Experiments with Sticky Tape

1) Tear off a strip of sticky tape about 8 inches long, and fold over a one-inch piece to make a "handle." Press this piece of tape down on the table, smooth it out, then pull it off quickly using the handle. Hang it from the edge of the table. Be careful not to let the tape touch any other object!

2) Prepare ***another*** strip of tape the same way you did in #1.

3) Do the two tapes seem to have any effect on each other? Describe what you see.

a) What happens when you bring the tapes ***close together?***

b) What happens when you move the tapes ***farther apart***? How does this compare to what you saw when they were close together?

4) We use the word "***force"*** to mean something that is a *push* or a *pull*. Try to use the word "force" to describe what you see happening with the tapes.

(In this situation – when preparing tapes as we have done – we call the force that is produced an ***"electrical***" force.)

5) This time, after pasting down a strip of tape on the table, mark it with a "B" (for "BOTTOM"). Then, press *another* strip of tape down right over the first one (so they stick together). Write a "T" (for "TOP") on this piece of tape. Now *slowly* pull the tapes off the table, so they come off "stuck together." When you have gotten them off the table, pull them apart quickly. *Keep them far away from the tapes that are hanging on the table.*

6) Do the B and T tapes seem to have any effect on each other? Describe what you see.

7) Based on what you just saw and described, try to make a *prediction* about what will happen when you bring your B and T tapes close to the ones hanging on the table:

   a) What do you think will happen when you bring the B tape close to one of the hanging tapes?

   b) What do you think will happen when you bring the T tape close to the one of the hanging tapes?

Explain how you came up with your predictions:

8) Now try it and see what happens:

   a) What happens when you bring the B tape close to a hanging tape? (Don't let them touch!)

   b) What happens when you bring the T tape close to a hanging tape? (Again, don't let them touch.)

How did your *observations* compare to your *predictions*?

9) Now make another set of B and T tapes. Investigate what kind of influence the "B" and "T" tapes have on each other.

   a) How does a "B" tape seem to affect another "B" tape?

   b) How does a "T" tape seem to affect another "T" tape?

   c) How does a "B" tape seem to affect a "T" tape?

10) Use the words "attract" and "repel" to describe what happens with the B and T tapes.

11) Does the ***distance*** between the tapes seem to make a difference in what you see? Describe what happens when you ***increase*** the distance between the tapes. Try to use the word "force" in your explanation.

12) What do you think will happen if you put a sheet of paper ***between*** the tapes? Do you think that the tapes will still seem to influence each other? Try it and see. Try it with two B tapes, then with two T tapes, and then with one B tape and one T tape. Keep one tape hanging, and hold

the other one in your hand. Then have someone else in your group hold a piece of paper between the tapes. ***Hint:*** If you slowly move the tape you are holding back and forth, it may be easier to see something happen.

Describe what happens when you put a piece of paper:

a) between two B tapes

b) between two T tapes

c) between a B tape and a T tape

13) Do you think that what you saw in #12 is caused by *air* moving (like what happens when you blow on something)? Explain your answer.

14) When we prepare tapes as we have done here (so that they seem to produce a *force* on each other), we say that we have "***charged***" the tapes. We say that we are putting "***charge***" on the tapes. So far, we don't really know what "charge" is, but we can think about it as some kind of substance, some type of material.

Explain what you did in #5; use the word "charge" or "charged" in your sentence:

15) Based on what you have observed, do you think that there is only one kind of charge, or is there *more* than one kind of charge? Explain your answer.

16) Let's suppose that there are ***two*** different kinds of charge. (You can call them "B charge" and "T charge.") Can you come up with some explanation for all of your observations? ***Hint:*** Think about how a "B" charge might affect another "B" charge, and about how it might affect a "T" charge.

In these explanations, try to use the word "charge."

a) Explain what happens when you bring two B tapes close together.

b) Explain what happens when you bring two T tapes close together.

c) Explain what happens when you bring a B tape close to a T tape.