## Big Bang Balloon Activity

Cosmology is pretty heady stuff. Ever since ancient times, we have asked questions about how we got here and how the world began. Every culture has some sort of creation story, whether it is Greeks or Romans or Aztecs. Edwin Hubble didn't set out to study cosmology, but his observations led to theories regarding the Big Bang and the beginning of the universe. Today you will replicate Hubble's observations.

Directions: Read through the ENTIRE lab before you start. That way you know the procedure to make a strong prediction. Make a hypothesis about what will happen as you blow air into the balloon (If/Then statement and include 2 reasons to support)

Procedure:

1. Grab a balloon, a marker, and a piece of string for you and your partner.

2. Partially inflate the balloon a little bit, pinch off the end, and make dots A-E on the balloon. Try to make this size (of the balloon) easy to remember, because it will be your starting point.

3. Label each of the dots with a letter (A-E), and measure the distances between them on your data sheet. This is the 1st plots

4. Now put more air into the balloon and re-measure the distances. (2nd plots)

5. Blow more air into the balloon and measure one last time. (3rd plots)

6. Answer the questions at the bottom

Data Table: Record the distance from points in centimeters.

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st plots (starting point of balloon) | 2nd plots (medium sized balloon) | 3rd plots (large sized balloon) |
| A to B |  |  |  |
| A to C |  |  |  |
| A to D |  |  |  |
| A to E |  |  |  |
| B to C |  |  |  |
| B to D |  |  |  |
| B to E |  |  |  |
| C to D |  |  |  |
| C to E |  |  |  |
| D to E |  |  |  |

Analysis/ Conclusion:

Write your conclusion (accept or reject hypothesis, and include your data to support it)

Discussion Questions.

1. What happened to the majority of the dots as you put more air into the balloon?

2. Did you find any dots that actually moved closer to each other as the air in the

balloon increased?

3. Do you think that you could arrange the dots on the balloon so that there could be a

decrease in distance between two of the dots? Explain whv or whv not!

4. Select a main reference dot (A, for example). How could you find out which of the

dots are moving away from it the fastest?

5. Do closer dots, or dots that are farther away, move away the fastest? In other

words, are closer dots moving faster or are further dots moving faster?

6. Explain what the balloon and the dots represent.

7. Explain how this model represents Hubble and his red shifVDoppler effect.

8. What do astronomers claim as proof for the big bang theory? List all 3.