Charge, Charging, and Uncharging

Activity 1: Particle Count

Question Group 1

Question 1

An inflated rubber balloon is **positively charged**. What can be inferred about the relative number of protons and electrons in the balloon?

a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 2

A vinyl golf tube is **positively charged**. What can be inferred about the relative number of protons and electrons in the golf tube?

a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 3

A foam square is **positively charged**. What can be inferred about the relative number of protons and electrons in the square?

a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question Group 2

Question 4

An aluminum pie plate is **positively charged**. What can be inferred about the relative number of protons and electrons in the pie plate?

a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 5

An acrylic ceiling light cover is **positively charged**. What can be inferred about the relative number of protons and electrons in the light cover?

a. # of protons = # of electrons

b. # of protons > # of electrons
c. # of protons < # of electrons

Question 6
A pop can is **positively charged**. What can be inferred about the relative number of protons and electrons in the pop can?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question Group 3
Question 7
An inflated rubber balloon is **negatively charged**. What can be inferred about the relative number of protons and electrons in the balloon?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 8
A vinyl golf tube is **negatively charged**. What can be inferred about the relative number of protons and electrons in the golf tube?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 9
A foam square is negatively charged. What can be inferred about the relative number of protons and electrons in the square?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question Group 4
Question 10
An aluminum pie plate is **negatively charged**. What can be inferred about the relative number of protons and electrons in the pie plate?

a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 11
An acrylic ceiling light cover is **negatively charged**. What can be inferred about the relative number of protons and electrons in the light cover?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 12
A pop can is **positively charged**. What can be inferred about the relative number of protons and electrons in the pop can?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question Group 5
Question 13
An inflated rubber balloon is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the balloon?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 14
A vinyl golf tube is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the golf tube?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 15

A foam square is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the square?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question Group 6
Question 16
An aluminum pie plate is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the pie plate?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 17
An acrylic ceiling light cover is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the light cover?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Question 18
A pop can is **electrically neutral**. What can be inferred about the relative number of protons and electrons in the pop can?
a. # of protons = # of electrons
b. # of protons > # of electrons
c. # of protons < # of electrons

Activity 2: Get Into the Flow
Question Group 7
Question 19
Two lab partners are doing a static electricity investigation. They begin with a **neutral** balloon. After conducting the procedure, they observe that the balloon has become **charged negatively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 20
Two lab partners are doing a static electricity investigation. They begin with a **neutral** golf tube. After conducting the procedure, they observe that the golf tube has become **charged negatively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question Group 8
Question 21
Two lab partners are doing a static electricity investigation. They begin with a **neutral** metal sphere. After conducting the procedure, they observe that the metal sphere has become **charged negatively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 22
Two lab partners are doing a static electricity investigation. They begin with a **neutral** pop can. After conducting the procedure, they observe that the pop can has become **charged negatively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.

d. Protons were removed from the object.

Question Group 9
Question 23
Two lab partners are doing a static electricity investigation. They begin with a **neutral** ceiling light cover. After conducting the procedure, they observe that the ceiling light cover has become **charged positively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 24
Two lab partners are doing a static electricity investigation. They begin with a **neutral** metal sphere. After conducting the procedure, they observe that the metal sphere has become **charged positively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question Group 10
Question 25
Two lab partners are doing a static electricity investigation. They begin with a **neutral** pop can. After conducting the procedure, they observe that the pop can has become **charged positively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 26

Two lab partners are doing a static electricity investigation. They begin with a **neutral** aluminum pie plate. After conducting the procedure, they observe that the pie plate has become **charged positively**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question Group 11
Question 27
Two lab partners are doing a static electricity investigation. They begin with a **negatively-charged** pop can. After conducting the procedure, they observe that the pop can has become **electrically neutral**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 28
Two lab partners are doing a static electricity investigation. They begin with a **negatively-charged** aluminum pie plate. After conducting the procedure, they observe that the pie plate has become **electrically neutral**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question Group 12
Question 29
Two lab partners are doing a static electricity investigation. They begin with a **positively-charged** pop can. After conducting the procedure, they observe that the pop

can has become **electrically neutral**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Question 30
Two lab partners are doing a static electricity investigation. They begin with a **positively-charged** aluminum pie plate. After conducting the procedure, they observe that the pie plate has become **electrically neutral**. Which statement accurately explains how this happened?
a. Electrons were added to the object.
b. Protons were added to the object.
c. Electrons were removed from the object.
d. Protons were removed from the object.

Activity 3: Analyze This!
Question Group 13
Question 31
Two students are experimenting with two **neutral** objects – a rubber balloon and a sample of animal fur. They rub the two together and the balloon becomes **charged negatively** and the fur becomes **charged positively**. Complete the analysis of this situation.

Before

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

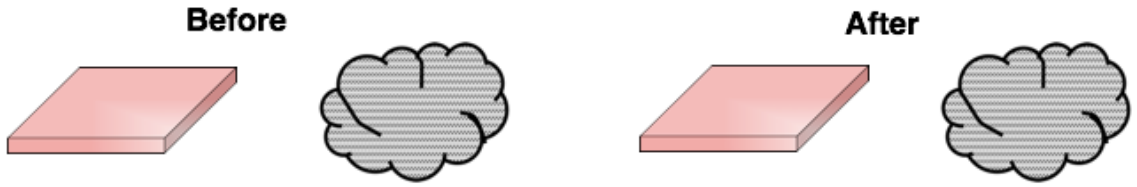
After

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

How did the **balloon** become charged?
Electrons were added to the balloon.
Protons were added to the balloon.
Electrons were removed from the balloon.
Protons were removed from the balloon.

Question 32
Two students are experimenting with two **neutral** objects – a foam square and a sample of animal fur. They rub the two together and the foam square becomes **charged negatively** and the fur becomes **charged positively**. Complete the analysis of this situation.



$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$
$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$
$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$

How did the **foam square** become charged?
Electrons were added to the foam square.
Protons were added to the foam square.
Electrons were removed from the foam square.
Protons were removed from the foam square.

Question Group 14
Question 33
Two students are experimenting with two **neutral** objects – a glass beaker and a sample of animal fur. They rub the two together and the glass beaker becomes **charged positively** and the fur becomes **charged negatively**. Complete the analysis of this situation.

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

How did the **beaker** become charged?
Electrons were added to the beaker.
Protons were added to the beaker.
Electrons were removed from the beaker.
Protons were removed from the beaker.

Question 34
Two students are experimenting with two **neutral** objects – a ceiling light cover and a sample of animal fur. They rub the two together and the light cover becomes **charged positively** and the fur becomes **charged negatively**. Complete the analysis of this situation.

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

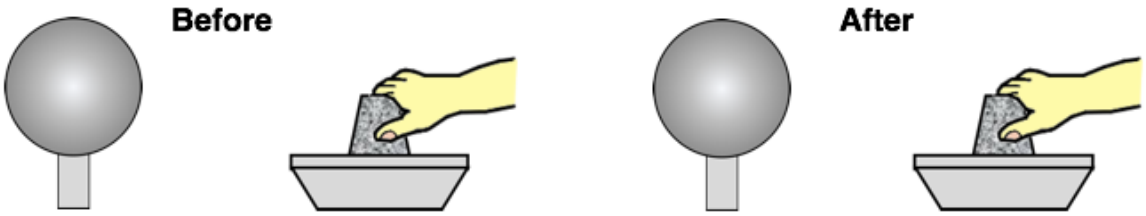
$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

$\#p^+ = \#e^-$
$\#p^+ > \#e^-$
$\#p^+ < \#e^-$

How did the **light cover** become charged?
Electrons were added to the light cover.
Protons were added to the light cover.
Electrons were removed from the light cover.
Protons were removed from the light cover.

Question Group15
Question 35
Two students are experimenting with two objects – a **neutral** metal sphere and a **negatively-charged** aluminum pie plate. They momentarily touch the pie plate to the sphere and pull it away. The metal sphere becomes **charged negatively**. The pie plate

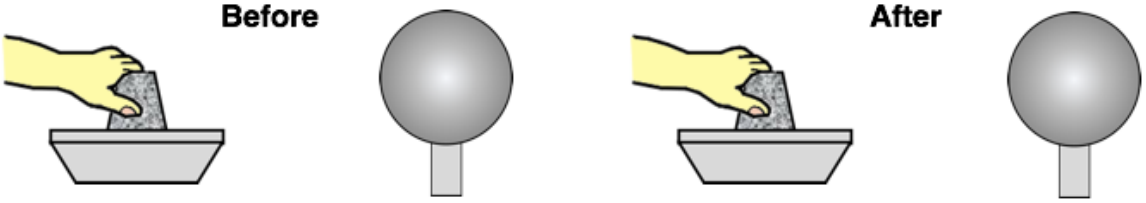
remains **negatively-charged**, but has less excess negative charge than it previously had. Complete the analysis of this situation.



$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$
$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$
$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$

How did the **sphere** become charged?
Electrons were added to the sphere.
Protons were added to the sphere.
Electrons were removed from the sphere.
Protons were removed from the sphere.

Question 36
Two students are experimenting with two objects – a **neutral** aluminum pie plate and a **negatively-charged** metal sphere. They momentarily touch the metal sphere to the pie plate and pull it away. The pie plate becomes **charged negatively**. The metal sphere remains **negatively-charged**, but has less excess negative charge than itpreviously had. Complete the analysis of this situation.

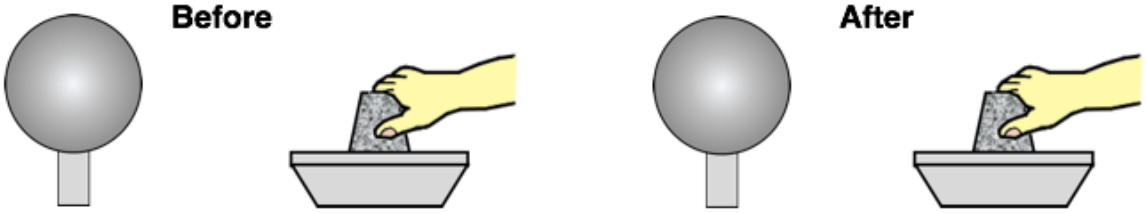


$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$
$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$
$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$

How did the **pie plate** become charged?
Electrons were added to the pie plate.
Protons were added to the pie plate.
Electrons were removed from the pie plate.
Protons were removed from the pie plate.

Question Group16
Question 37
Two students are experimenting with two objects – a **neutral** metal sphere and a **positively-charged** aluminum pie plate. They momentarily touch the pie plate to the sphere and pull it away. The metal sphere becomes **charged positively**. The pie plate remains **positively-charged**, but has less excess positive charge than it previously had. Complete the analysis of this situation.

Before **After**

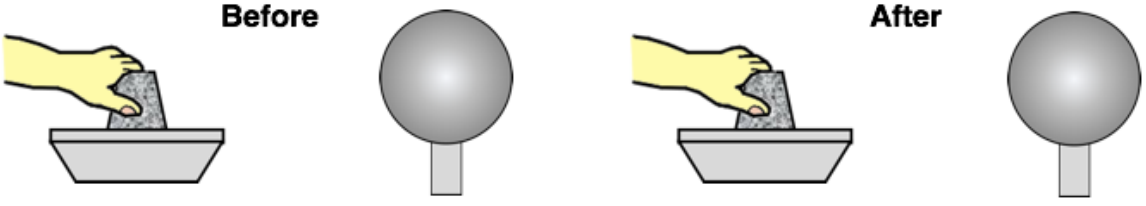


$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$
$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$
$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$

How did the **sphere** become charged?
Electrons were added to the sphere.
Protons were added to the sphere.
Electrons were removed from the sphere.
Protons were removed from the sphere.

Question 38
Two students are experimenting with two objects – a **neutral** aluminum pie plate and a **positively-charged** metal sphere. They momentarily touch the metal sphere to the pie plate and pull it away. The pie plate becomes **charged positively**. The metal sphere remains **positively-charged**, but has less excess positive charge than it previously had. Complete the analysis of this situation.

Before **After**



$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$	$\#p^+ = \#e^-$
$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$	$\#p^+ > \#e^-$
$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$	$\#p^+ < \#e^-$

How did the **pie plate** become charged?

Electrons were added to the pie plate.
Protons were added to the pie plate.
Electrons were removed from the pie plate.
Protons were removed from the pie plate.