What's Going On?

Checking In

Minds on What will happen?

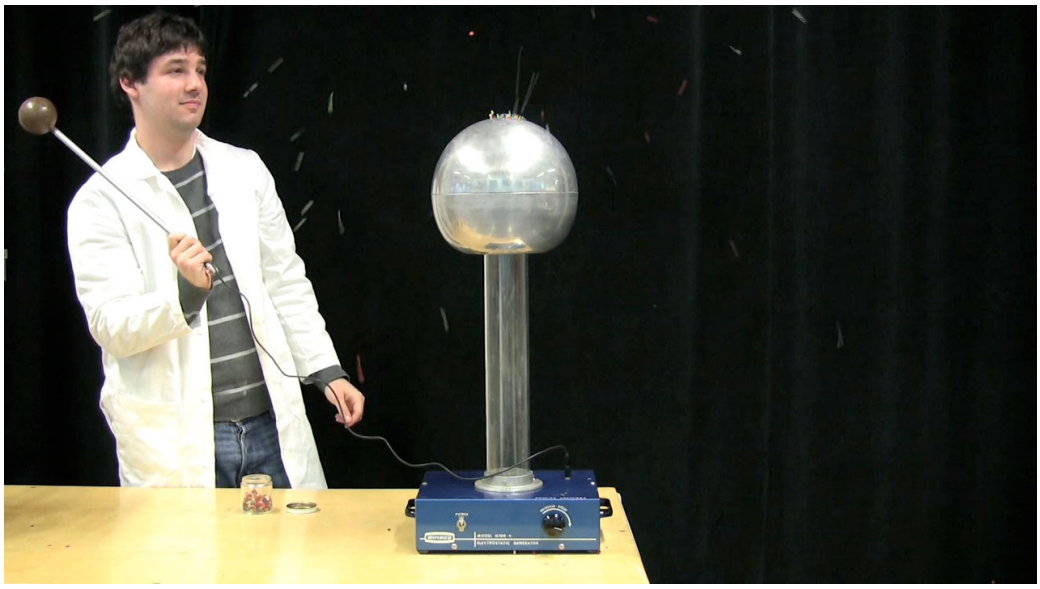
Action! Real-Life Electrostatics

Consolidation Why does it happen?

Learning Goal - I will be able to describe ways in which static electricity is part of our everyday lives.

Minds on

What Will Happen?



Minds on

Real-Life Electrostatics

When are electrostatics present, or used, in our everyday lives?

Doorknob shock
Car door shock
Plastic slides
Thunderstorms

Action!

Real-Life Electrostatics

Lightning Rods

When lightning hits a tree, the sap conducts the electricity to the ground and the tree heats up in the process.

This often results in an explosion and fire.

Action!

Real-Life Electrostatics

Lightning Rods

What may have happened if the tree had been wet on the outside and dry on the inside?

The electricity might have followed a different path to the ground and left the tree unharmed.

Action!

Real-Life Electrostatics

Lightning Rods

What may have happened if the tree had been beside a taller object that was also a conductor?

The lightning strike could have followed this conductor safely to the ground and left the tree unharmed.

Action!

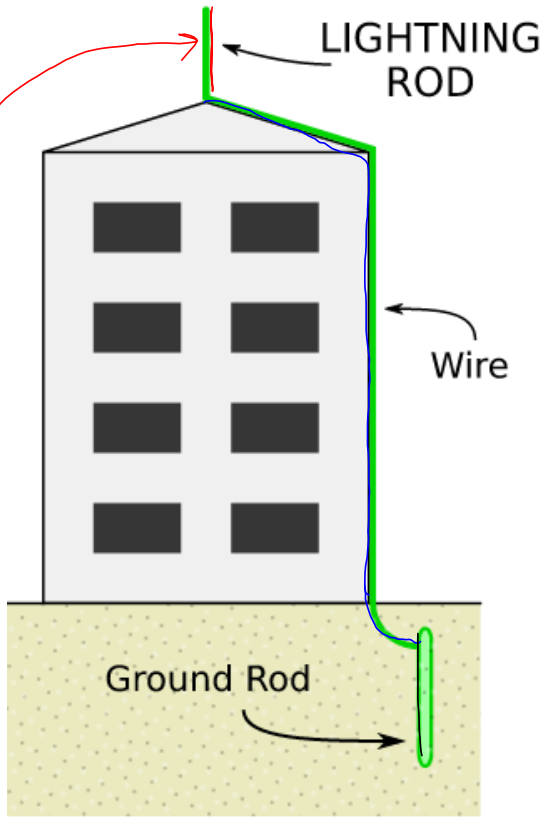
Real-Life Electrostatics

Lightning Rods

This is the principle of a lightning rod.

A lightning rod is a metal pole with a wire attached to it that runs to the ground.

The purpose of a lightning rod is to provide point where a stream of electrically charged particles is more likely to form than on the rest of the building.



Action!

Real-Life Electrostatics

Lightning Rods

Therefore, if lightning strikes in the area around the building, it is more likely to strike the lightning rod.

The lightning rod also decreases the total amount of electric charge in the building, making it less likely to get struck by lightning.

Action!

Real-Life Electrostatics

Lightning Rods

If lightning hits the lightning rod, the flow of electrically charged particles is directed to the ground, leaving the building unharmed.

Action!

Real-Life Electrostatics

Lightning Rods

Van De Graaf Demo!

Action!

Real-Life Electrostatics

Lightning Rods

https://www.youtube.com/watch?v=zhu5pIrPw7U

https://www.youtube.com/watch?v=G1_XFbtWoFg

https://www.youtube.com/watch?v=wGc3q4dVOS0

Action!

Real-Life Electrostatics

Grounding Static Charges on Vehicles

Friction occurs when two surfaces rub against each other.

Cars and airplanes build up charge through friction between the vehicle's outer surface and the air.

Action!

Real-Life Electrostatics

Grounding Static Charges on Vehicles

Static build-up on a car can be prevented using a ground strap.

Action!

Real-Life Electrostatics

Grounding Static Charges on Airplanes

Airplanes obviously can't drag straps along the ground.

Instead, airplanes use needle-like projections on the wings and body.

Action!

Real-Life Electrostatics

Grounding Static Charges on Airplanes

The force of repulsion between charges becomes so strong around a point that charges will disperse into the air from the point.

Action!

Real-Life Electrostatics

Static Charges and Flammable Materials

Static charge build-up is particularly dangerous when using flammable materials.

When airplanes are fuelled, the very explosive fuel moving through the nozzle creates a build up of static charges.

Action!

Real-Life Electrostatics

Static Charges and Flammable Materials

If the nozzle comes too close to the body of the plane, a spark could ignite the fuel.

To avoid this, the nozzle and fuel truck are both grounded.

Action!

Real-Life Electrostatics

Spray Painting

If you've ever spray painted something, you'll know that it can be tricky.

You lose a lot of paint as the paint comes out in a mist and it doesn't all land on the object.

Electrostatics can help.

Consolidation

Why Does it Happen?

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