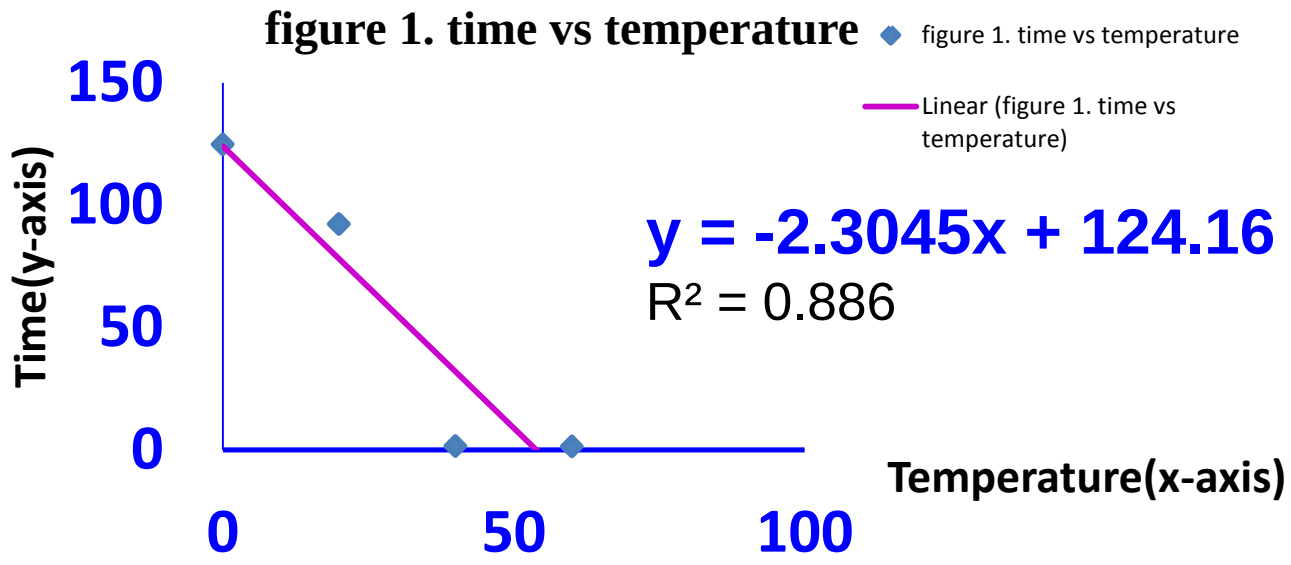
Bell Work, Dec 9 - 12, 2013

Bonding, Structure, 5% rule

Bell Work, Monday, Dec 9, 2013

Draw the "colored" parts & labels of the graph below



1. **What does negligible mean?**
2. **What is the 5% rule?**
3. **For the above graph the maximum value of y = 124.8 seconds.**

a. Calculate 5% of 124.8 s

b. Use the 5% rule and determine if the y-intercept is negligible? Show your work.

Bell Work, Monday, Dec 9, 2013

1. **What does negligible mean?**

   Negligible means insignificant or approximately a value of zero.

2. **What is the 5% rule?**

   If the absolute value of the y-intercept is less than (<) 5% of the of the greatest value of y in any ordered pair (or the greatest value of the dependent variable*), then the y-intercept is set = 0.

   (* Provided the dependent variable is plotted on the y axis)

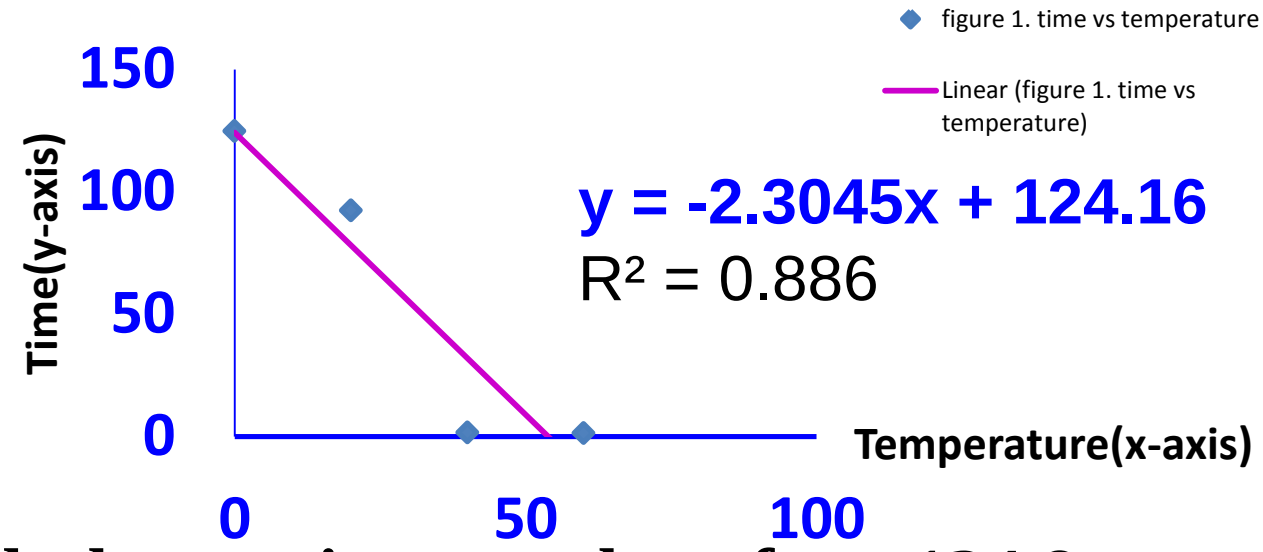
3. For the above graph the maximum value of y = 124.8 seconds.

a. Calculate 5% of 124.8 s

5% = 5/100 = 0.05

5% of 124.8s = 0.05 x 124.8s = 6.24s

Bell Work, Monday, Dec 9, 2013



3. For the above graph the maximum value of y = 124.8 seconds.

b. Use the 5% rule and determine if the y-intercept is negligible? Show your work.

5% of y max = 6.24 **124.16 > 6.24**

Y-intercept = 124.16 **The y-intercept > 5% y max**

The y-intercept is not negligible.

Graphs with negative slopes usually do not have negligible y-intercepts.

Bell Work, Tuesday, Dec 10, 2013

1. We determined the top piece of tape was:

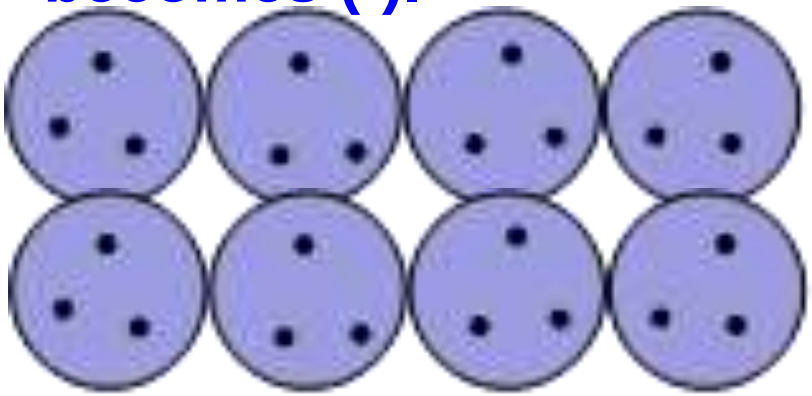
a. positive because it was repelled by another top tape

b. positive, because it was attracted to the plastic rod, which was defined as having negative charge.

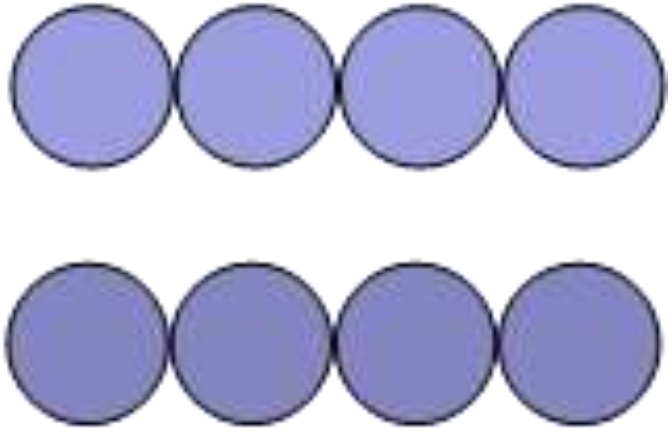
c. negative, because it was repelled by the other top tape.

d. positive, because it was attracted to the bottom tape.

2. Below are groups of the inner cores of the atoms of the tapes after they have been pulled apart. Sketch in the mobile negative charges to show how the top tape becomes (+) and the bottom becomes (-).



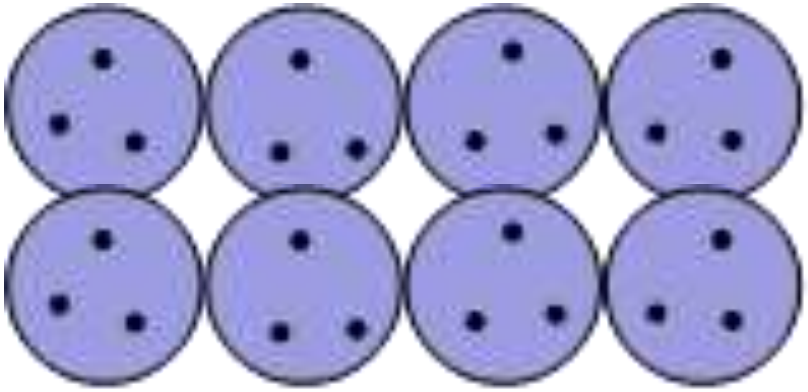
Before tapes are separated



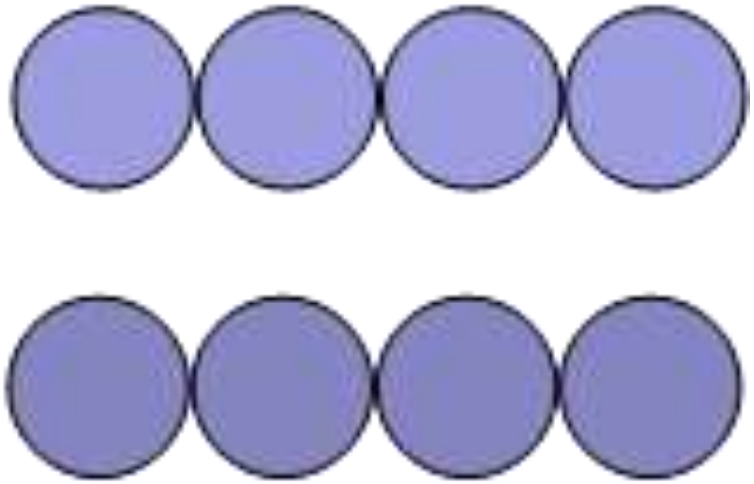
After tapes are separated

Bell Work, Tuesday, Dec 10, 2013

2. Below are groups of the inner cores of the atoms of the tapes after they have been pulled apart. Sketch in the mobile negative charges to show how the top tape becomes (+) and the bottom becomes (-).



Before tapes are separated



After tapes are separated

Show more dots on the negative tape, less dots on the positive tape.

Bell Work, Wednesday, Dec 11 , 2013

1. Experiments with the cathode-ray tube demonstrated that

a. visible light was influenced by a magnet

b. a cathode beam consists of charged particles

c. atoms are negatively charged

d. atoms contain a nucleus

2. J.J. Thomson

a. discovered the nucleus of the atom

b. suggested that the nucleus of the atom had a (+) charge

c. proposed that the atom was a sphere of (–) charge

d. concluded that atoms contained mobile particles with a (–) charge

3. Describe how JJ Thomson concluded that the mobile charged particle in the atom had a (–) charge and that the mass must be much smaller than an atom.

The cathode ray was attracted to a + electric field and mass to charge ratio more than 1000 times smaller than hydrogen (the smallest atom)

Bell Work, Wednesday, Dec 11 , 2013

4. When you ripped the tapes apart in the Sticky Tape Lab, the two pieces of tape were then attracted to each other. Propose a hypothesis to account for this observation.

5. Which of the following features of our hypothesis is NOT supported by the observation from question 4 alone?

a. **Some charged particle was transferred between atoms of the two tapes.**
b. **Atoms contain smaller particles that carry an electric charge.**
c. **The smaller, charged particle in the atom is negatively charged.**
d. **The smaller, charged particle in the atom is mobile.**

Bell Work, Wednesday, Dec 11 , 2013

4. When you ripped the tapes apart in the Sticky Tape Lab, the two pieces of tape were then attracted to each other.

Propose a hypothesis to account for this observation.

- **We assume that each atom contains both positive and negative charges that normally cancel each other.**
- **When we rip the tape some of the negative charges transferred to the bottom tape leaving the top tape with less negative charges than positives, thus a positive charge.**
- **The bottom tape ended up with more negative charges & thus it is negative.**
- **Opposites (+ & -) attract.**

Bell Work, Wednesday, Dec 11 , 2013

5. Which of the following features of our hypothesis is NOT supported by the observation from question 4 alone?

a. **Some charged particle was transferred between atoms of the two tapes.**

b. **Atoms contain smaller particles that carry an electric charge.**

c. **The smaller, charged particle in the atom is negatively charged.**

d. **The smaller, charged particle in the atom is mobile.**

A positive (+) charged objects will repel the top tape, and a negative (–) charge to objects will repel the bottom tape, and a neutral (0) charged objects do not repel either.

Bell Work, Thursday, Dec 12 , 2013

1. What information does the atomic number convey?

The number of protons determines each element's identity.

The atomic number is also the number of protons in the nucleus of an atom and the number of electrons in a neutral atom (equal number of protons & electrons).

2. What is the mass number?

Mass number: the sum of the numbers of protons and neutrons in the nucleus of an atom

3. What is an isotope?

Isotopes are atoms of the same element that have different masses.

The isotopes of a particular element all have the same number of protons and electrons but different numbers of neutrons.

Bell Work, Thursday, Dec 12 , 2013

4. Define valence electrons.

The electrons at the highest energy level (the outer electrons). It is these electrons that that determines the atom's chemical properties.

5. An ionic bond is a bond that forms between

ions with opposite charges.

6. In which type of bond do atoms share valence electrons?

covalent bonds

7. What is so special about Nobel Gasses (Group 18)

All these elements have full outer energy levels (He has a duet & all the others have octets of valence electrons).

The elements are inert (inert means they do not form ions nor do they react with other elements).