

Tuesday, October 9, 2018

Your Learning Goal:

Students will be able to model origin of our universe and the big bang while understanding the universe's expansion through math analysis.

Table of Contents: Our Expanding Universe– 9R

Catalyst: (9L)

How did everything in our universe get here?



Homework:

Watch: The Universe Beyond
the Big Bang
Cornell Notes 10 L + R



Agenda:

1. Catalyst
2. Model of Big Bang
3. Big Crunch
4. Reflection

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The Universe: Beyond the Big Bang

Questions

Summary

10L

10/8/18

The Universe: Beyond the Big Bang

Questions

Summary

10R

10/8/18

Catalyst

How did everything in the universe get here?

Reflection Questions:

9L

Our Expanding Universe



9R

9 R

Dot Galaxy	Distance 1 (cm)	Distance 2 (cm)	D2 – D1 (cm)	Speed (D2-D1/time)
Home				
1				
2				
3				
4				

Time: _____



1. Blow up the balloon a little but hold the end closed (DO NOT TIE)
1. Draw 5 dots on the balloon, spread out all over
2. Label one dot (any dot) your HOME galaxy



1. While someone holds the balloon closed, use string to measure the distance from HOME to each of your other dot galaxies.
2. Write your distance between dots in the D1 section of your data table.

The distance from HOME to itself is ZERO

The distance from HOME to itself is ZERO



Calculate the speed of each galaxy

1. Using a stopwatch, **TIME** how long it takes to blow your balloon up all the way (**WITHOUT POPPING**)
2. Re-measure all the distances from your HOME galaxy to all the other dots
3. Write your distance between dots in the D2 section of your data table.

9 R

Dot Galaxy	Distance 1 (cm)	Distance 2 (cm)	D2 – D1 (cm)	Speed (D2/ time)
Home			/	0
1			/	
2				
3				
4				

Time: _____

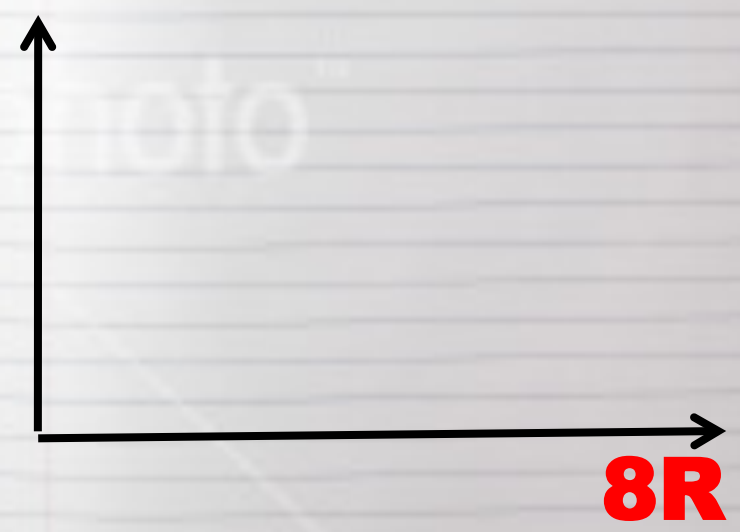
Catalyst

Reflection Questions:

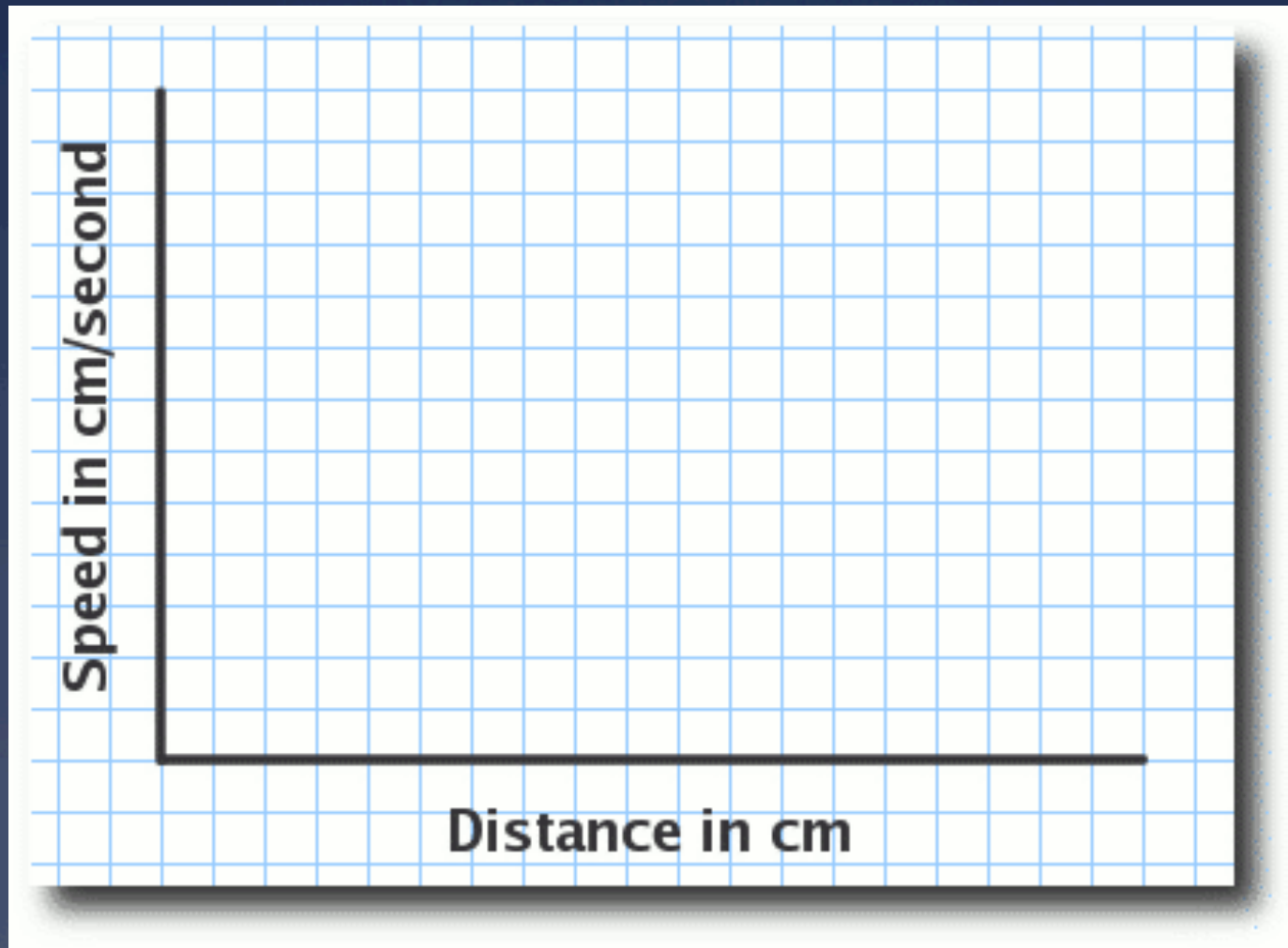
8L

10/8/18

Our Exploding Universe



Plot all of your D2-D1 and speed points on your graph



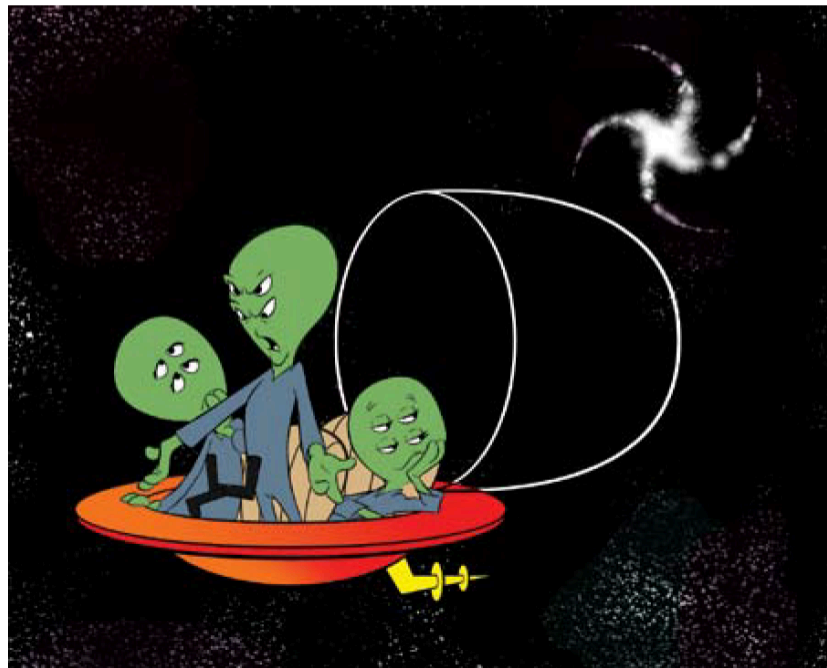
What does it All Mean?

Q: How do we know the universe is expanding, and what exactly does that mean?

By Bill Robertson

A: Unless you've been hiding out in a cave for the last 20 years, you've heard that the universe is expanding and it started with a big bang. To put an expanding universe in perspective, it helps to imagine that you live in a two-dimensional universe. There's a great book for helping you imagine this; it's called *Flatland* and was written in 1884 by Edwin A. Abbott. It's an amazing book of mathematical and scientific fiction and it's short, so by all means pick up a copy. Given that we can't include a copy of the book in this issue of *Science and Children*, I'll settle for explaining the major features of living in a two-dimensional (2-D) universe.

For your universe, let's use an infinitely large sheet of paper. Like the inhabitants of *Flatland*, you



BRIAN DISKIN

"I don't get it! That galaxy was right here last time!!"

Let's Watch the Video

<https://www.youtube.com/watch?v=wNDGgL73ihY&frags=pl%2Cwn>

Catalyst

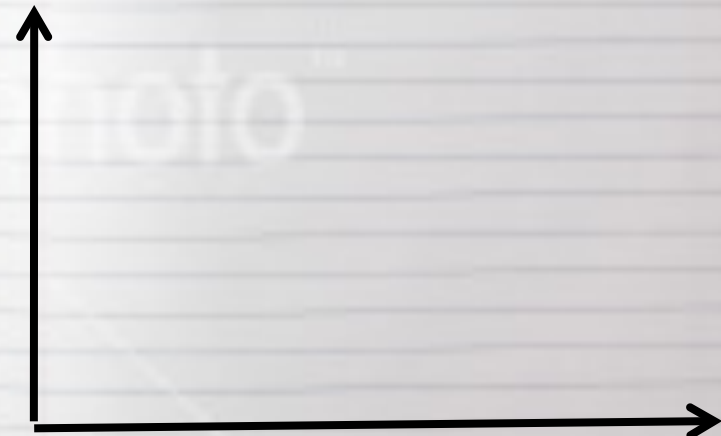
Reflection Questions:

1. How do the speeds of your galaxies change as they get further from HOME?
2. What does this tell you about the expansion of the universe?

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10/8/18

Our Exploding Universe



8R

Help for your Reflection Questions

* [https://map.gsfc.nasa.gov/universe/
bb_tests.html](https://map.gsfc.nasa.gov/universe/bb_tests.html)