphere is touched. The sphere becomes charged.



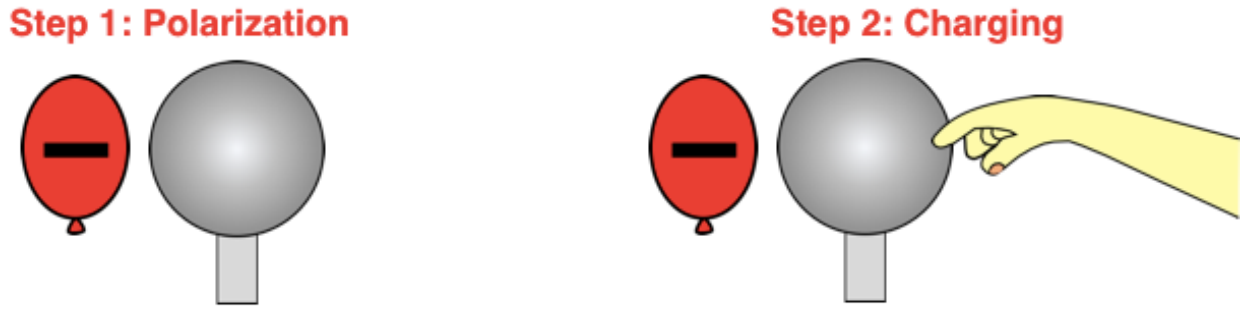
How did the sphere become charged? And what charge did it acquire?

Step 1: Polarization Step
Protons move from the sphere to the balloon.
Protons move from the balloon to the sphere.
Electrons move from the sphere to the balloon.
Electrons move from the balloon to the sphere.
Protons in the sphere move towards the balloon.
Protons in the sphere move away from the balloon.
Electrons in the sphere move towards the balloon.
Electrons in the sphere move away from the balloon.

Step 2: Charging Step
Protons move from the finger to the sphere. The sphere becomes positive.
Protons move from the sphere to the finger. The sphere becomes negative.
Electrons move from the sphere to the finger. The sphere becomes positive.
Electrons move from the finger to the sphere. The sphere becomes negative.
Protons move from the balloon to the sphere. The sphere becomes positive.
Protons move from the sphere to the balloon. The sphere becomes negative.
Electrons move from the sphere to the balloon. The sphere becomes positive.
Electrons move from the balloon to the sphere. The sphere becomes negative.

Question 4:

A neutral metal sphere is **charged by induction**. **Step 1**: A negatively-charged balloon is brought near the neutral sphere. **Step 2**: While the balloon is held near, the sphere is touched. The sphere becomes charged.



How did the sphere become charged? And what charge did it acquire?

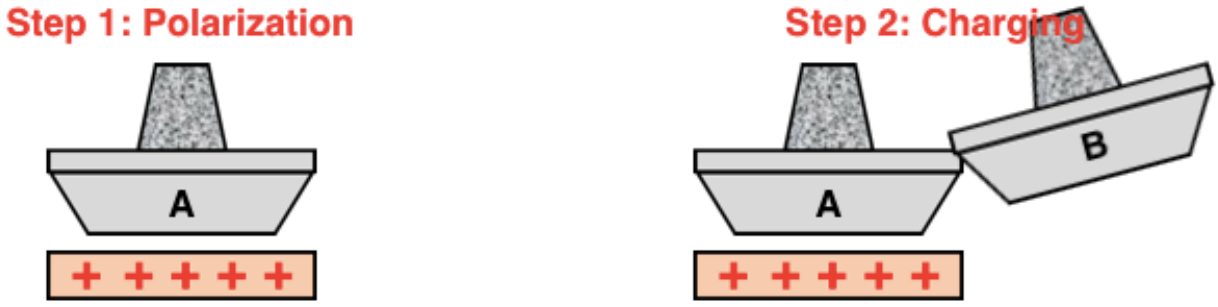
Step 1: Polarization Step

Protons move from the sphere to the balloon.
Protons move from the balloon to the sphere.
Electrons move from the sphere to the balloon.
Electrons move from the balloon to the sphere.
Protons in the sphere move towards the balloon.
Protons in the sphere move away from the balloon.
Electrons in the sphere move towards the balloon.
Electrons in the sphere move away from the balloon.

Step 2: Charging Step

Protons move from the finger to the sphere. The sphere becomes positive.
Protons move from the sphere to the finger. The sphere becomes negative.
Protons move from the balloon to the sphere. The sphere becomes positive.
Protons move from the sphere to the balloon. The sphere becomes negative.
Electrons move from the sphere to the finger. The sphere becomes positive.
Electrons move from the finger to the sphere. The sphere becomes negative.
Electrons move from the sphere to the balloon. The sphere becomes positive.
Electrons move from the balloon to the sphere. The sphere becomes negative.

Question 5:
A neutral pie tin is **charged by induction**. **Step 1**: Neutral pie tin **A** is brought near a positively-charged acrylic board. **Step 2**: While pie tin **A** is held near the board, it is touched by neutral pie tin **B**. The result is that pie tin **A** becomes charged.

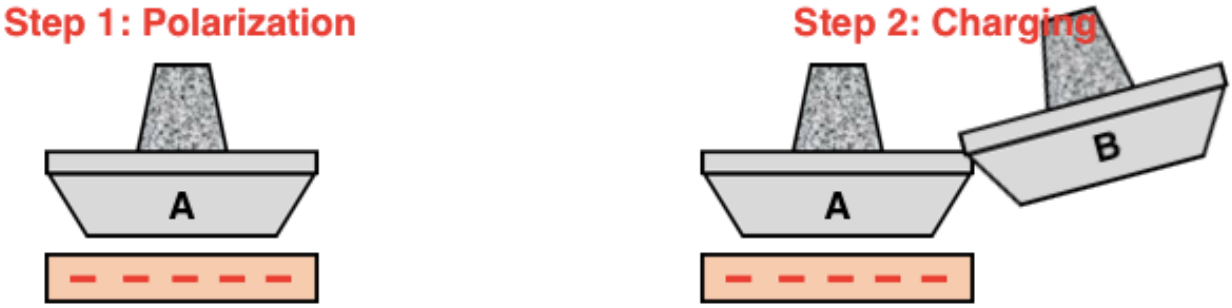


How did the sphere become charged? And what charge did it acquire?

Step 1: Polarization Step
Electrons in pie tin A move towards the acrylic board.
Electrons in pie tin A move away from the acrylic board.
Protons in pie tin A move towards the acrylic board.
Protons in pie tin A move away from the acrylic board.
Electrons move from the acrylic board to pie tin A.
Electrons move from pie tin A to the acrylic board.
Protons move from the acrylic board to pie tin A.
Protons move from pie tin A to the acrylic board.

Step 2: Charging Step
Electrons move from pie tin B into pie tin A. Pie tin A becomes negative.
Electrons move from pie tin A to pie tin B. Pie tin A becomes positive.
Protons move from pie tin B into pie tin A. Pie tin A becomes positive.
Protons move from pie tin A to pie tin B. Pie tin A becomes negative.
Electrons move from the acrylic board into pie tin A. Pie tin A becomes negative.
Electrons move from pie tin A into the acrylic board. Pie tin A becomes positive.
Protons move from the acrylic board into pie tin A. Pie tin A becomes positive.
Protons move from pie tin A into the acrylic board. Pie tin A becomes negative.

Question 6:
A neutral pie tin is **charged by induction**. **Step 1**: Neutral pie tin **A** is brought near a negatively-charged foam board. **Step 2**: While pie tin **A** is held near the board, it is touched by neutral pie tin **B**. The result is that pie tin **A** becomes charged.



How did the sphere become charged? And what charge did it acquire?

Step 1: Polarization Step
Electrons in pie tin A move towards the foam board.
Electrons in pie tin A move away from the foam board.
Protons in pie tin A move towards the foam board.
Protons in pie tin A move away from the foam board.
Electrons move from the foam board to pie tin A.
Electrons move from pie tin A to the foam board.
Protons move from the foam board to pie tin A.
Protons move from pie tin A to the foam board.

Step 2: Charging Step
Electrons move from pie tin B into pie tin A. Pie tin A becomes negative.
Electrons move from pie tin A to pie tin B. Pie tin A becomes positive.
Protons move from pie tin B into pie tin A. Pie tin A becomes positive.
Protons move from pie tin A to pie tin B. Pie tin A becomes negative.
Electrons move from the foam board into pie tin A. Pie tin A becomes negative.
Electrons move from pie tin A into the foam board. Pie tin A becomes positive.
Protons move from the foam board into pie tin A. Pie tin A becomes positive.
Protons move from pie tin A into the foam board. Pie tin A becomes negative.

Question 7

A neutral metal sphere is **charged by induction**. **Step 1**: A positively-charged balloon is brought near neutral sphere **A**. **Step 2**: While the balloon is held near, sphere **A** is touched by neutral sphere **B**. The result is the sphere becomes charged.

How did sphere A become charged? And what charge did it acquire?

Step 1: Polarization Step

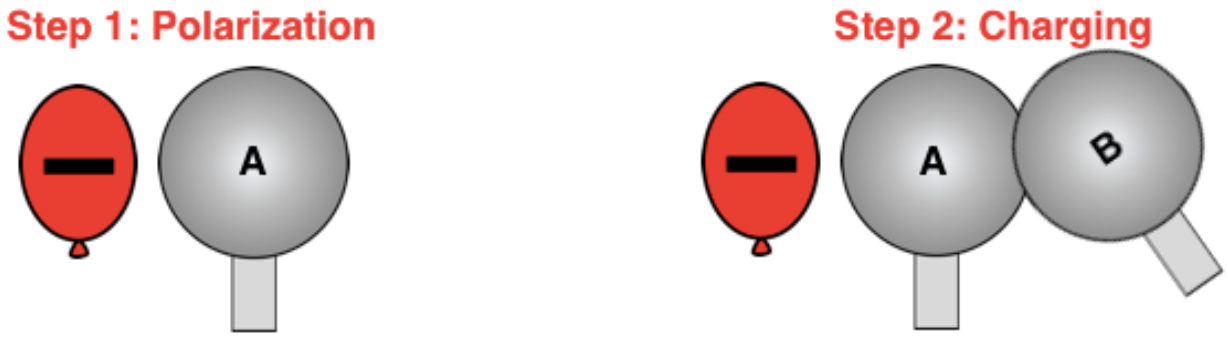
Protons move from sphere A to the balloon.
Protons move from the balloon to sphere A.
Electrons move from sphere A to the balloon.
Electrons move from the balloon to sphere A.
Protons in t sphere A move towards the balloon.
Protons in sphere A move away from the balloon.
Electrons in sphere A move towards the balloon.
Electrons in sphere A move away from the balloon.

Step 2: Charging Step

Protons move from sphere B to sphere A. Sphere A becomes positive.
Protons move from sphere A to sphere B. Sphere A becomes negative.
Electrons move from sphere A to sphere B. Sphere A becomes positive.
Electrons move from sphere B to sphere A. Sphere A becomes negative.
Protons move from the balloon to sphere A. Sphere A becomes positive.
Protons move from sphere A to the balloon. Sphere A becomes negative.
Electrons move from sphere A to the balloon. Sphere A becomes positive.
Electrons move from the balloon to sphere A. Sphere A becomes negative.

Question 8

A neutral metal sphere is **charged by induction**. **Step 1**: A negatively-charged balloon is brought near neutral sphere **A**. **Step 2**: While the balloon is held near, sphere **A** is touched by neutral sphere **B**. The result is the sphere becomes charged.



How did sphere A become charged? And what charge did it acquire?

Step 1: Polarization Step

Protons move from sphere A to the balloon.
Protons move from the balloon to sphere A.
Electrons move from sphere A to the balloon.
Electrons move from the balloon to sphere A.
Protons in sphere A move towards the balloon.
Protons in sphere A move away from the balloon.
Electrons in sphere A move towards the balloon.
Electrons in sphere A move away from the balloon.

Step 2: Charging Step

Protons move from sphere B to sphere A. Sphere A becomes positive.
Protons move from sphere A to sphere B. Sphere A becomes negative.
Electrons move from sphere A to sphere B. Sphere A becomes positive.
Electrons move from sphere B to sphere A. Sphere A becomes negative.
Protons move from the balloon to sphere A. Sphere A becomes positive.
Protons move from sphere A to the balloon. Sphere A becomes negative.
Electrons move from sphere A to the balloon. Sphere A becomes positive.
Electrons move from the balloon to sphere A. Sphere A becomes negative.