**NASA’s Universe of Learning Science Briefing:** October 2019

The resources in this list pertain to the presentation given on October 23, 2019, titled, "Hubble Constant Discrepancies – Implications for Our Expanding Universe".

NASA’s Universe of Learning is a program which will integrate NASA’s Astrophysics Science Mission Directorate programs, and will advance STEM learning and literacy by creating and delivering a unified suite of education products, programs, and professional development that spans the full spectrum of NASA Astrophysics. NASA’s Universe of Learning is partnering with the Museum Alliance to provide professional development briefings for the informal science education community. These briefings provide current NASA Astrophysics themes, content, and resources to the informal community. These curated lists present the resources described during the briefings. To find the briefings, you can go here: [http://universe-of-learning.org/science_briefing](http://universe-of-learning.org/science_briefing).

### Featured Resources

**ViewSpace video “Beyond the Headlines: Mystery of Cosmic Expansion Deepens”:** We know the universe is expanding, but how fast? The more scientists explore this question, the more apparent it is that we still have a lot to learn about our universe.

**Activity guide “The Hubble Constant: Playing with Time”:** A guided tabletop activity for families, other mixed age groups, or youth 12+, which uses balloons, sharpies, and stickers to explore concepts related to the expansion of the universe. The activity guide also includes suggested discussion prompts and common questions about the universe’s expansion. Soon to be hosted on universe-of-learning.org/gsawn

**Supernova Educator’s Guide:** A collection of activities, games, and lessons about supernovae, each tied to National Science Education Standards.

**Big Bang Science Fiction:** This series of activities called "Cosmic Times" would be good for a camp for 7th to 12th graders. You can go through the history of how science gathered evidence and refined the age of our universe from the early 20th century to the 21st century.

This material is based upon work supported by NASA under cooperative agreement award number NNX16AC65A to the Space Telescope Science Institute, working in partnership with Caltech/IPAC, Jet Propulsion Laboratory, Smithsonian Astrophysical Observatory, and Sonoma State University. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.
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- **ViewSpace Video “Did you know: Fate of the Universe”:** Did you know that scientists are not sure how the universe will end? This video explores what we know about the universe’s past and what may happen in the future.

- **ViewSpace Video “Did you know: The Universe is Expanding”:** This video explores the structure and scale of the universe and what it means for it to be expanding.

- **Cosmology articles on Hubblesite:** Explore more about the Big Bang and Dark Energy, along with infographics and related news results from the Hubble mission.

- **WMAP Introduction to Cosmology:** If you need more background information about how scientists determined that the universe is expanding, this is a great place to start. For a quick start, you should click on "Our Universe" then "Expansion" to get to the nitty gritty, but the website as a whole is a good read.

- **Planck mission informal ed resources:** A collection of activities, videos, and interactives about the Planck Mission and the CMB

- **WMAP “Build a Universe”:** Use sliders to tweak the contents of the universe and its cosmology until you can match the observed Cosmic Microwave Background in this flash-based interactive.

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**Image and video resources for WMAP:** A collection of images and videos about the Cosmic Microwave Background, the WMAP mission, and related science concepts

**WMAP Science Concept animations:** A collection of animations about the expansion of the universe and the Big Bang.

**ViewSpace Video** “At a Glance: There’s More than One Way to Destroy a Star—Types of Supernova”