**Electric Charge Behavior and Interactions Model:**

**Sticky Tape Activity**

**Part I – Sticky Tape Interactions**



1. Take a 10 cm piece of transparent tape and make a handle on the end by folding under the first cm of tape, sticky side to sticky side. Place this tape on the lab table. This is the base tape.

2. Attach a second similarly prepared strip of tape onto the base tape. Label the tape’s handle “B” for bottom.

3. Attach a third similarly prepared strip of tape onto the base tape. Label the tape’s handle “T” for top.

4. Repeat steps 1 - 3 so that you have two sets of tapes.

5. Briskly peel the first of the T tapes from the bottom tape, and hang the T tape from the edge of the table by its handle.

6. Briskly peel the second of the T tapes from the bottom tape and slowly bring the second T tape near the hanging T tape.

*Describe what you see.*

*Make sketches of the tapes at two different distances from one another with vectors to represent the forces on the tapes.*

*Label the forces.*

7. Reattach the T tapes to the bottom tapes.

8. Cut two pieces of paper, the same dimensions as the tapes, and hang one from the edge of the table with a small piece of tape. Approach the hanging paper with the other piece of paper.

*Describe what you see*.

9. Cut two pieces of aluminum foil, the same dimensions as the tapes, and hang one from the edge of the table with a small piece of tape. Approach the hanging foil with the other piece of foil.

*Describe what you see*.

10. Gently peel one set of T and B tapes from its base tape, keeping the T and B tapes together. Firmly rub your thumb down the slick side of the tape until it is no longer attracted to your hand. Briskly peel the T and B tapes apart.

11. Hang each tape strip by its handle next to the hanging paper and foil.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **F** |  | **P** |  | **T** |  | **B** | **table** |
|  |  |  |  |  |  |  |  |  |

12. Repeat step 10 with the other set of tapes.

13. With a T tape hanging from one hand and a B tape hanging from the other, experiment by approaching each of the hanging tapes. Then record your observations in the table on the following page.

*In the table below, sketch the various pairs of tapes as they approach one another with vectors to represent the forces on the tapes. Label the forces.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Hanging foil | Hanging paper | Hanging top | Hanging bottom |
| Approach w/top tape |  |  |  |  |
| Approach w/ bottom tape |  |  |  |  |

**Part II: Formulating a model for the cause of the forces.**

14. Now imagine that you could see the sub-microscopic differences between the T and B tapes. Why are the separated parts of the tape attracted to your hand, while the double layer of tape is not attracted to your hand? What changes about the tapes when they are separated from each other?

*The T and B tapes have properties allowing them to exert forces while the double layer of tape lacks these properties. On the diagram of the partially separated T and B tapes, invent a way of representing how the properties of the tapes change as they are separated.*

T tape



B tape

*Summarize in words what your diagram of the partially separated tapes shows:*

15. The existence of forces between two objects that aren’t touching, like gravity or the force between the tapes, can seem like magic. Although the mechanism for actually pushing and pulling on the tapes is pretty wild, (we’ll get to that later in this unit) the pattern of what does and doesn’t experience forces can be

expressed in a very small number of rules.

*In the space below, summarize all of the interactions in the table on the previous page with as*

*few rules as possible.*