Solar System Links 2017-2018

These resources are intended as a starting point for competitors, coaches, and test authors in familiarizing themselves with the kind of material and images that may be covered in Solar System exams. Solar System tests will not necessarily contain information covered in any/all of these resources, and may test students on material that is not included here.

NASA Resources:
NASA Mercury Planet Overview https://solarsystem.nasa.gov/planets/mercury
NASA Venus Overview https://solarsystem.nasa.gov/planets/venus
NASA Mars Overview https://solarsystem.nasa.gov/planets/mars
NASA Moon Overview https://solarsystem.nasa.gov/planets/moon/
NASA Io Overview https://solarsystem.nasa.gov/planets/io
NASA Phobos & Deimos https://solarsystem.nasa.gov/planets/mars/moons
The above links provide students with both a basic overview of the large geologic bodies in the solar system, as well as links to better understand the past, present, and planned future work of NASA to further develop our understanding of these bodies. Each link contains high quality images of geologic features, exploration timelines, and news on recent discoveries pertaining to each object.

NASA Mars Exploration Home Page https://mars.nasa.gov
This page explores beyond known information about Mars to the past, present, and future missions to explore Mars's atmosphere, surface, and interior. Each mission's page includes details on instrumentation, insights, and timelines. Images taken by different missions revealing different aspects of Mars's geology are available in the "Multimedia" section.

NASA Asteroid Redirect Mission https://www.nasa.gov/mission_pages/asteroids/initiative/index.html
This site details the steps in asteroid redirect mission conception, testing, and theoretical implementation. The "Overview" section provides explanation of the motivation behind the program.

NASA Asteroid & Comet Watch https://www.nasa.gov/asteroid-and-comet-watch
This site provides information ranging from a broad overview to specific details on the asteroid belt and asteroid observation, measurement, and missions.

NASA Educational Index https://www.nasa.gov/audience/forstudents/9-12/A-Z/index.html
This link contains resources explaining many astronomical and geologic concepts included in this year's rules, at a level appropriate for the B Division competition. These materials provide students with an understandable context for the concepts in the rules, and may be especially helpful for students new to the event or to studying the solar system.

NASA Astromaterials Research and Exploration Science Education
https://ares.jsc.nasa.gov/interaction/lmdp/documents/studentguide_rockssoilssurfaces_v2.pdf This resource, primarily for instructors, provides helpful context and examples of the kinds of tasks that scientists perform to learn more about the geology of rocky bodies in the solar system. Additional materials on the main website (https://ares.jsc.nasa.gov) provide background on solar system formation and evolution.

Jet Propulsion Laboratory (JPL) Resources:
JPL Missions https://www.jpl.nasa.gov/missions/

This site provides an appropriately-detailed overview of the key statistics and significance of past, present, and future missions that JPL has been involved with.

JPL Image Gallery https://www.jpl.nasa.gov/spaceimages/
This site provides another expansive source of images for students to familiarize themselves with the geologic features of the objects included in this year's list, and for proctors to find high quality images for exams. In the "More Info" section accompanying each image, complete descriptions of when, where, and how the images were obtained complete the students' understanding of the significance of the object and learn more about the contributions of past and present missions.

JPL Planetary Sciences Home Page https://scienceandtechnology.jpl.nasa.gov/research/research-topics-list/planetary-sciences
The specific sites linked within each topic area outlined here correlate well to sections of this year's rules, and provide clear outlines for students in terms of relevant missions, instrumentation, and insights involved with each area. The site https://science.jpl.nasa.gov/PlanetaryScience/Geophysics/ provides additional detail to the information in the Planetary Geology and Geophysics section of the JPL Planetary Science Page

Additional Resources:
Scientific American Radiocarbon Dating Video https://www.youtube.com/watch?v=phZeE7Att_s
A B-division friendly explanation of radiometric dating. This video explains radiometric dating in the context of fossil dating, but the same principles apply to dating of geologic materials in the solar system.

NASA/NOAA SciJinks https://scijinks.gov/menu/topics/
This website created by NASA/NOAA has thorough explanations of tides and seasons without requiring prior understanding of Solar System dynamics.

EarthSky Libration Article http://earthsky.org/astronomy-essentials/how-much-of-the-moon-can-we-see-from-earth-lunar-libration
This website provides comprehensive qualitative explanations of the different types of libration acting on Earth's Moon, including background on the causes of each type of libration as well as the observational effect of each.

Lunar and Planetary Institute Planet Surface Processes
http://www.lpi.usra.edu/education/resources/processes/ The resources here, though primarily intended for educators, provide B-Division appropriate exercises and background information on different geologic processes present in the solar system, including cratering, weather, erosion, and volcanism. Students are especially encouraged to explore the link to "Background on Planetary Processes" (http://www.lpi.usra.edu/education/explore/shaping_the_planets/).