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Exploring Planetary Defense for Informal Audiences

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Abstract

The Lunar and Planetary Institute (LPI) is creating a planetary defense module of activities and background information for engaging the public, through out-of-school time programs, as part of its Explore program. The module will be freely available online in fall 2019, with hands-on activities and resources for librarians, camp programmers, and other informal science education programs to use with their audiences.

www.lpi.usra.edu/education/explore

1. Introduction

The Lunar and Planetary Institute's Explore program is designed to engage children in Earth and space science in out-of-school time, library, and informal science education programs [1] [2]. Since its inception in 1998, the Explore program has grown to support a national community of informal science facilitators, programmers, and educators— all trained to bring Earth and space science to their children's and youth programs [3].

At the heart of the Explore program is the content, freely available online. Content is arranged into modules, developed by topical themes (Figure 1). LPI is creating a new module around the theme of planetary defense, focusing on the detection and characterization of potentially hazardous objects.

The format is intended to be flexible — materials can be presented in short or long formats and in various venues, e.g., as part of summer youth programs, family days, after-school programs, and festivals, to name a few. The resulting planetary defense resource will enable these groups to explore the characteristics of asteroids and meteoroids and efforts to protect our planet.

2. Planetary Defense

The Explore modules already include a variety of tested activities that will be modified to enable greater discussion around the theme of planetary defense. There are two different impact cratering activities: modeling impacts in an impact box and modeling them with water balloons (Figure 2). *Edible Rocks* analyzes candy bars "slices" using terminology related to meteorite features. *Investigating the Insides* models how scientists can use spacecraft orbital data to infer interior properties of a planetary body. The *Dry Ice Comet* activity may be modified and included, based on input from scientists. A few additional activities will be developed specific to asteroid detection and characterization, possibly building upon those developed for the Dawn mission. Rich background and links to other planetary defense resources will be provided.

Figure 1: Examples of *Explore* themes

3. The Explore Modules

To date, a dozen themes have been developed, ranging from *All About Ice* to *Space Exploration.* Each theme includes hands-on activities specifically designed for out-of-school time environments and background content for the facilitators. All materials were reviewed by planetary scientists.

Figure 2: A water balloon can model an impact in which the resulting "crater" is 10 to 20 times wider than the impactor.

4. Partnerships

The new module will benefit from input and content review from LPI's Planetary Radar Group, which has extensive experience in STEM engagement and in detecting and characterizing asteroids using ground-based planetary radars, such as the Arecibo Observatory in Puerto Rico. Others creating public engagement resources on planetary defense are welcome to share feedback. Members of the Explore network will also be invited to test and provide feedback as the module develops.

The Explore program has benefitted from a variety of partnerships over its history. It began with a collaboration with the State Library of Louisiana. The program has since worked with state libraries across the United States, and has shared activities and content with a variety of out-of-school time organizations, including the American Camp Association. Since its inception, the Explore program has grown to support a national community at libraries, parks, museums, planetariums, and other community centers. In 2012, LPI's Explore program began its partnership with the STAR Net program at the Space Science Institute, revising and creating new Explore modules to support STAR Net STEM exhibits for libraries and assisting in professional development workshops for librarians.

5. Conclusion

After the materials have been vetted with scientists and members of the out-of-school time community, the final activities and resources will be disseminated through the Explore network. Others working on planetary defense public engagement and communications will be invited to share the final materials, and links will be included to other planetary defense resources.

For further information, please contact Christine Shupla at shupla@lpi.usra.edu.

References

[1] Shupla, C. et al: *Sharing Mission Resources through Libraries: A New Model*, 45th Lunar and Planetary Science Conference, 17 – 21 March 2014, the Woodlands, USA, 2014.

[2] LaConte, K., Shupla, C., Barr, A., Shipp, S., Bottke, W.: *Public Engagement in the Science of NLSI's Center for Lunar Origin and Evolution (CLOE)*, 43rd Lunar and Planetary Science Conference, 19-23 March 2012, The Woodlands, USA, 2012.

[3] LaConte, K et al: *Tested Tools and Techniques for Promoting STEM Programming in Libraries: Fifteen Years of the Lunar and Planetary Institute's Explore Program*, Celebrating Science: Putting Education Best Practices to Work. Astronomical Society of the Pacific Conference Series, pp. 27-35, 2015.