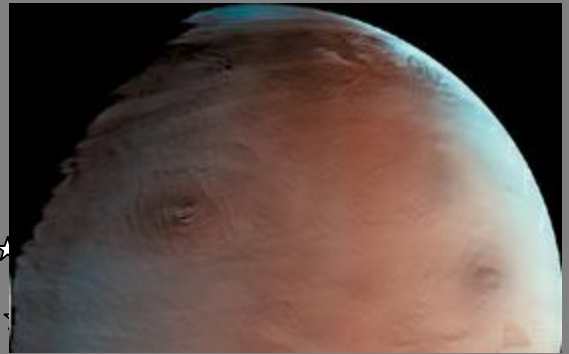


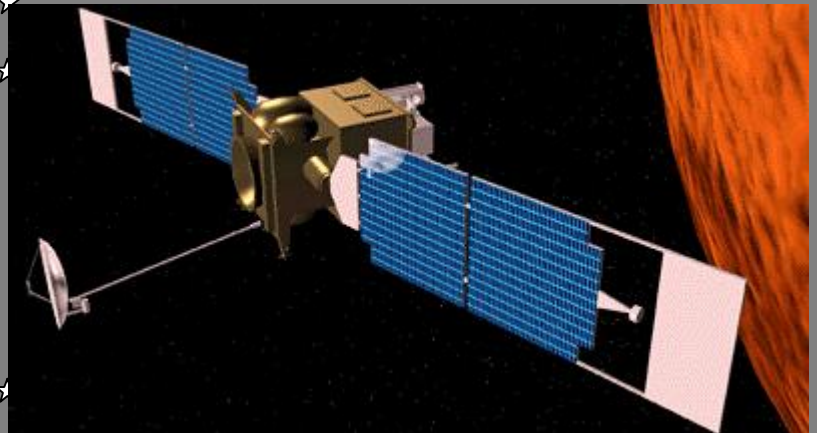
Mars and Beyond!



Mars taken by Mars Orbital Camera



Family Portrait of Jupiter's Great Red Spot and the Galilean Satellites



Mars Global Surveyor

By Nancy Wilkinson

Mars and Beyond
Lesson 1
Space Travel Time Line

Objectives:

Students will create a time line on space travel.

Materials Needed:

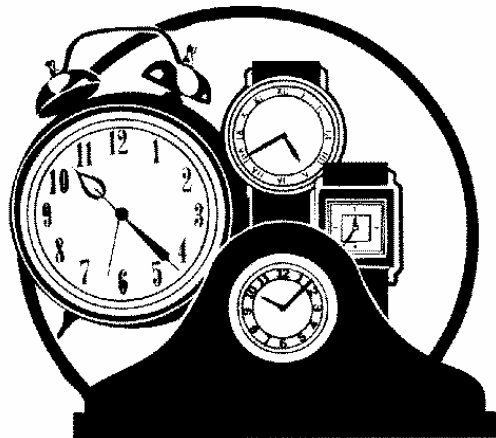
- 1) A large sheet of butcher paper for each group.
- 2) One copy of the time line found on pages 7-8 for each group.
- 3) Tape pages 9 – 16 together to make one large time line.

Opening Activity:

Show a time line of space travel found on pages 9 - 16. Explain that this shows American space travel since 1957 to the year 2006. How many months are included in this time line? (592)

Activity:

- 1) Divide the number of months on the time line (592) by the number of groups.
- 2) Each group should select a time period to create a time line.
- 3) Decide as a class if the time line will include each month or group of months or a year as in the example.
- 4) Decide as a class a set number of inches used to represent each span of time. For example one inch = one month.
- 5) Mark off the butcher paper with the dates. List each month or period of months.
- 6) Write down the significant space travel event under the appropriate date.
- 7) Students may want to copy pictures off the Internet or draw pictures to go with their time line.



Closure:

Connect all of the time lines together to have one large time line. How many feet long is this time line?

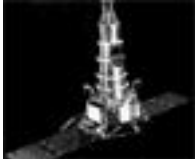
United States of America
Time Line for Planetary and Lunar Exploration
(Courtesy of National Space Science Data Center)

1) February 1958	Explorer	Earth Orbiter
2) March 1958	Vanguard	Earth Orbiter
3) August 1958	Pioneer 0	Attempted Lunar Orbit (Launch Failure)
4) October 1958	Pioneer 1	Attempted Lunar Orbit (Launch Failure)
5) Nov 1958	Pioneer 2	Attempted Lunar Orbit (Launch Failure)
6) Dec 1958	Pioneer 3	Attempted Lunar Flyby (Launch Failure)
7) March 1959	Pioneer 4	Lunar Flyby
8) Nov 1959	Pioneer P	Attempted Lunar Orbiter (Launch Failure)
9) Sept 1960	Pioneer P	Attempted Lunar Orbiter (Launch Failure)
10) Dec 1960	Pioneer P	Attempted Lunar Orbiter (Launch Failure)
11) Aug 1961	Ranger 1	Attempted Lunar Test Flight
12) Nov 1961	Ranger 2	Attempted Lunar Test Flight
13) Jan 1962	Ranger 3	Attempted Lunar Impact
14) Apr 1962	Ranger 4	Lunar Impact
15) Jul 1962	Mariner 1	Attempted Venus Flyby (Launch Failure)
16) Aug 1962	Mariner 2	Venus Flyby
17) Oct 1962	Ranger 5	Attempted Lunar Impact
18) Jan 1964	Ranger 6	Lunar Impact (Cameras Failed)
19) Jul 1964	Ranger 7	Lunar Impact
20) Nov 1964	Mariner 3	Attempted Mars Flyby
21) Nov 1964	Mariner 4	Mars Flyby
22) Feb 1965	Ranger 8	Lunar Impact
23) Mar 1965	Ranger 9	Lunar Impact
24) May 1966	Surveyor 1	Lunar Lander
25) Jul 1966	Explorer 33	Attempted Lunar Orbiter
26) Aug 1966	Lunar Orbiter 1	Lunar Orbiter
27) Sep 1966	Surveyor 2	Attempted Lunar Lander
28) Nov 1966	Lunar Orbiter 2	Lunar Orbiter
29) Feb 1967	Lunar Orbiter 3	Lunar Orbiter
30) Apr 1967	Surveyor 3	Lunar Lander
31) May 1967	Lunar Orbiter 4	Lunar Orbiter
32) Jun 1967	Mariner 5	Venus Flyby
33) Jul 1967	Surveyor 4	Attempted Lunar Lander
34) Jul 1967	Explorer 35 (IMP-E)	Lunar Orbiter
35) Aug 1967	Lunar Orbiter 5	Lunar Orbiter
36) Sep 1967	Surveyor 5	Lunar Lander
37) Nov 1967	Surveyor 6	Lunar Lander
38) Jan 1968	Surveyor 7	Lunar Lander
39) Dec 1968	Apollo 8	Manned Lunar Orbiter
40) Feb 1969	Mariner 6	Mars Flyby
41) Mar 1969	Mariner 7	Mars Flyby
42) May 1969	Apollo 10	Manned Lunar Orbiter

43) Jul 1969	Apollo 11	Manned Lunar Landing
44) Nov 1969	Apollo 12	Manned Lunar Landing
45) Apr 1970	Apollo 13	Manned Lunar Mission (Landing Aborted)
46) Jan 1971	Apollo 14	Manned Lunar Landing
47) May 1971	Mariner 8	Attempted Mars Flyby (Launch Failure)
48) May 1971	Mariner 9	Mars Orbiter
49) Jul 1971	Apollo 15	Manned Lunar Landing
50) Mar 1972	Pioneer 10	Jupiter Flyby
51) Apr 1972	Apollo 16	Lunar Manned Landing
52) Dec 1972	Apollo 17	Lunar Manned Landing
53) Apr 1973	Pioneer 11	Jupiter/Saturn Flyby
54) Jun 1973	Explorer 49 (RAE-B)	Lunar Orbiter/Radio Astronomy
55) Nov 1973	Mariner 10	Venus/Mercury Flybys
56) Aug 1975	Viking 1	Mars Orbiter and Lander
57) Sep 1975	Viking 2	Mars Orbiter and Lander
58) Aug 1977	Voyager 2	Jupiter/Saturn/Uranus/Neptune Flyby
59) Sep 1977	Voyager 1	Jupiter/Saturn Flyby
60) May 1978	Pioneer Venus 1	Venus Orbiter
61) Aug 1978	Pioneer Venus 2	Venus Probes
62) Aug 1978	ISEE-3/ICE	Comet Giacobini-Zinner and Halley Flybys
63) May 1989	Magellan	Venus Orbiter
64) Oct 1989	Galileo	Jupiter Orbiter/Probe
65) Sep 1992	Mars Observer	Attempted Mars Orbiter (Contact Lost)
66) Jan 1994	Clementine	Lunar Orbiter/Attempted Asteroid Flyby
67) Feb 1996	NEAR	Asteroid Eros Orbiter
68) Nov 1996	Mars Global Surveyor	Mars Orbiter
69) Dec 1996	Mars Pathfinder	Mars Lander and Rover
70) 15 Oct 1997	Cassini	Saturn Orbiter
71) Jan 1998	Lunar Prospector	Lunar Orbiter
72) Oct 1998	Deep Space 1 (DS1)	Asteroid and/or Comet Flyby
73) Dec 1998	Mars Climate Orbiter	Mars Orbiter
74) Jan 1999	Mars Polar Lander	Mars Lander
75) Jan 1999	Deep Space 2 (DS2)	Mars Penetrator
76) Feb 1999	Stardust	Comet Coma Sample Return
77) Jan 2001	Genesis	Solar Wind Sample Return
78) Mar 2001	Mars Surveyor 2001	Orbiter - 7 - Mars Orbiter
79) Apr 2001	Mars Surveyor 2001	Lander - 5 - Mars Lander/Rover
80) Jul 2002	CONTOUR	Fly-by of three Comet Nuclei
81) 2002	Pluto-Kuiper Express	Proposed Flyby of Pluto and Kuiper Belt
82) May 2003	Champion/DS4	Comet Sample Return
83) May 2003	Mars Surveyor 2003	Mars Orbiter and Lander
84) 2003	Europa Orbiter	Proposed Europa Orbiter
85) July 2005	Mars Surveyor 2005	Mars Orbiter and Lander


Time Line for Planetary and Lunar Exploration (Courtesy of NASA)


Note (L.F.) = Launch Failure

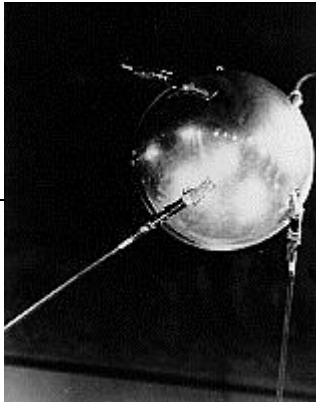
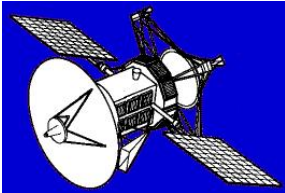
February 1958 March 1958 August 1958 October 1958 Nov 1958 Dec 1958	Explorer 1 Vanguard 1 Pioneer 0 Pioneer 1 Pioneer 2 Pioneer 3	Earth Orbiter Earth Orbiter Attempted Lunar Orbit (Launch Failure) Attempted Lunar Orbit (Launch Failure) Attempted Lunar Orbit (Launch Failure) Attempted Lunar Flyby (Launch Failure)	January- December, 1958
March 1959 Nov 1959	Pioneer 4 Pioneer P	Lunar Flyby Attempted Lunar Orbiter (Launch Failure)	January- December, 1959
Sept 1960 Dec 1960	Pioneer P-30 Pioneer P	Attempted Lunar Orbiter (Launch Failure) Attempted Lunar Orbiter (Launch Failure)	January- December, 1960
Aug 1961 Nov 1961	Ranger 1 Ranger 2	Attempted Lunar Test Flight Attempted Lunar Test Flight	January- December, 1961
Jan 1962 Apr 1962 Jul 1962 Aug 1962 Oct 1962	Ranger 3 Ranger 4 Mariner 1 Mariner 2 Ranger 5	Attempted Lunar Impact Lunar Impact Attempted Venus Flyby (Launch Failure) Venus Flyby Attempted Lunar Impact	January- December, 1962
			January- December, 1963

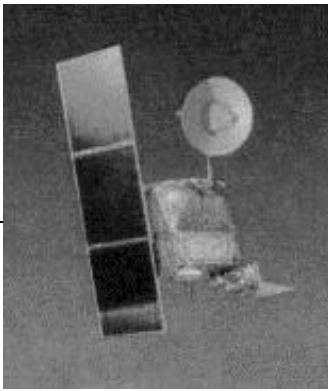
Ranger 6

Jan 1964 Jul 1964 Nov 1964 Nov 1964	Ranger 6 Ranger 7 Mariner 3 Mariner 4	Lunar Impact (Cameras Failed) Lunar Impact Attempted Mars Flyby Mars Flyby	January-December, 1964
Feb 1965 Mar 1965	Ranger 8 Ranger 9	Lunar Impact Lunar Impact	January-December, 1965
May 1966 Jul 1966 Aug 1966 Sep 1966 Nov 1966	Surveyor 1 Explorer 33 Lunar Orbiter 1 Surveyor 2 Lunar Orbiter 2	Lunar Lander Attempted Lunar Orbiter Lunar Orbiter Attempted Lunar Lander Lunar Orbiter	January-December, 1966
Feb 1967 Apr 1967 May 1967 Jun 1967 Jul 1967 Jul 1967 Aug 1967 Sep 1967	Lunar Orbiter 3 Surveyor 3 Lunar Orbiter 4 Mariner 5 Surveyor 4 Explorer 35 (IMP-E) Lunar Orbiter 5 Surveyor 5	Lunar Orbiter Lunar Lander Lunar Orbiter Venus Flyby Attempted Lunar Lander Lunar Orbiter Lunar Orbiter Lunar Lander	January-December, 1967
Jan 1968 Dec 1968	Surveyor 7 Apollo 8	Lunar Lander Manned Lunar Orbiter	January-December, 1968
Feb 1969 Mar 1969 May 1969 Jul 1969 Nov 1969	Mariner 6 Mariner 7 Apollo 10 Apollo 11 Apollo 12	Mars Flyby Mars Flyby Manned Lunar Orbiter Manned Lunar Landing Manned Lunar Landing	January-December, 1969
Apr 1970	Apollo 13	Manned Lunar Mission (Landing Aborted)	January-December, 1970

Jan 1971 May 1971 May 1971 Jul 1971	Apollo 14 Mariner 8 Mariner 9 Apollo 15	Manned Lunar Landing Attempted Mars Flyby (Launch Failure) Mars Orbiter Manned Lunar Landing	January- December, 1971
Apr 1972 Dec 1972	Apollo 16 Apollo 17	Lunar Manned Landing Lunar Manned Landing	January- December, 1972
Apr 1973 Jun 1973 Nov 1973	Pioneer 11 Explorer 49 (RAE-B) Mariner 10	Jupiter/Saturn Flyby Lunar Orbiter/Radio Astronomy Venus/Mercury Flybys	January- December, 1973
			January – December, 1974
Aug 1975	Viking 1	Mars Orbiter and Lander	January – December, 1975
		Voyager 1 launched 9/5/1977	January – December, 1976

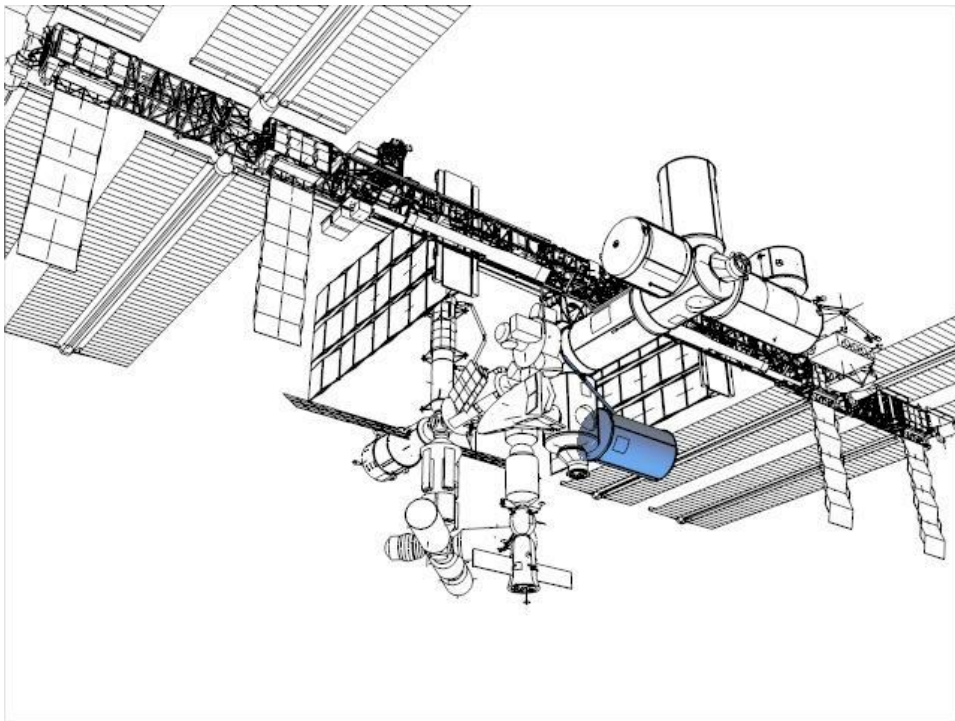
<p>Aug 1977 Sep 1977</p>	<p>Voyager 2 Voyager 1</p>	<p>Jupiter/Saturn/Uranus/Neptune Flyby Jupiter/Saturn Flyby</p>	<p>January – December, 1977</p>
<p>May 1978 Aug 1978 Aug 1978</p>	<p>Pioneer Venus 1 Pioneer Venus 2 ISEE-3/ICE</p>	<p>Venus Orbiter Venus Probes Comet Giacobini-Zinner and Halley Flybys</p>	<p>January – December, 1978</p>
			<p>January – December, 1979</p>
			<p>January – December, 1980</p>
			<p>January – December, 1981</p>
	<p>Ranger 4 – 4/23/1962 - Lunar Impact</p>		<p>January – December, 1982</p>

			January – December, 1983
			January – December, 1984
		Launched in 1957, the Sputnik 1 spacecraft was the first artificial satellite successfully placed in orbit around the Earth and was launched from Baikonur Cosmodrome at Tyuratam (370 km southwest of the small town of Baikonur) in Kazakhstan, then part of the former Soviet Union. The Russian word "Sputnik" means "companion" ("satellite" in the astronomical sense).	January – December, 1985
			January – December, 1986
			January – December, 1987
		The Magellan spacecraft launched May 4, 1989	January – December, 1988
May 1989 Oct 1989	Magellan Galileo	Venus Orbiter Jupiter Orbiter/Probe	January – December, 1989

		<p>Due to launch on 12/10/1998, the Mars Surveyor '98 program is comprised of two spacecraft to be launched separately, the Mars Climate Orbiter (formerly the Mars Surveyor '98 Orbiter) and the Mars Polar Lander (formerly the Mars Surveyor '98 Lander). The two missions will study the Martian weather, climate, and water and carbon dioxide budget, in order to understand the reservoirs, behavior, and atmospheric role of volatiles and to search for evidence of long-term and episodic climate changes.</p>	<p>January – December, 1990</p>
			<p>January – December, 1991</p>
<p>Sep 1992</p>	<p>Mars Observer</p>	<p>Attempted Mars Orbiter (Contact Lost)</p>	<p>January – December, 1992</p>
			<p>January – December, 1993</p>
<p>Jan 1994</p>	<p>Clementine</p>	<p>Lunar Orbiter/Attempted Asteroid Flyby</p>	<p>January – December, 1994</p>
			<p>January – December, 1995</p>
<p>Feb 1996 Nov 1996 Dec 1996</p>	<p>NEAR Mars Global Surveyor Mars Pathfinder</p>	<p>Asteroid Eros Orbiter Mars Orbiter Mars Lander and Rover</p>	<p>January – December, 1996</p>

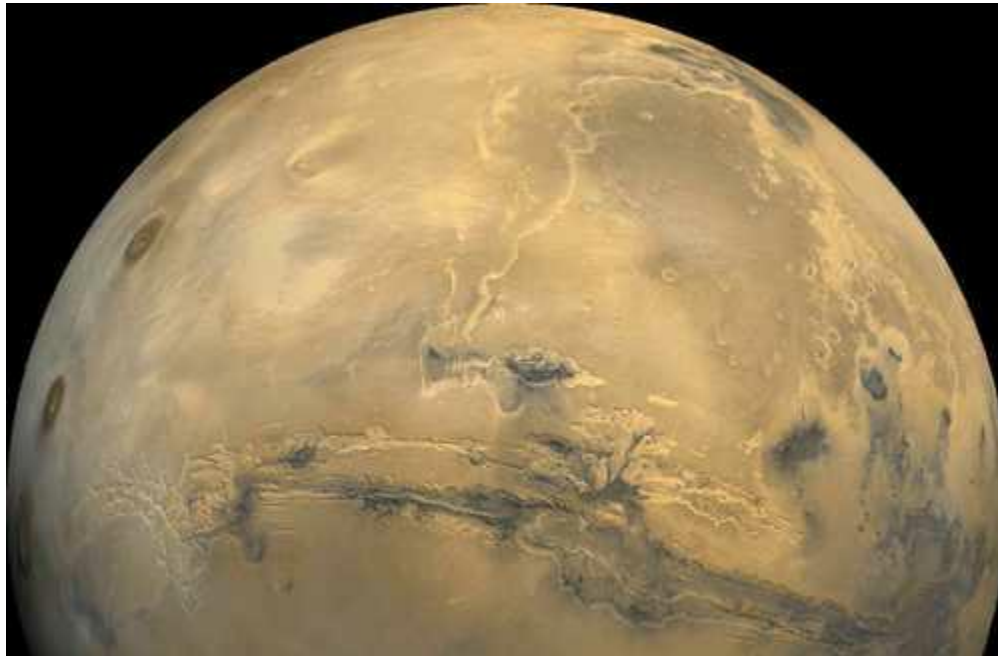
15 Oct 1997	Cassini	Saturn Orbiter	January – December, 1997
1998 October 1998 December 10	New Millenium DS 1 Mars Climate Orbiter	Flyby Mission to Asteroid and/or Comet Orbiter Mission to Mars	January – December, 1998
January 3 1999 January 3 1999 February 1999	Mars Polar Lander Deep Space 2 (DS2) Stardust	Mars Lander Mars Penetrator Comet Coma Sample Return	January – December, 1999
			January – December, 2000
Jan 2001 Mar 2001 Apr 2001	Genesis Mars Surveyor 2001 Mars Surveyor 2001	Solar Wind Sample Return Orbiter - 7 - Mars Orbiter Lander - 5 - Mars Lander/Rover	January – December, 2001
Jul 2002 2002	CONTOUR Pluto-Kuiper Express	Fly-by of three Comet Nuclei Proposed Flyby of Pluto and Kuiper Belt	January – December, 2002
May 2003 May 2003 2003	Champollion/DS4 Mars Surveyor 2003 Europa Orbiter	Comet Sample Return Mars Orbiter and Lander Proposed Europa Orbiter	January – December, 2003

			January – December, 2004
July 2005	Mars Surveyor 2005	Mars Orbiter and Lander	January – December, 2005



The International Space Station will have a wingspan end-to-end width of 356.4 feet (108.6 meters). It's length will be 290 feet (79.9 meters). It's weight on Earth will be 1,005,000 pounds (455,865 kilograms). It will exist at an Altitude of 220 nautical miles average (407 kilometers) above the Earth. It will hold a crew of up to 7 people.

Images of Mars



Olympus Mons:

