

# Chapter 16 Worksheet

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Name: \_\_\_\_\_

Provide a short and specific definition in YOUR OWN WORDS. Do not use the definition from the book

Electrical Conductor \_\_\_\_\_

\_\_\_\_\_

Electrical Insulator \_\_\_\_\_

\_\_\_\_\_

Induction \_\_\_\_\_

\_\_\_\_\_

Electric Field \_\_\_\_\_

\_\_\_\_\_

Additional Notes:

# Chapter 16 Worksheet

## Section 16.1

1. What are the 2 types of charges?

1) \_\_\_\_\_

2) \_\_\_\_\_

2. Fill in the table.

Representations of charges and electric fields	
Item	Illustration
Positive Charge	
Negative Charge	
Electric Field Vector	
Electric Field Lines	

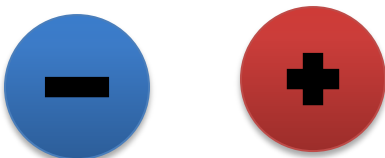
3. What will happen to the following charges when they interact?



Interaction: \_\_\_\_\_



Interaction: \_\_\_\_\_



Interaction: \_\_\_\_\_

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4. Where the following subatomic particles located and what are their charges?

Subatomic Particle	Location	Charge
Proton		
Neutron		
Electron		

5. Describe a cation in your own words?
6. Describe an anion in your own words?
7. When charge is transferred, which of the subatomic particles is “being transferred”?
8. Explain quantized in your own words?
9. What is the charge and mass of an electron? (with proper labels)
10. What is the charge and mass of a proton? (with proper labels)

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11. Explain, in your own words, how Millikan determined the charge of an electron.

12. What is the difference between an insulator and a conductor?

13. Give 3 examples of insulators.

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

14. Give 3 examples of conductors.

1) \_\_\_\_\_

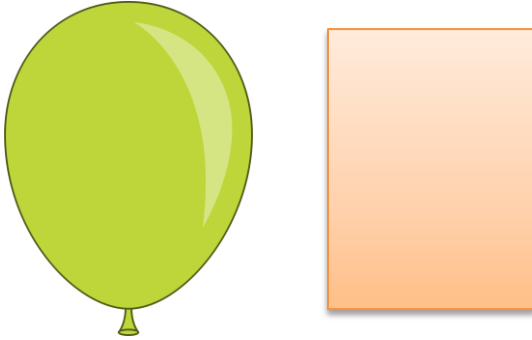
2) \_\_\_\_\_

3) \_\_\_\_\_

15. In your own words, describe a superconductor.

16. What does it mean when an objects is charged by induction? How is this different than charging by contact?

17. You bring a charged balloon (see below) near an insulator. Draw what will happen to the charges on the individual molecules in the insulator as well as the overall charge on the balloon.



18. When a rubber rod is rubbed on a piece of wool, it becomes negatively charged. What can you conclude about the charge on the piece of wool? Explain.

19. Circle which of the following can be charged by induction?

Silver Spoon      Balloon      Plastic Comb      Copper pot

20. Explain why you chose the objects in problem 19.

## Section 16.2

21. Looking at the picture below, does the star or the square feel a larger electric field force? Explain.



22. An electroscope has a net negative charge. Explain what will happen to the leaves when the following experiments happen?

1) A positive rod is brought near the top of the electroscope.

2) A negative rod is brought near the top of the electroscope.

3) A positive rod touches the top of the electroscope.

23. What is the SI unit for charge? (Name and symbol)

24. What is the Coulomb's law equation?

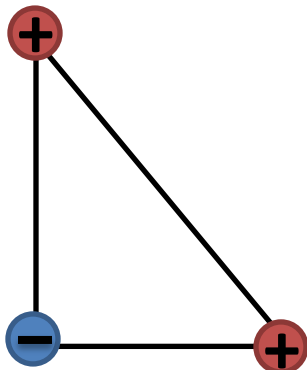
25. What will happen the for electric force in the following situations (give numeric answers)

- 1) One of the charges doubles
- 2) Both charges double
- 3) The distance between the charges triples
- 4) The distance between the charges is halved
- 5) One of the charges doubles, the other triples and the distance is cut in half

26. Explain how electric force and gravitational force are similar as well as how they are different.

27. The following diagram represents point charges.

Use this diagram to answer questions 1-3



- 1) What is the direction of the net force acting on charge 1?
- 2) What is the direction of the net force acting on charge 2?
- 3) What is the direction of the net force acting on charge 3?

## Section 16.3

28. What is the label for electric field?

29. In your own words, describe an electric field.

30. The direction of the electric field vector,  $\mathbf{E}$ , is in the direction of the electric force that would be exerted on a small \_\_\_\_\_ test charge.

31. What is the Electric Field Strength Due to a Point Charge equation?

32. What will happen the for electric field in the following situations (give numeric answers)

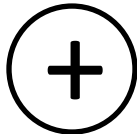
1) The charges doubles

2) The distance between the charges triples

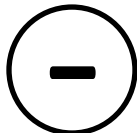
3) The distance between the charges is halved

4) One of the charges triples and the distance is cut in half

33. What direction do the arrows point for a **positive** charge?



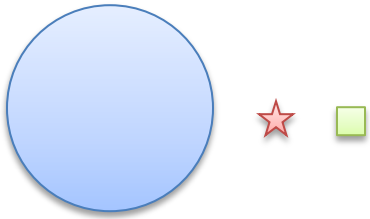
34. What direction do the arrows point for a **negative** charge?



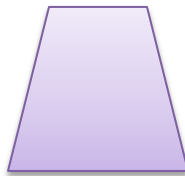
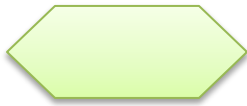




36. Which of the following feels more field strength, the star or the square? Explain.



37. Where is the charge the greatest in the following diagrams? Explain.



38. Explain why does a test charge have to be small?

39. Explain why you are more likely to get a shock when you touch something with your finger vs. your palm.