

Sun-Earth Connection Missions



<http://sunearth.ssl.berkeley.edu/educators/missions.html>
<http://sunearth.gsfc.nasa.gov/educators/missions.html>

NASA SEC Mission (Launch Date)	Mission Education Page	Science Objective
ACE (1997 –) Advanced Composition Explorer http://helios.gsfc.nasa.gov/ace/	Cosmic and Heliospheric Learning Center http://helios.gsfc.nasa.gov	Study of the physics and chemistry of the solar corona, the solar wind, and the interstellar medium.
Cluster II (2000 –) http://sci.esa.int/cluster	http://istp.gsfc.nasa.gov/istp/outreach	Study of Earth's magnetic field, electric surroundings, and the effects of the solar wind on the Earth's protective magnetosphere.
CRRES (1990 – 1991) Combined Release and Radiation Effects Satellite http://www.ball.com/aerospace/crres.html	No Education Page	To Find out how Earth's radiation environment affects microelectronic circuitry; the composition of the Earth's radiation belts; the magnetosphere interacts with the ionosphere.
FAST (1996 –) Fast Auroral SnapshoT Explorer http://plasma2.ssl.berkeley.edu/fast	http://cse.ssl.berkeley.edu	How the particles and fields in the upper atmosphere change during an aurora.
Genesis (2001 –) http://www.genesismission.org	http://www.genesismission.org/educate - also visit - http://sun.jpl.nasa.gov/	The search for origins of the universe through the study of solar wind and fusion chemistry.
Geospace Electrodynamic Connections (GEC) (2008 –) http://stp.gsfc.nasa.gov/missions/gec/gec.htm	http://stp.gsfc.nasa.gov/educ_out/educ_out.htm	GEC will determine how the ionosphere-thermosphere (I-T) system reponds to magnetosphere forcing and how the I-T system is dynamically coupled to the magnetosphere.
GEOTAIL (1992 –) http://istp.gsfc.nasa.gov/istp/geotail	http://istp.gsfc.nasa.gov/istp/outreach/	Study of the magnetotail region and the change over time, and how the magnetotail, plasma sheet, and magnetopause interact.
HESSI (2001 –) High Energy Solar Spectroscopic Imager http://hesperia.gsfc.nasa.gov/hessi/	http://cse.ssl.berkeley.edu/hessi_epo/	Study of solar flares, the effect on electron and proton acceleration and the origin of energy for solar flares.

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IMAGE (2000 –) Imager for Magnetopause-to-Aurora Global Exploration http://image.gsfc.nasa.gov/	http://image.gsfc.nasa.gov/poetry/	Study of how the magnetosphere is changed by its interaction with the solar wind; how plasmas are transported from place to place within the magnetosphere; the loss of magnetospheric plasmas from the system during storms.
IMEX (2001 –) Inner Magnetosphere Explorer http://ham.space.umn.edu/spacephys/imex.html	No Education Page	To provide global imaging of the aurora, ring current, and plasmaspheric populations. IMEX will provide in situ measurements, particularly of electric fields and ring current populations, and cross-calibration, while TWINS and IMAGE will provide a context for interpreting the IMEX measurements.
IM (2009 –) Ionospheric Mappers http://lws.gsfc.nasa.gov/lws_missions_im.htm	http://lws.gsfc.nasa.gov/lws_education.htm	A global network of satellites that will gather knowledge of how the ionosphere behaves as a system, linking solar energy with Earth's atmosphere.
IMP-8 (1973 –) Interplanetary Monitoring Platform http://nssdc.gsfc.nasa.gov/space/imp-8.html	No Education Page	IMP-8 measures the magnetic fields, plasmas, and energetic charged particles (e.g., cosmic rays) of Earth's magnetotail and magnetosheath and of the near-Earth solar wind. IMP-8 is one of the longest running solar-terrestrial spacecrafts. The year 2001 marks this spacecraft's 28th year.
INTERBALL (1995 –) http://www.iki.rssi.ru/interball.html	No Education Page	Study of the relationship between processes in the geotail and the particle acceleration above the auroral oval; how solar flares and X-ray bursts affect the magnetotail and cusp regions.
ISTP (multiple missions) International Solar-Terrestrial Physics Program http://istp.gsfc.nasa.gov/	http://istp.gsfc.nasa.gov/istp/outreach/	Participating Missions: • CLUSTER II • POLAR • WIND • GEOTAIL • SOHO <i>(find these listed alphabetically)</i>
LWS (multiple missions) Living With a Star Program http://lws.gsfc.nasa.gov	http://lws.gsfc.nasa.gov/lws_education.htm	Participating Missions: • IM • SDO • RBM • Solar Sentinels <i>(find these listed alphabetically)</i>

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MC Magnetospheric Constellation (2010 –) http://stp.gsfc.nasa.gov/missions/mc/mc.htm	http://stp.gsfc.nasa.gov/educ_out/educ_out.htm	This group of nano-satellites, will enable us to determine the dynamics of the magnetotail, understand its responses to the solar wind, and reveal the linkages between local and global processes.
MMS Magnetospheric MultiScale (2006 –) http://stp.gsfc.nasa.gov/missions/mms/mms.htm	http://stp.gsfc.nasa.gov/educ_out/educ_out.htm	MMS will quantitatively determine the geoeffectiveness of solar processes on the geospace system by exploring the fundamental physics underlying the plasma processes that control magnetospheric dynamics.
Polar (1996 –) http://istp.gsfc.nasa.gov/istp/polar/	http://istp.gsfc.nasa.gov/istp/outreach/	Study of the role of the ionosphere in geomagnetic storms; the properties of the particles and fields near the Earth's polar regions and how is energy from the magnetosphere is deposited into the upper atmosphere and auroral regions.
RBM Radiation Belt Mappers (2008 –) http://lws.gsfc.nasa.gov/lws_missions_rbm.htm	http://lws.gsfc.nasa.gov/lws_education.htm	To understand the origin and dynamics of Earth's radiation belts and determine the evolution of the penetrating radiation during magnetic storms.
SAMPEX Solar Anomalous and Magnetospheric Particle Explorer (1992 –) http://surya.umd.edu/www/sampex.html	http://surya.umd.edu/www/outreach.html	Study of how high-energy particles entering the magnetosphere affect Earth's upper atmosphere; the isotopic composition of solar flares, and how cosmic rays are affected by the solar activity cycle.
SDO Solar Dynamics Observatory (2006 –) http://lws.gsfc.nasa.gov/lws_missions_sdo.htm	http://stp.gsfc.nasa.gov/lws_education.htm	To observe the Sun's dynamics and understand the nature and source of variations, from the stellar core to the turbulent solar atmosphere.
Sentinels (2009 –) http://lws.gsfc.nasa.gov/lws_missions_sentinels.htm	http://lws.gsfc.nasa.gov/lws_education.htm	The Sentinels will observe the global structure of the inner heliosphere, follow the propagation of solar eruptive events to Earth, and trace geomagnetic disturbances back to their solar sources.

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SNOE (1998 –) http://lasp.colorado.edu/snoe	No Education Page	To measure nitric oxide density in the terrestrial lower thermosphere (100-200 km altitude) and analyze the energy inputs to that region from the Sun and magnetosphere that create it and cause its abundance to vary dramatically.
SOHO (1995 –) Solar and Heliospheric Observatory http://sohowww.nascom.nasa.gov	Explore: http://sohowww.nascom.nasa.gov/explore/ Stanford Solar Center: http://solar-center.stanford.edu/index.html	Study of how the solar corona is heated, the internal structure of the Sun, and what causes the activity seen on the surface of the Sun.
Solar-B (2005 –) http://stp.gsfc.nasa.gov/missions/solar-b/solar-b.htm	http://stp.gsfc.nasa.gov/educ_out/educ_out.htm	Solar-B seeks to understand the magnetic origins of solar activity and variability and how they influence and sometimes change the Earth's environment.
Solar Probe (2007 –) http://www.jpl.nasa.gov/ice_fire//sprobe.htm	http://www.jpl.nasa.gov/ice_fire//outreach/index.htm	To find the source regions of the fast and slow solar wind at maximum and minimum solar activity; locate the source and trace the flow of energy that heats the corona; determine the structure of the polar magnetic field and its relationship with the overlying corona; and determine the role of plasma turbulence in the production of solar wind and energetic particles.
Spartan 201-05 (1993, 1994, 1995) http://umbra.gsfc.nasa.gov/spartan	No Education Page	Study of how the solar corona expands to become the solar wind; what the velocities and temperatures at the base of the solar wind are and how the solar wind is accelerated.
STEREO (2004 –) Solar TERrestrial Relations Observatory http://stp.gsfc.nasa.gov/missions/stereo/stereo.htm	http://stp.gsfc.nasa.gov/educ_out/educ_out.htm	STEREO will determine how coronal mass ejections (CMEs) are produced, how they evolve in the solar corona and how CME particles accelerate. It will also uncover the 3-D structure of a CME en route to Earth.
STP (multiple missions) Solar Terrestrial Probes Program http://stp.gsfc.nasa.gov	http://stp.gsfc.nasa.gov	Participating Missions: <ul style="list-style-type: none"> • GEC • MC • MMS • Solar-B • STEREO • TIMED (find these listed alphabetically)

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TIMED (2001 –) Thermosphere • Ionosphere • Mesosphere • Energetic Dynamics http://stp.gsfc.nasa.gov/missions/timed/timed.htm	http://stp.gsfc.nasa.gov	TIMED will study the atmospheric properties (e.g., winds, temperature, chemical constituents, and energetics) of the Mesosphere, Lower Thermosphere, and Ionosphere (MLTI) region on a global scale.
TRACE (1998 –) http://vestige.lmsal.com/TRACE/	http://vestige.lmsal.com/TRACE/Public/eduprodu.htm	Study of the 3-D structure of features seen on the Sun's surface; how the corona is heated; and what triggers solar flares.
TWINS (2003 –) Two Wide-angle Imaging Neutral-atom Spectrometers http://nis-www.lanl.gov/nis-projects/twins/	No Education Page	This mission will provide new ways for stereoscopic imaging of Earth's plasma environment in order to study its dynamics.
Ulysses (1990 –) http://ulysses.jpl.nasa.gov/	http://ulysses.jpl.nasa.gov/outreach/outreach.html	To study what the solar wind looks like near the poles of the Sun; what the Sun's magnetic field looks like near its poles; and how the polar wind and magnetic field change during maximum sunspot conditions.
Voyager (1997 –) http://vraptor.jpl.nasa.gov/voyager/voyager.html – or – http://www.jpl.nasa.gov/voyager/	See Mission pages for outreach components	To find the solar heliopause located beyond the orbit of Pluto; to uncover the properties of the interstellar medium, and to study the interaction of the interstellar medium and the solar wind.
Wind (1994 –) http://istp.gsfc.nasa.gov/istp/wind/	http://istp.gsfc.nasa.gov/istp/outreach/	To study plasma interactions as the solar wind impacts the Earth's magnetosphere; and how energy is transported out of the Earth's magnetosphere and into the upstream solar wind.
Yohkoh (1991 –) http://www.lmsal.com/SXT/Yohkoh	http://www.lmsal.com/YPOP/	To observe how the Sun produces X-ray flares and other activity; how the level of activity changes over time; and how the chromosphere and corona are heated