Discussion Question Answers
African Americans in Astronomy and Astrophysics

Part Two: Dr. George Carruthers, Space Scientist

1. How did Carruthers become interested in science? What was his family history?
   - He became interested when 8 or 9 as a result of reading science fiction. He also found a textbook or encyclopedia of astronomy.
   - His father was an engineer, but he died when Carruthers was 12. His mother then moved the family from the country to Chicago.

2. How did George Carruthers learn about astronomy?
   - He read science books.
   - He built his own telescope from a kit to look at stars.

3. Why did Carruthers struggle when he went to the University of Illinois?
   - His high school math classes (which he excelled in) weren’t enough to prepare for college classes. He had to take summer school math in college in order to get to the level of other students. He was also one of the only black students in his classes, and it was difficult to socialize and study with the other students.

4. What event occurred in Carruthers freshman year that is relevant to his career path? Why was this a big deal at the time in which it happened?
   - The Russians launched Sputnik, the first artificial satellite. This made Carruthers sure there were going to be important results in space science.
   - The United States and Russia were fighting the Cold War, and since they were first in space, it started the Space Race.

5. Why do you think that astronomy and engineering were separated until around the time that Carruthers started becoming active in his career (Think back to the previous lesson)? If you think that the two disciplines weren’t truly separated as Carruthers said, explain your thought process.
   (There are many more possible answers)
   - Close attention to the stars and weather was less practical, since fewer people were farmers or sailors.
It took more and more specialized knowledge to make advancements in both engineering and astronomy in the 1960s.

6. **How does Dr. Carruthers see himself as a role model?**

   - He thinks the people who are interested in both science and engineering should focus on small projects as a way to combine those interests.
   - He is often called to give talks and presentations to students.

7. **What were some of Dr. Carruthers contributions to space science?**

   - He invented a device to detect electromagnetic radiation in short wavelengths.
   - He invented the far ultraviolet camera, the first observatory used on the moon in the Apollo 16 mission.
   - He captured the first ultraviolet image of Halley’s Comet in 1986.

8. **What does Dr. Carruthers think about the future of science education?**

   - He thinks that there needs to be more science education in general (it’s not race-specific)
   - He thinks there needs to be more demonstrations and practical activities.
   - There also should be a way to incentivize doing projects outside of school hours and off-campus

9. **Compare the kind of work that Dr. Carruthers did as an astrophysicist to the kind of work that Benjamin Banneker did in the eighteenth century.**

   - Carruthers is much more technical than Banneker, requiring more expensive and modern equipment.
   - Banneker’s work was focused on the practical concerns of farmers and surveyors.
   - Both were very interested in the stars, and expanding their own knowledge.