Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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# The Big Bang Balloon

**Purpose**

According to the big bang theory, almost all galaxies are moving outward from other galaxies. The purpose of this lab is to demonstrate the principles of this expansion using a simple model.[[1]](#endnote-1)

**Procedure**

**Materials**

1. Large deflated round balloon
2. Felt-tip permanent pen
3. String
4. 30cm ruler

**Sequence of Steps**

1. Mark a pair of dots 0.5cm apart across the middle of the deflated balloon. Label these points A and B. Mark a third dot 0.5 cm away from B. Label this dot C.
2. Blow into the balloon for 2-3 seconds. Record your actual elapsed time below. Pinch the end of the balloon between your fingers to **keep it inflated**, but do not tie the neck.

Elapsed time: \_\_\_\_\_\_\_\_ seconds.

1. Use the string to measure the distance across the balloon between A and B, and between B and C. Mark on the string your measurements with a pen. **Keep balloon inflated!** Once you have measured using the string, use the ruler to accurately measure the distance on the string in centimeters.

Distance between A and B: \_\_\_\_\_\_\_\_\_\_ cm

Distance between B and C: \_\_\_\_\_\_\_\_\_\_ cm

1. Calculate the rate of change in the distance between A and B and between B and C. To calculate the rate, subtract the original starting distance between the dots from the distance measured after inflation. Divide the number by the number of seconds you blew into the balloon. **Keep your balloon inflated!**

Formula: (inflation distance) – (start distance) = rate of change

(Elapsed time)

Rate of change for A to B: \_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

Rate of change for B to C: \_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

1. With the balloon still inflated, blow into the balloon for an additional 2-3 seconds.

Elapsed time: \_\_\_\_\_\_\_\_\_ seconds.

1. Measure and calculate the rate of change in the distance between A and B and B and C. To calculate the rate, use the distance measured in step 3 as the “original” distance.

Distance between A and B: \_\_\_\_\_\_\_\_\_\_ cm

Distance between B and C: \_\_\_\_\_\_\_\_\_\_ cm

Formula: (inflation distance) – (start distance) = rate of change

(Total elapsed time)

Rate of change for A to B: \_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

**C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf**Rate of change for B to C: \_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

**Observations**

1. Did the distance from A to B or from B to C show the greatest rate of change?
2. Did the rate of change for either set of dots differ in steps 4 and 6?
3. Suppose dots C and A represent galaxies, and dot B represents the earth. How does the distance between galaxies and the earth relate to the rate at which they are moving apart?
4. Describe the location of the planets in relation to earth, when compared to the location of stars in relation to earth.
5. Compare the inflation of this balloon to “The Big Bang Theory”. How are they similar? How are they different?

1. Prescott, Diane (2008). *The Big Bang Theory; Lab*. Atwater High School. [↑](#endnote-ref-1)