Electrostatic Web Quest

   What is the difference between a conductor and an insulator? Give an example of each.
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2. https://www.physicsclassroom.com/class/estatics/Lesson-1/Polarization
   a) What is polarization?
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   b) How do you polarize an insulator?
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   https://www.physicsclassroom.com/Physics-Interactives/Static-Electricity/Aluminum-Can-Polarization
   Launch the interactive. What are your observations?
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   https://www.physicsclassroom.com/class/estatics/Lesson-2/Charging-by-Friction
   Describe how charging by friction works.
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   https://www.physicsclassroom.com/class/estatics/Lesson-2/Charging-by-Induction
   Describe charging by induction.
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   https://www.physicsclassroom.com/class/estatics/Lesson-2/Charging-by-Conduction
   Describe charging by conduction with a negatively charged object and a positively charged object.
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3. Click on John Travoltage. Make sparks fly with John Travoltage. Wiggle Johnnie’s foot and he picks up charges from the carpet. Bring his hand close to the door knob and get rid of the excess charge.
   a) What happens when you rub John’s foot against the carpet? Explain in terms of electrons.
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b) Rub John's foot against the carpet with his hand pointed up. Explain what happens.

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c) After rubbing his feet quickly 8 times, what happens when he touches the doorknob? Explain in terms of electrons.

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d) Place John's finger on the door, then rub his foot. Does charge accumulate? Explain.

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e) Build up some charge in his body while his finger is away. Then move his finger until he gets shocked. Then move it further away from the door knob and investigate if he gets shocked at a different distance depending on how much charge he has built up. What happens?

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4. Write one paragraph. Explain how John Travoltage's shirt gets charged and what happens to the charge when John gets near a doorknob. Be sure to include the terms charge, friction, positive, negative, metal and ground. Make sure to include what happens to the amount of charge that is built up in his body if the hand is initially close or far from the door knob.

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5. **Click on Balloons and Static Electricity.** Why does a balloon stick to your sweater? Rub a balloon on a sweater, then let go of the balloon and it flies over and sticks to the sweater. View the charges in the sweater, balloons, and the wall.

a) Look at the balloon. What can you say about its charge? (Hint: count both types of charges)

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b) Click and drag the balloon and rub it against the sweater. What happens to the balloon?

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c) How did the balloon get charged, with what type of charge?

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d) Where did that charge come from?

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e) What happened to the sweater? How did it get charged?

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f) Bring the balloon in the middle, between the sweater and the wall. What happens to the balloon when you let it go? Explain.

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g) What is the overall charge of the wall?

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h) What do you think will happen when the balloon is brought close to the wall? Predict first.

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i) Bring the balloon in contact with the wall. What happens to the charges in the wall?

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6. Write one paragraph. Explain why the balloon sticks to your sweater and also to the wall.

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7. **Click on Charges and Fields.** Move 2 charges from the + 1nC boxes on the left. Click on the Show E-Field. In the lower left hand corner is the equipotential box. Move it around and click on the plot. Try to follow one of the equipotential lines and see what happens to the voltage. Repeat with 2 negative charges and then a positive and a negative charge.

8. Write one paragraph. Explain how the electric field lines flow between the different sets of charges. What are the equipotential lines and how do they vary with distance from the charges. What do they correspond to on a topographical map?

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Conclusion:
9. Closer to a point charge, the electrostatic field created is stronger / weaker.

10. Placed exactly between two oppositely charged point charges, a test charge (the sensor) will show zero / minimum / maximum force.

11. Placed exactly on a point charge, the sensor will show zero / minimum / maximum field strength.