PHYSICS IN MOTION
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Unit 5A
Introduction to Electricity
Introduction to Electricity Lab

Name:

Date:

The Great Whodini, a famous magician, has hired you to provide expert advice for his magic act. In a few weeks, Whodini is scheduled to perform in front of thousands of people at the World's Fair. At the show he would like to perform a new, never-before-seen trick of moving objects from a distance, without contact. Whodini wants your input on the best way to move objects without touching them. Under a tight deadline, you gather the following materials and begin experimenting with electrically-charged objects. You decide to run several tests to find out if Whodini's trick will be possible, and if so, how.

Materials:

- acrylic rod (2)
- Teflon rod (2)
- wooden rod
- silk cloth
- scrap paper
- wooden block

Part I: Charging Objects by Friction

a. Cut a piece of scrap paper into a few dozen quarter-inch squares.
b. Neutralize the Teflon rod by slowly moving it across your palm.
c. Move the rod towards the paper squares.

1. What do the squares do as the rod gets closer?

_____

d. Rub the Teflon rod with silk. Move the rod towards the paper squares.

2. Now how to do the squares behave as the rod gets nearer?

_____

e. Repeat the same process with the acrylic rod.

3. What do the squares do before and after the acrylic rod is charged?

_____

4. From what you've seen so far, can you tell if the charges on the acrylic and Teflon rod are the same polarity (positive or negative)? Why or why not?

_____

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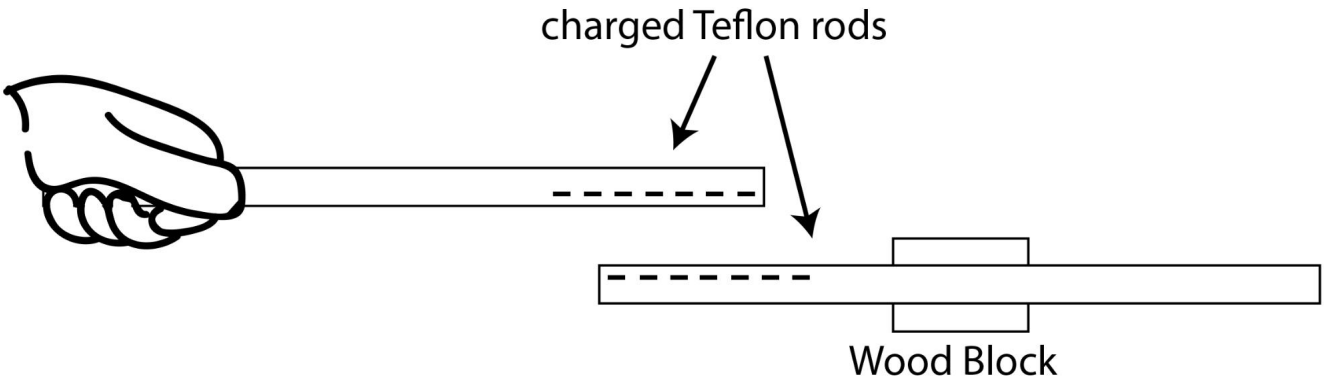
Part II: Electrical Forces Between Charged Objects

a. Charge just one end of the Teflon rod by rubbing with the silk cloth.
b. Balance the rod on the wooden block.
c. Charge one end of the second Teflon rod using the silk.
d. Hold the second rod parallel to the rod on the block.



Record the direction of the force (attract or repel) between the rods in the table below:

e. Repeat the same process with the two acrylic rods. Record the force direction in the same table.
f. Repeat the same process for using one acrylic rod and one Teflon rod. Record the direction of the force in the table.

Direction of Electrical Forces Between Charged Objects		
	Teflon (-)	Acrylic (+)
Teflon (-)		
Acrylic (+)		

5. Based on the table, what can we say about the electric force between objects having the same charge?

_____

_____

a. Place the wooden rod on the wood block.
b. Charge the Teflon rod by rubbing it on silk.
c. Hold the Teflon rod parallel to the wood rod, noticing the direction of the force between the two.
d. Switch the acrylic rod in place of the Teflon rod and repeat the procedure.
e. Remember from Part 1 how paper squares behaved near charged acrylic and Teflon rods.

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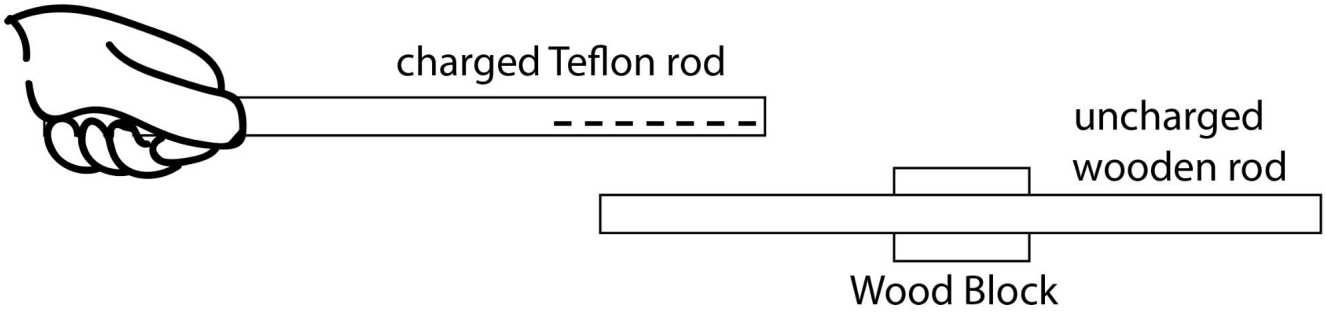
Part III: Electric Forces Between a Charged Object and an Uncharged Object

f. Fill in the table below about electric force directions



Direction of Electrical Forces between a Charged Object and an Uncharged Object		
	Teflon (-)	Acrylic (+)
Wood (neutral)		
Paper (neutral)		

6. What can we say about the direction of the force between a charged object and an uncharged object?

_____

7. Based on the results you've recorded in the two tables, make a recommendation to Whodini. How can he move an object without touching it, and what materials will make the movement as dramatic as possible?

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