Features:

Educators:
Space Weather Action Center (SWAC) - Follow the basic steps in the Instructional Guide as your students track a solar storm. Your class will be accessing, analyzing and recording NASA satellite and observatory data.

Public Outreach:
Make and Take section will provide activities that can be done on the museum floor and for local events.

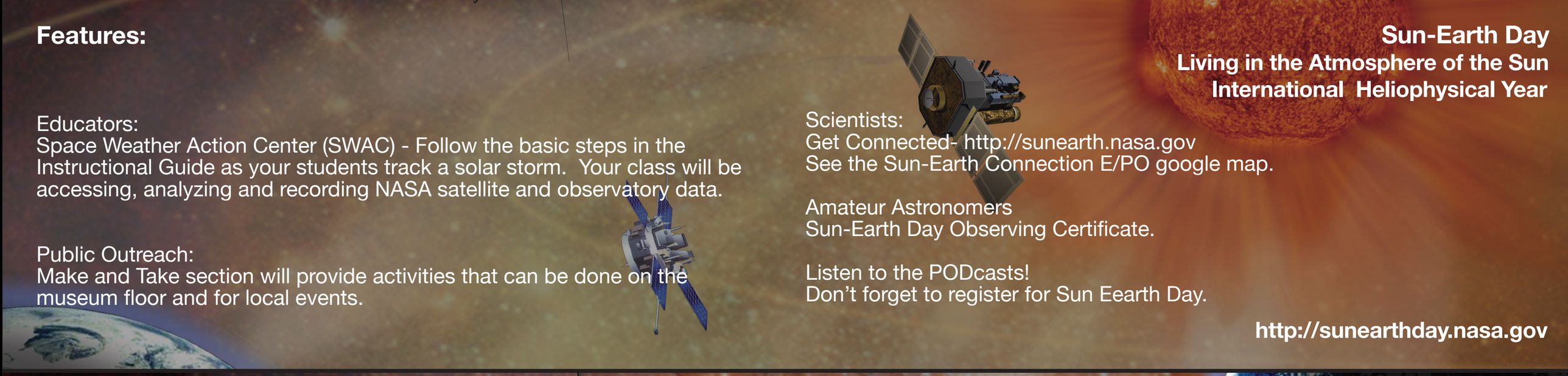
Sun-Earth Day
Living in the Atmosphere of the Sun
International Heliophysical Year

Scientists:
Get Connected- http://sunearth.nasa.gov
See the Sun-Earth Connection E/PO google map.

Amateur Astronomers
Sun-Earth Day Observing Certificate.

Listen to the PODcasts!
Don't forget to register for Sun Eearth Day.

http://sunearthday.nasa.gov



Space weather

Sun-Earth Day
International Heliophysical Year

www.nasa.gov

Artistic rendition - Solar system not to scale

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National Aeronautics and Space Administration

Heliophysics deals with the Sun-Heliosphere-Earth Connected system a fairly new area of research and the reason for the development of a timeline for students to begin their understanding of Living in the Atmosphere of the Sun. Students should learn how to conduct investigations the way that scientists investigate. These experiences engage students in scientific phenomena through observation, data gathering and analysis of evidence, ***inquiry***. Students learn to build their investigations on prior knowledge, beginning with research and discoveries from the past. Much can be learned from history about the nature of science. A timeline is a representation or exhibit of key events within a particular historical period, often consisting of illustrative visual material accompanied by written commentary, arranged chronologically. "Students can learn from significant people in history, which will provide a foundation for the development of sophisticated ideas related to history."(History and Nature of Science, National Science Education Standards). You can use Technology Through Time on the Sun Earth Day website to create a complete timeline. ***http://sunearthday.nasa.gov***

Solar Discoveries Timeline

1600 - William Gilbert (1544-1603) published "De Magnete" and was the first to describe Earth's magnetic field.

1645 - The 70 year Maunder Minimum period began during which sunspots were almost completely absent; extreme winters occurred during this same period.

1740 - Anders Celcius (1701-1744) and Olof Hiorter (1696-1750) discovered that compass needles moved in an erratic manner instead of always pointing north. These 'magnetic storms' were later investigated in more detail by von Humboldt (1769-1859).

1814 - Solar spectrum discovered by Joseph von Fraunhofer (1787-1826) using a new instrument called the spectroscope. By passing sunlight through a slit and a prism, faint black lines speckled the 'rainbow;' each being fingerprints of atoms. These elements were identified in 1863 by Gustov Kirchoff (1824-1887) and Anders Angstrom (1814-1874).

1843 - Heinrich Schwabe (1789-1875) used the accumulated records of sunspots to uncover the 11-year sunspot cycle.

1859 - Richard Carrington (1826-1865) and Robert Hodgson (b.1804) first reported a solar flare during a major week-long solar 'superstorm' in 1859 that caused world-wide telegraph outages and brilliant sky-filling aurora – they infered a causal link between the Sun and magnetic storms.

1881 - Sophus Tromholt (1851-1896) discovered the auroral oval. Modern auroral physics began with the first international cooperative study of polar regions, the First Polar Year.

1896 - Kristian Birkeland (1867-1917) proposed that auroras and magnetic storms were caused by beams of very fast electrons emitted by the sun.

1907 - Carl Stormer (1854 -1957) developed the first quantitative theory of charged particle motion in Earth's magnetic field.

1908 - Kristian Birkeland suggested a cavity around Earth for solar curpuscles, and suggested a ring current and continuous solar wind, all confirmed in future decades.

1923 - Sydney Chapman (1888-1970) developed a theory of magnetic storms, and in 1931 developed the theoretical basis for ionospheric structure.

1939 - Hannes Alfven (1908-1995) created a mathematical theory for magnetic storms and aurora.

1955 - Leverett Davis, Jr. (1924-2003) suggested the existence of the "heliosphere," which is the region of space formed by the interaction of interstellar plasmas with solar plasmas and the interplanetary field.

1958 - Eugene Parker (b. 1927) developed a detailed mathematical model for the solar wind and interplanetary magnetic fields.

1958 - Explorer 1 was launched successfully. Physicist James Van Allen (1914-2006) concluded that Earth was surrounded by belts of high-energy particles.

1962 - Marcia Neugebauer (b. 1932) was the first to directly observe this "solar wind" using data from the Mariner 2 spacecraft enroute to Venus.

1963 - Donald Carpenter (b. 1928) proposed that Earth's neutral atmosphere extends thousands of kilometers into space in a region we now call the plasmasphere. Apollo missions between 1968 -1972 photographed the neutral component of this region, which is called the geocorona.

1971 - OSO-7 discovered of bursts of plasmas from the solar surface, which were called coronal transients and later named Coronal Mass Ejections (CMEs).

1972 - Skylab made the first actual images of the X-ray sun and showed dark 'coronal holes', because X-rays cannot penetrate the Earths atmosphere.

1979 - The first detection of aurora on another planet was made by the Pioneer 11 spacecraft as it flew by Saturn.

2005 - After 28 years of flight, the Voyager satellites finally detected radio signals from an outer boundary of the heliosphere about 14 billion kilometers from the sun.