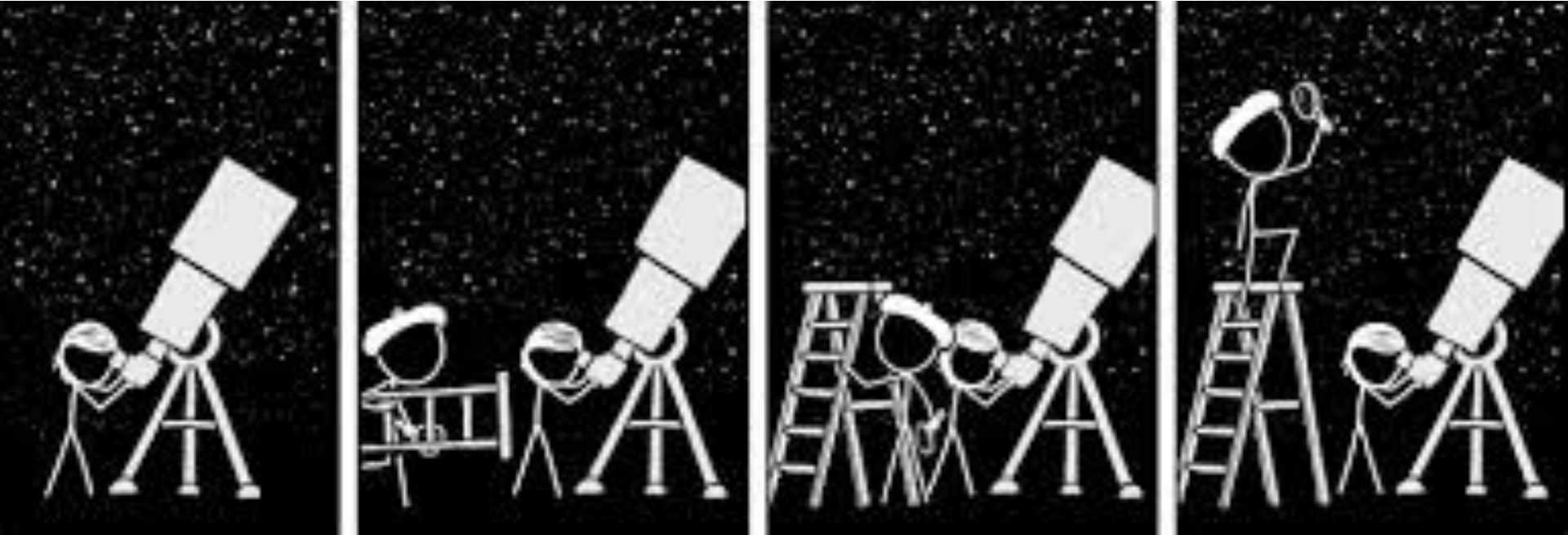


# Astronomy



*“It is clear to everyone that astronomy at all events compels the soul to look upwards, and draws it from the things of this world to the other.”* **Plato**

# Teaching Objectives:

- Understand theories and relevance of *The Big Bang Theory*
- Define Key Terms such as:
  - **Galaxies**: What are they? How were they formed?
  - **Gravity**: What role does it play in the formation of solar systems?
  - **Astronomical Unit**
  - **A Light Year**
- Explore:
  - Current Space Missions and Real Life Data
  - Current Technology being used in NASA: Kepler Telescope



ENGAGE

**TED**Ed



TED ED: [CLICK HERE](#)

- Watch
- Think
- Dig Deeper
- Discuss

Highlight each word to check off as you complete each step.

EXPLORE



Quizlet: **CLICK HERE**



Cards



Learn



Speller



Test



Scatter



Gravity



Cards



Learn



Speller



Test



Scatter



Gravity

Highlight each word to check off as you complete each step.

# The Big Bang Theory

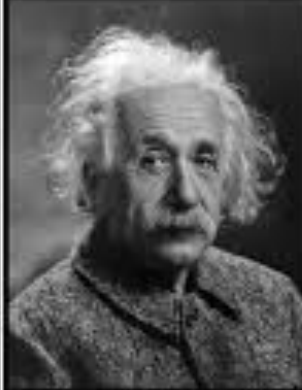
The theory that best explains the current universe is the **Big Bang** theory. This theory states that, in the beginning, the universe was all in one place. All of its matter and energy were squished into an infinitely small point, a singularity. The laws of physics which applied at that instant are not understood at all. Something unknown caused the universe to explode, and thus began the [expansion](#) that we see today.

The early universe was small, so everything happened very quickly compared to the timescales on which events happen for the present universe. At the start, the universe was very small and dense. This stage was called the **primordial fireball**. For the first second, only elementary particles, such as [protons](#), [neutrons](#), and [electrons](#), could exist. But the universe quickly cooled and expanded. For about the next 500,000 years, electromagnetic radiation (light) was the most important thing in the universe and hence this time was known as the **radiation era**. When the universe had cooled to the point where the simplest atoms (hydrogen) could form, radiation no longer dominated and matter took over. The [cosmic microwave background radiation](#) was produced at this time. So began the **matter era** in which the universe exists now.

So how old is the universe? There is much debate over the current age of the universe among astrophysicists. But everyone agrees that it is somewhere between 10 and 20 billion years old.



APPLY



On the big Bang theory: For every one billion particles of antimatter there were one billion and one particles of matter. And when the mutual annihilation was complete, one billionth remained - and that's our present universe.

(Albert Einstein)

izquotes.com

## RESPOND

In your own words, describe The Big Bang Theory.

A large, empty white rectangular area with rounded corners and a thick red border, intended for the student's response to the prompt above.

EXPLAIN

READ

As you read the article, think about these essential questions:

- What are Galaxies?
- How are they formed?



KIDS DISCOVER: [CLICK HERE](#)

# WATCH

What is a galaxy?



Galaxy Formation



[Galaxy Formation Simulation:](#)  
[CLICK HERE](#)



APPLY

**RESPOND HERE**

What are galaxies?

How are they formed?

EXPLAIN

# Gravity

WATCH

READ



## GRAVITY

THE INSIDE STORY ON THE MOVIE



**Do you want to be an astronaut?** Then you must have watched Gravity.

**Richard Graham:** visual special effects project manager for Gravity, says, "You'll only want to go to space for the first 12 minutes of the movie. Then, things get pretty heavy. Being in space is dangerous. You'll only survive 30 seconds without an enormous amount of science and engineering."



**How were the special effects in Gravity done?**

Aside from the faces of the astronauts, mostly everything else was computer generated (CG). It was photoreal, realistic CG. This was a first.



Long shots were another unique aspect of the film. While a film usually has 2,000 cuts, Gravity had 200.

**How can you get in this field?**

Art and science are equally important. You could do fine art if you are good at drawing and painting. Or you could go for computer science and study systems and network architecture.



It's important to know the principles of physics, like motion, mass, thermodynamics. Otherwise, how will you create a realistic experience of being in space?

**Can you guess who was funny on the sets of Gravity?**

Richard reveals that "George Clooney's quite good at making funny faces. While he was waiting in a cage for the cameraman to change lights, he would pull faces."



**How scientific is Gravity?**

Richard says, "It's pretty scientific. Most of the changes made were to move the story forward. Since the movie happens in real time, we showed an activity that happens in 45 minutes in 45 seconds. It takes 3 astronauts to take a spacesuit off, but Sandra Bullock takes her own spacesuit off."



**How do astronauts feel when they return to Earth?**

Richard says, "NASA sends astronauts to an ashram in India where they can meditate. Most astronauts have an idea of the individual's significance in the cosmos when they come back, so they find it difficult to get back to normal life."



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## CREATE



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  - class period
  - image
  - caption
  - relevance
  - link to image

- Change share settings on the post to anyone with the link "can comment"
- TURN IN the drawing: Link the URL here:
- Comment on your classmates work
  - give appreciations
  - ask questions
  - make connections

# EXTEND

Take a Virtual Field Trip

- [CLICK HERE](#)
- Sign up for a [Google Hangout](#)



This *HYPERDOC* was created by [@kellyihilton](#)

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