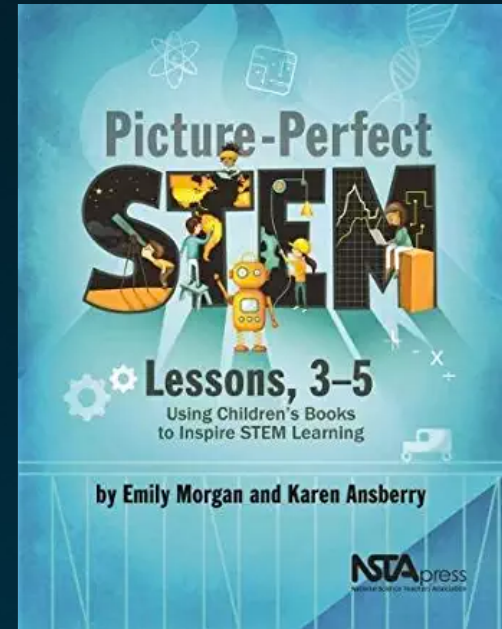




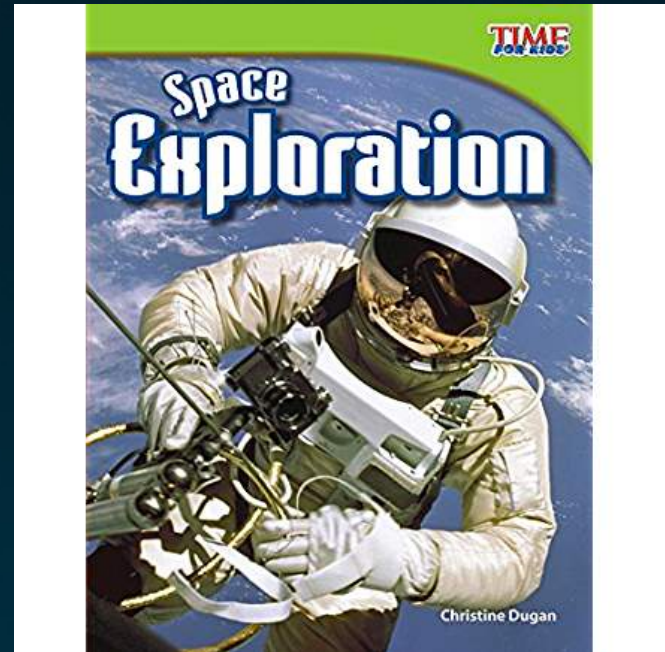
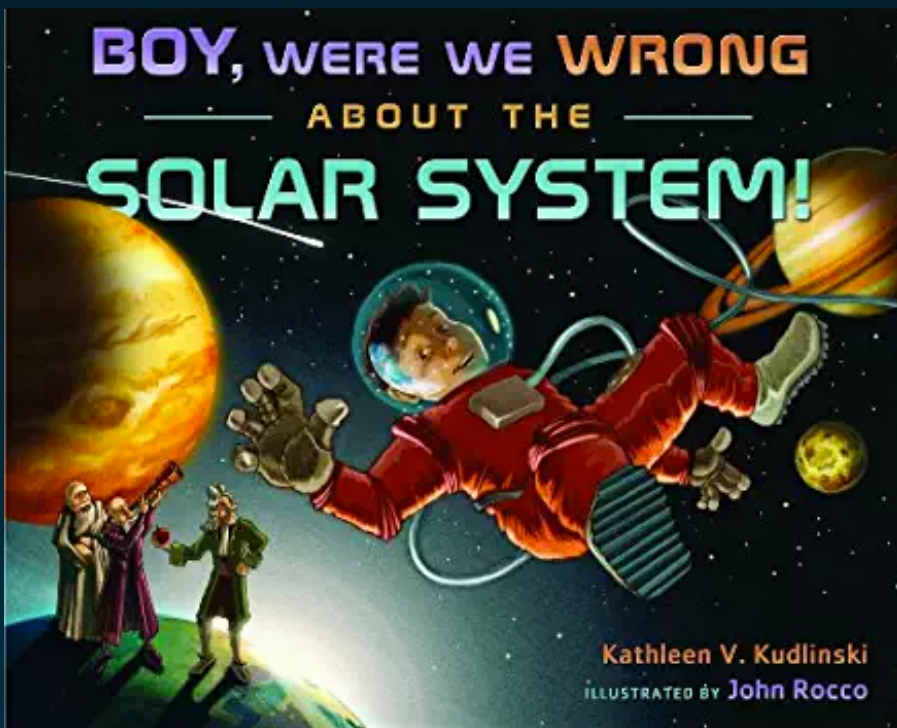
# Space Exploration

Grades 3-5

Picture Perfect STEM



# Featured Picture Books





# Connecting to the Framework

## Science & Engineering Practices

- Engaging in Argument From Evidence
- Obtaining, Evaluating, and Communicating
- Information

## Disciplinary Core Ideas

- ESS1.B: Earth and the Solar System
- ETS1.A: Defining and Delimiting Engineering Problems
- ETS2.A: Interdependence of Science, Engineering, and Technology
- ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World



# Connecting to Framework and ELA

## Crosscutting Concepts

- Systems and System Models

## Common Core - ELA

- Reading Informational Text.
  - Craft & Structure 3.1, 4.1, 5.1
  - Key Ideas and Details 3.1, 4.1, 5.1
- Writing
  - Research to build and present knowledge: 3.7, 4.7, & 5.7





# ENGAGE

- The [Known Universe](#) Video
- HOW DO WE KNOW WHAT WE KNOW ABOUT THIS UNIVERSE?







# EXPLORE

- Download and open NASA's Eyes on the Solar System app.
- Have students use the Eyes on the Solar System student page to record responses.

*Opportunity to explore what is known about the solar system.*





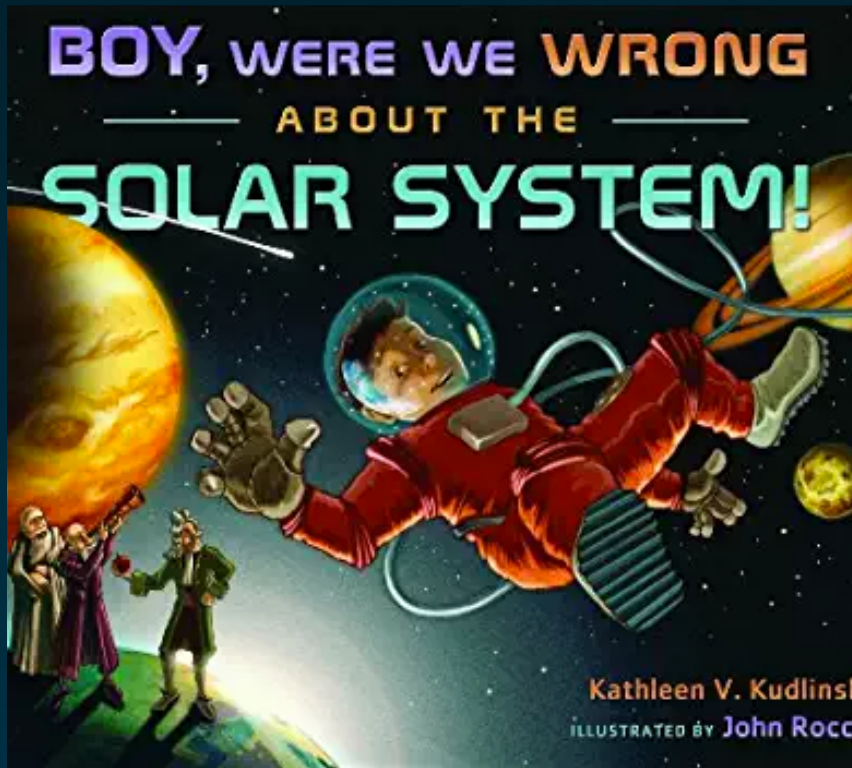
# Ask

- Which objects in the solar system were known by the ancients?
- Why do you think those bodies were discovered?
- Why do you think the other celestial bodies on the app were not known until later?
- What are some of the interesting facts you recorded about the objects in our solar system?
- How do we know all of these things about our solar system?
- Where is the farthest that people have actually traveled in our solar system?
- Do you think scientists know all there is to know about our solar system?
- Do you think scientists have ever made wrong guesses in their quest to understand our solar system?





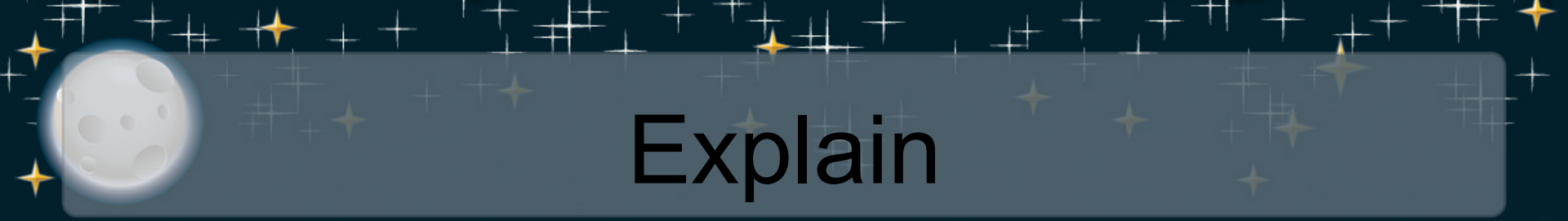
# Explain



- Card Sort
- Label one post-it “Then” & one post-it “Now”
- Sort the cards into the two categories







# Explain

- Scientists in this book had to make scientific arguments based on evidence they observed to convince others to accept a new idea or model. This is known as *empirical evidence*.



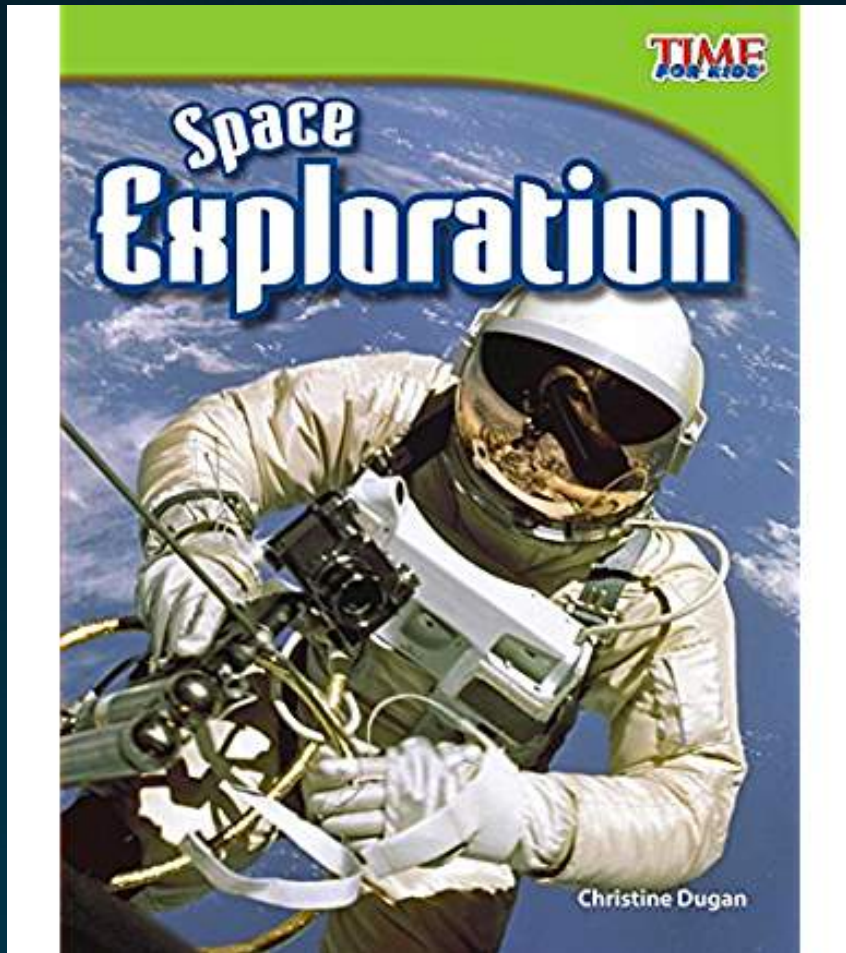


# Explain

- Evidence that we can observe changes as technology improves.
- Look back at the then and now cards
  - Discuss technological advances and observations that led people to change each idea about the solar system.



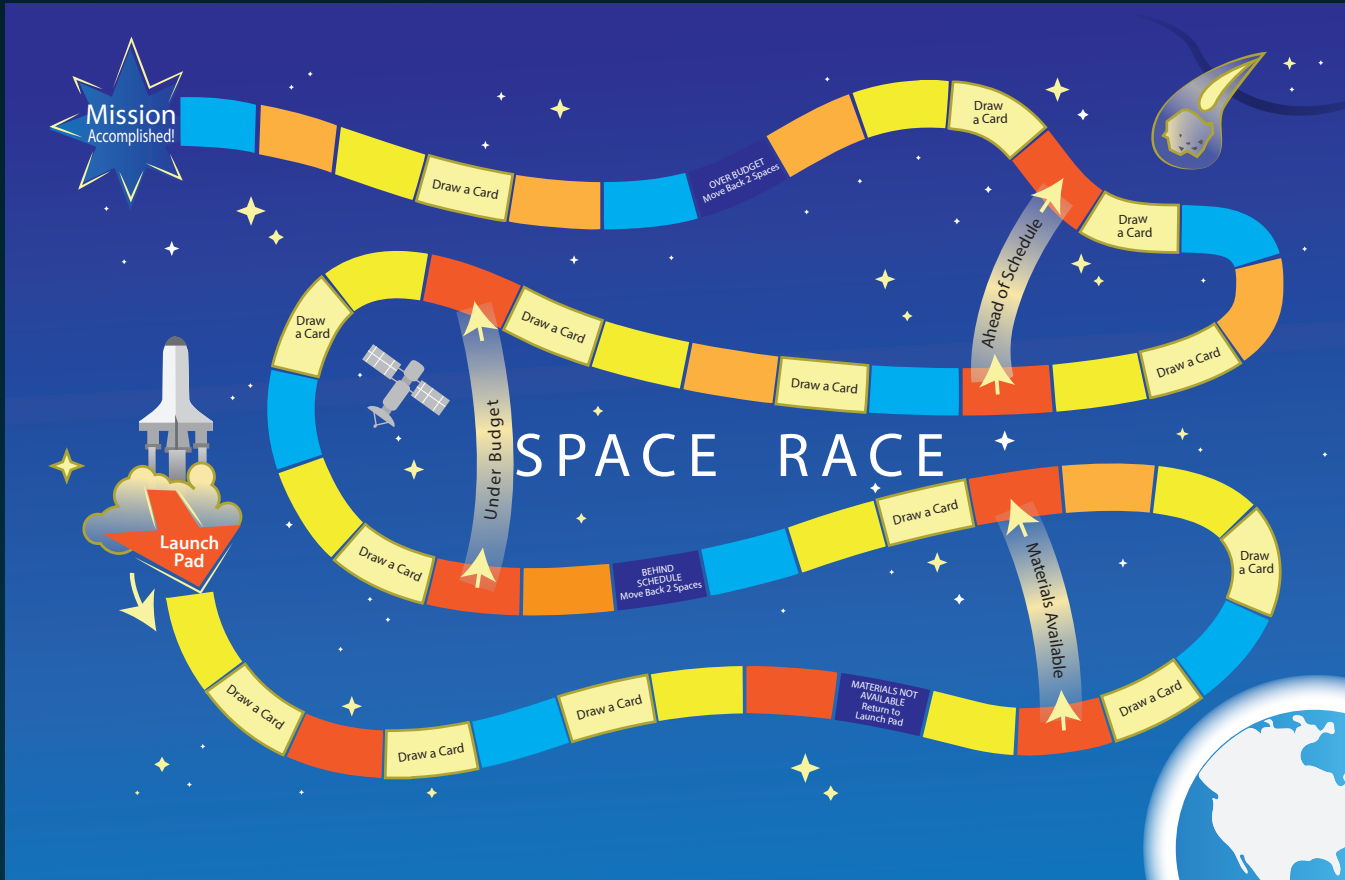
# Elaborate



- What new space technologies have you heard about or seen on the news?



# Space Race Game





# Space Race Game

- Fun way to learn about four of the greatest space exploration programs.
  - Project Apollo
  - Space Shuttle Program
  - Hubble Space Telescope
  - International Space Station (ISS)







# After Game

- Sort cards into the 4 stacks representing each of the 4 missions.
- Each student should take one stack.
- Read through your stack of cards with your group and develop a definition for the word criteria.





# Criteria and Constraints

- Success of a designed solution is determined by considering the criteria of the solution.
- Possible solutions to a problem are limited by constraints.
- Look at the purple spaces and shortcuts on the game board.





# Criteria and Constraints

- Often materials (technologies) needed for a space program to get started have not been invented.
- Engineers develop new technologies.
- What happened if you landed on a shortcut in the game?





# Elaborate

- Research a current or future mission in space exploration.
  - Links to NASA on wikipage
- Use the Mission to Space Info Sheet and presentation rubric to take notes about your selected mission.
- Create a Google Slide Presentation





# Space Expo

- Share presentations at Space Expo!

Time to create \_\_\_\_ minutes

Time to share \_\_\_\_ minutes







# The Known Universe

- How do we know what we know about the universe?
- Why do you think scientists at the museum decided to call the video we watched at the beginning, “The Known Universe” and not just the “Universe”?





# Nature of Science

- Complete the top of the Nature of Science Notetaker with your group. Use the provided word bank.

