Name(s)	Period
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Big Bang Balloon Lab

PURPOSE

The purpose of this lab is to simulate (model) the expansion of the universe.

MATERIALS

- Balloon
- Permanent marker
- Measuring Tape
- Clip

PROCEDURE

- 1. Partially inflate your balloon, twist the end, and use the clip to seal it, but **do not tie it**.
- 2. Use the marker to make six dots on the balloon in **widely scattered locations**. Label the dots A-F. Each dot represents a galaxy formed in the early universe.
- 3. **Without letting air out of the balloon**, use the measuring tape to measure the distance **from A** to each other dot. Record the distances in the worksheet table under the heading "Initial Distance"
- 4. **Without letting air out of the balloon,** inflate the balloon with one more full breath. Again, measure the distances to each of the dots, and record the distances under "Trial 1" on the worksheet.
- 5. Inflate the balloon in one breath increments *two more times*. After each inflation, measure and record the distances on the worksheet.

DATA

	Distance from A (in mm)		TOTAL CHANCE		
Balloon Point	Initial Distance	Trial 1	Trial 2	Trial 3	TOTAL CHANGE (Trial 3 – Initial)
В					
С					
D					
Е					
F					

ANALYSIS

- 1. In your model, what distance changed the most?
- 2. In your model, what distance changed the least?
- 3. If each dot represents a group of stars, describe the motion of these groups relative to one another.
- 4. Based on your model, is the universe expanding, contracting, or staying the same?

- 5. Based on your model, how does the distance between the objects effects how quickly the objects are moving away?
- 6. How is your model similar to reality and how is your model different?
- 7. What are some of the advantages and disadvantages of using your model to study the Big Bang Theory?
- 8. If dot A is our galaxy, would dots B, C, D, and E be red-shifted (moving AWAY from us) or blue-shifted (moving TOWARDS us)?

Dot	Red or Blue Shifted
В	
С	
D	
Е	
F	

GRAPH

Construct a multi-line graph displaying the distance of each dot from A for each trial. The trial number (time) should be your x-axis. The distance from A should be your y-axis. You should have a line for each letter B-E.