



SPACE & ROCKETRY

eSeries "GRADING SHEET"

NAME: _____
Partner: _____
Period: _____ Rotation: _____

MODULE GRADE: COURSE GR. _____ }
POST TEST _____ } **MODULE AVERAGE=** _____

SPACE & ROCK. "WORKSHEET" "WORKSHEET" TOTAL= _____

DAILY LAB PERFORMANCE: _____

(If you are absent, write ABS on the line for the day you miss and discuss what you need to make up with the teacher) **LAB PERFORMANCE TOTAL=** _____

Extra Credit—Discuss this with the instructor before beginning!!!

WORD SEARCH	_____ (5)	CHALLENGES	_____ (5)
MODULE REPORT	_____ (5)	Painting Rocket at Home	_____ (5)
RESEARCH REPORT	_____ (5)	MODULE NOTES	_____ (0-10)
		TOTAL EXTRA CREDIT=	_____
		BONUS POINTS	*** _____

SPACE & ROCKETRY "WORKSHEET"

When the software tells you to do an Equipment check do it and get a stamp. **T.I.:** _____ (5)

LESSON 1- Show the teacher your "Notes" screen with your name and your note. **T.I.:** _____ (5)

LESSON 2- Have the teacher give you a rocket kit when you get to the part in the lesson.

LESSON 3- "Deep Space Explorer" "Your Universe"

LESSON 4

Deep Space Explorer—"Know Your Place" and "Rivers in the Sky".

Environmental Impacts- Write notes from video clips (separate piece of paper). **Paper:** _____ (10)

LESSON 5- "Observation Log" completed sheet. **Observation Log Worksheet:** _____ (20)

LESSON 6- Finish rocket (take home for extra credit to spray paint, optional)

LESSON 7

Turn in your Rocket Grading Sheet at the end of the module. **Grading Sheet :** _____ (30)

LESSON 12-Career Guidance Report- **Career NOTES:** _____ (10)

Study Guide **Study Guide:** _____ (10)

NOTES FROM LESSONS 1-8 **Notes:** _____ (10)

Worksheet Total: _____



“SPACE AND ROCKETRY”

Study Guide for Post Test

1. Which philosopher stated that the Earth was the center of the heavens and everything else revolved around it? (1-The Early History of Astronomy [7 of 13])

Copernicus Ptolemy Kepler Galileo

2. Which astronomer established that Earth and all the other planets revolve around the sun, which is the center of our system of planets? (1-The Early History of Astronomy [8 of 13])

Copernicus Ptolemy Kepler Galileo

3. Early “rockets,” used by the Chinese as long ago as 1200 AD, were called (2-The History of Rockets [2 of 4]) _____.

fireworks firecrackers fire rockets fire arrows

4. Newton’s third law of motion, which is especially important when learning about rockets, states: (2-Newton's Laws and Rocketry [1 of 4])

“If at first you don’t succeed, try, try again.”

“An object at rest tends to stay at rest and an object in motion tends to stay in motion unless the object is acted upon by an outside force.”

“For every action there is an equal and opposite reaction.”

“Acceleration = Force/Mass”

5. The three major parts of the space shuttle are (3-The Space Shuttle [3 of 6]) _____.

the orbiter, the paper airplane, and the glider.

two solid rocket boosters, the payload, and the glider.

the main propellant tank, the wings, and the paper airplane.

the orbiter, two solid rocket boosters, and the main propellant tank.

6. After Hubble’s deployment in 1990, scientists realized that the telescope’s (3-Shuttle Missions [3 of 5]) _____ had a flaw.

modular design archives astronomical targets primary mirror

7. Early space capsules (4-Living in Space [1 of 4]) _____.

were very spacious.

contained gyms and cafeterias.

were good for long-term space exploration.

were similar in size to the space you have at your desk.

8. How many countries are members of the ISS team? (4-Space Stations [3 of 9]) 5 16 17 13

9. The eight major planets in our solar system are commonly divided into what two groups? (5-The Planets)

outside and inside

under and above

inner and outside

inner and outer

10. What is a comet? (5-The Planets [4 of 4])

a ball of frozen gas and rock

a chunk of rock, metal, and ice

an asteroid belt Ceres

11. We are able to see the moon from Earth because (5-The Moon) _____.

it is like a sun.

light from the sun reflects off of it, making it visible.

it goes through phases.

it is always full.

12. Galaxies are (1-Modern Astronomy [1 of 4]) & (6-Deep Space) _____.

six trillion miles away from the Earth.

groups of hundreds of millions of stars, cosmic dust, and gas held together by gravity.

all the same size and shape.

the result of supernovas.

13. A pulsar is (6-Pulsars and Quasars).

a star that suddenly becomes very bright and then begins to fade slowly.

a rapidly rotating neutron star.

the center of a very distant galaxy that gives off powerful light and radio waves.

a space colony.

14. In a refracting telescope, the light is (7-Optical Telescopes) so that it forms an image near the back of the tube. reflected mirrored bent scattered

15. In a reflecting telescope, the light is reflected back up the tube to form an image at a point called the (7-Optical Telescopes).

secondary focal point primary focus primary mirror reflection point

16. One of Kepler's laws of planetary motion states that each planet moves (8-Kepler, Newton & Friends) as it passes closest to the sun. slowest fastest in a circular motion

into space

17. If there were no force of gravity, planets would (8-Orbits & Gravity [1 of 3]).

crash into the sun

travel in a straight line out into space

disintegrate

crash into each other

18. Any force tending to produce motion in a body or alter the motion of that body is called (8-Action/Reaction). gravity thrust acceleration velocity

19. How would you slow down a spacecraft in motion? (9-Space Flight)

Step on the brake pedal.

Accelerate.

Apply thrust in the direction that is opposite to the direction in which you are traveling.

Apply friction in the direction that is opposite to the direction in which you are traveling.

20. Power-to-weight ratio is about (10-Power to Weight Ratio).

figuring out how much weight you can lift over your head

comparing the power something produces with the weight it must move

the difference in weight between a pencil and a dictionary

motorcycles and buses

21. In WWII, (10-Early Experiments) used the V2 rocket to carry explosive warheads.

the United States

Italy

Germany

Britain

22. In 1987-88, a Soviet crew spent (11-Live In Space) days in space, setting a record for time in space.

1,365

27

163

366

23. A (6-Space Colony) is a place other than Earth where humans can live.

global surveyor

satellite

space colony

spacelab

24. When a spacecraft uses a planet's gravitational force to boost it toward another target object, this is called (3-The Space Shuttle).

the stone-skipping effect

the cannon effect

launch assist

gravity assist

25. (3-The Space Shuttle) use the powerful boost of a solid fuel rocket to get a launch vehicle off the ground, and they use the on-and-off capabilities of a liquid fuel stage to provide the control to achieve and maintain orbit.

Solid fuel rockets

Liquid fuel rockets

Multi-stage rockets

Space shuttles

"OBSERVATION LOG" Worksheet

Some of the information below will be found in the lesson and the video's in the lesson.

Some of the information will be found in the "Deep Space Explorer" software.

Some will be found at the Internet links: www.wikipedia.org or www.nasa.gov or www.space.com or www.enchantedlearning.com , www.ask.com , www.encyclopedia.com , www.planetary.org

In "Deep Space Explorer", be sure you follow directions **Steps 8 & 9 to get the "Show Info" and the "Online Info"**. You should be able to fill all the lines.

** "**Other Significant Information**" can include: Temperature, Size of Planet, Number of Moons, Mountains, Gases, Atmosphere, Orbit, Nicknames, what type of core, what the planet is made of, clouds, mountains, craters, if it has rings and the number order of the planet. Apparent Magnitude is the size the planet appears from where you are when you use Deep Space Explorer.

Target Object: MERCURY # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: VENUS # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: EARTH # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: MARS # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: JUPITER # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: SATURN # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: URANUS # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: NEPTUNE # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Target Object: PLUTO # _____ Size: _____

Length of Year: _____

Distance from Sun: _____

Two Other Significant Information Items: _____

Stargazer's Log

When you use the software you will need to find some of the information by right clicking on the star and then selecting "INFO". Some information will have to be taken by right clicking on the star and then clicking on "On Line".

1. Star Name: Our Sun

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

2. Star Name: SIRIUS

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

3. Star Name: ALTAIR

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

4. Star Name: PROCYON

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

5. Star Name: **ACTURUS**

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

6. Star Name: **VEGA**

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

7. Star Name: **RIGIL KENTAURUS**

Radius: _____

Distance from Earth: _____

Apparent Magnitude: _____

Temperature: _____ Luminosity: _____

Other significant information from Internet: _____

8. The largest star viewed: _____

9. The farthest star (from Earth) viewed: _____

10. The smallest star viewed: _____

11. The closest star (to Earth) viewed: _____

ROCKET GRADING RUBRIC (10-7-11)

	3 Points Excellent	2 Points Good	1 Points Fair	0 Points Not Done	
A. <u>Engine Mount Assembly:</u> Measured & Glued Correctly, (Blue Tube is even with bottom of White Body Tube), metal hook is in correct location					
B. <u>Fin Assembly:</u> Glued tight, not loose.					
C. <u>Launch Lug:</u> Straight, well glued (Hot Melt), Neatly glued, glue is in-between fins. No glue over hole.					
D. <u>Nose Cone:</u> is loose and not tight when in place.					
E. <u>Shock Chord Mount Assembly:</u> Paper mount is attached flat against tube.					
F. <u>Parachute:</u> Packed correctly: thin, small & spiral wrap.					
G. <u>Parachute & Shock Chord:</u> tied to the bottom of nosecone , glued. Extra cut off end of knot.					
H. <u>Body Tube:</u> In good condition, not smashed or dented.					
I. <u>Finishing Touches:</u> 5 Stickers, NEAT (not wrinkled) & "Name" bottom of Nosecone.					
J. <u>Wadding & Engine with Igniter.</u> Loosely installed at bottom of tube.					
**Extra Credit: Painting (up to 10 pts.)					
<u>TOTAL POINTS:</u> 30					

Extra Credit Painting is defined as: smooth and even coats, complete coverage, no runs or drips (up to 5 points). More than one color, extra detailing like stripes/spirals will get extra points (up to 5 points).

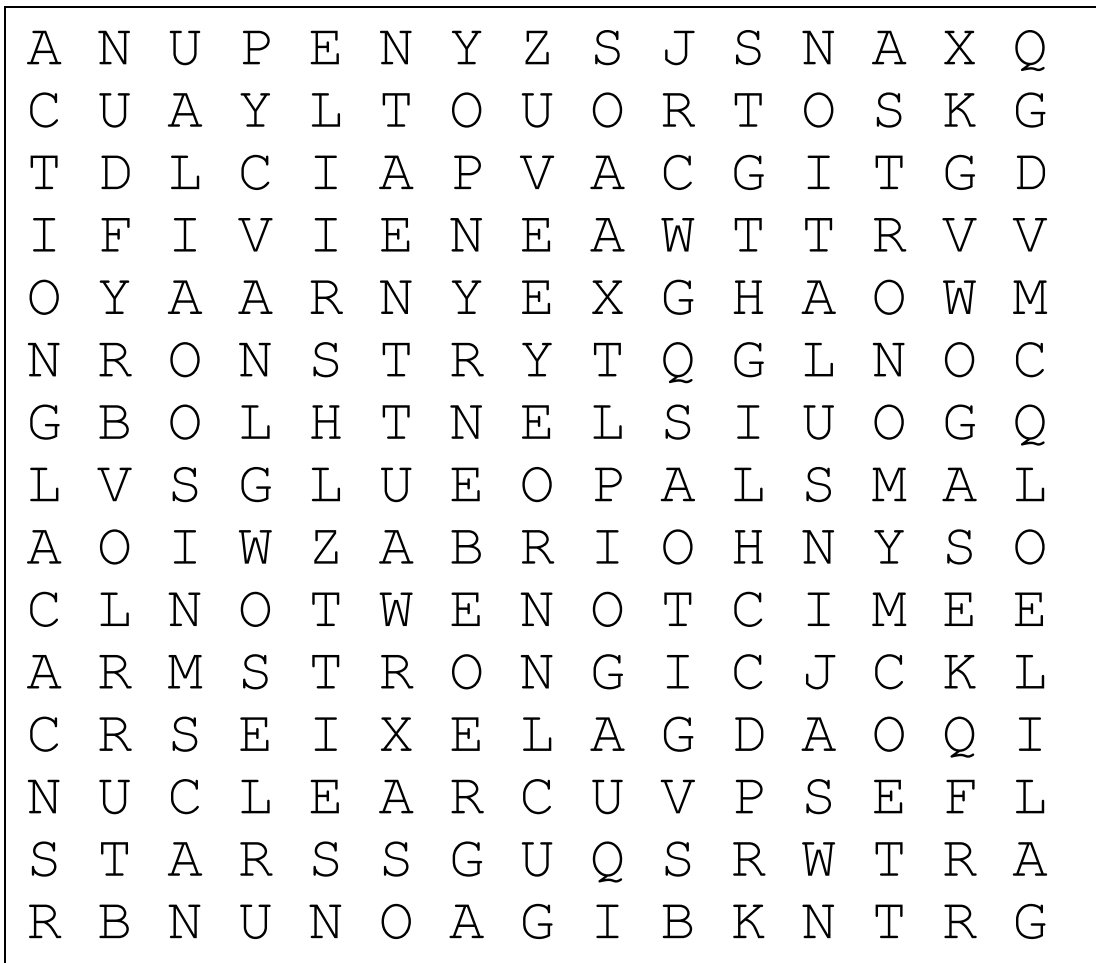
ROCKET GRADING RUBRIC (4/27/11)

	3 Points Excellent	2 Points Good	1 Points Fair	0 Points Not Done	
A. <u>Engine Mount Assembly:</u> Measured & Glued Correctly, (Blue Tube is even with bottom of White Body Tube), metal hook is in correct location					
B. <u>Fin Assembly:</u> in all the way, Glued tight, not loose.					
C. <u>Launch Lug:</u> Straight, well glued (Hot Melt), Neatly glued, glue is in-between fins. No glue over hole.					
D. <u>Nose Cone:</u> is loose and not tight when in place.					
E. <u>Shock Chord Mount Assembly:</u> Paper mount is attached flat against tube. 1" down					
F. <u>Parachute:</u> Packed correctly: thin, small & spiral wrap.					
G. <u>Parachute & Shock Chord:</u> tied to the bottom of nosecone , glued. Extra cut off end of knot.					
H. <u>Body Tube:</u> In good condition, not smashed or dented.					
I. <u>Finishing Touches:</u> 5 Stickers, NEAT & "Name" bottom of Nosecone.					
J. <u>Wadding & Engine with Igniter.</u> Loosely installed at bottom of tube.					
**Extra Credit: Painting (up to 10 pts.)					
<u>TOTAL POINTS:</u> 30					

Extra Credit Painting is defined as: smooth and even coats, complete coverage, no runs or drips (up to 7 points). More than one color, extra detailing like stripes/spirals will get extra points (up to 3).

Space & Rocketry

Wordsearch Version I



ACTION

ALLOY

ARMSTRONG

ASTEROIDS

ASTRONOMY

COPERNICAN

GALEXIES

GALILEO

GAS

GRAVITY

INSULATION

LIGHT

LIGHTYEARS

NEWTON

NOVA

NUCLEAR

PLANETS

REACTION

SPACE

STARS

SUPERNOVA

SPACE & ROCKETRY

Wordsearch version II



ACTION

ALLOY

ARMSTRONG

ASTEROIDS

ASTRONOMY

COPERNICAN

GALEXIES

GALILEO

GAS

GRAVITY

INSULATION

LIGHT S

LIGHTYEARS

NEWTON

NOVA

NUCLEAR

PLANETS

REACTION

PACE

STARS

SUPERNOVA



Space & Rocketry-BBBBBB

V6.0 Study Guide

Circle the correct answers to these questions as you come upon them during your next seven lessons. This study guide can then be used as a resource for your final post test!

1. The study of the universe and all the objects in it is (1- THE EARLY HISTORY OF ASTRONOMY).
history - chemistry - astronomy - meteorology
2. The (1- THE EARLY HISTORY OF ASTRONOMY) system places the sun at the center of the solar system with the planets orbiting it. *Ptolemaic - Tychonic - Galactic - Copernican*
3. The first astronomers were (1- THE EARLY HISTORY OF ASTRONOMY).
Oxford graduates - the astronauts - from ancient civilizations - part of the Renaissance
4. (1- THE EARLY HISTORY OF ASTRONOMY) was the first astronomer to use a telescope to study the universe.
Copernicus - Ptolemy - Galileo - Sir Isaac Newton
5. Groups of stars, cosmic dust, and gas held together by gravity are called (1- MODERN ASTRONOMY).
novas - supernovas - pulsars - galaxies
6. Astronomers study (1-THE EARLY HISTORY OF ASTRONOMY-Screen 6 & Modern Astron.) to identify patterns which give meaning to the universe.
planets - stars - galaxies - all of the answers
7. New theories in astronomy are often (1- Lesson Review: The History of Space Theories) when first proposed.
enthusiastically accepted - rejected - proven incorrect - not related to facts
8. The way rockets work is explained by Newton's third law, "For every (2-NEWTONS LAWS & ROCKETRY) there is an equal and opposite _____".
Action, reaction - friction, inertia - temperature degree - acceleration, motion
9. Dr. Robert Goddard launched the first (2-THE HISTORY OF ROCKETS).
space shuttle - Skylab - liquid-propellant rocket - lunar lander
10. A rocket moves (2-NEWTONS LAWS & ROCKETRY) its exhaust.
in the same direction as - parallel to - away from - perpendicular to
11. In July of 1969, Neil Armstrong and Edwin "Buzz" Aldrin, Jr. (2-THE HISTORY OF ROCKETS).
were the first to orbit the Earth - walked on the moon - flew the first space shuttle mission - landed on Mars
12. In 1898, (2-THE HISTORY OF ROCKETS), a Russian schoolteacher, was one of the first to write about the possibility of rocket flight in space. *Konstantin Tsiolkovsky - Robert Goddard - Hermann J. Oberth - Yuri Gagarin*
13. (2-THE HISTORY OF ROCKETS) worked with long-range liquid rockets, and his writings inspired other scientists and engineers. *Konstantin Tsiolkovsky - Robert Goddard - Hermann J. Oberth - Yuri Gagarin*
14. Blowing up a balloon and letting it jet around the room as air escapes is a demonstration of (2-NEWTONS LAWS & ROCKETRY).
planetary orbits - the action/reaction law - buoyancy - quantum mechanics
15. The space shuttle is (3- THE SPACE SHUTTLE).

***a reusable space vehicle - a combination of a rocket and an airplane -
capable of carrying heavy payloads - all of the answers***

16. Sally K. Ride, the (3- SHUTTLE MISSIONS), was on the seventh space shuttle mission.
ground control manager - hostess – first American women astronaut - Congressional liaison
17. In order to be able to study Earth, the sun, and humans' ability to live and work in space,
(4- LIVING IN SPACE) were developed and launched.
Saturn v rockets - the Mercury spacecraft - space stations - starships
18. In order to live and work in space, your "home" must be (4- LIVING IN SPACE): it must have or
be able to create everything necessary to support human life.
interdependent - self supporting - dormant - internally baffled
19. The inner planets are (5- THE PLANETS).
giant gas balls - small and have hard surfaces made of iron and rock - made of ice and hail - asteroids
20. The outer planets are (5- THE PLANETS).
giant balls of gas - collections of small rocky objects – "dirty" snowballs - small and made of iron and rock
21. The sun is actually (5- THE SUN).
a giant nuclear reactor - a planet - made of frozen methane - an alien spaceship
22. (5- THE SUN) holds planets in a curved path around the sun.
fusion - fission - gravity - gamma radiation
23. The (5- THE PLANETS) is a collection of small planet-like objects traveling around the sun
between the inner and outer planets.
Milky Way - asteroid belt - Mars Observatory - inversion zone
24. It takes about (5- THE SUN) for light from the sun to reach the Earth.
eight hours - eight days - eight years - eight minutes
25. Scientists measure distances in space using (6- DEEP SPACE).
kilometers - star multiples - light years - the galactic constant
26. A (6- NOVAS AND SUPERNOVAS) is a star that suddenly becomes very bright and then begins
to fade slowly. ***nova - nebula - pulsar - supernova***
27. A (6- NOVAS AND SUPERNOVAS) is a star that becomes very bright and explodes.
nova - nebula - pulsar - supernova
28. Powerful computer systems developed for space exploration and now adapted for use in
industry are examples of (7- SPACE PRODUCTS).
space stations - space spin offs - quantum theory - space colonization
29. New alloys developed in space are often (7- SPACE PRODUCTS- TECHNOLOGY TEXTBOOK)
than alloys processed on Earth. ***easier to make - harder to make - more dense - less effective***
30. Which of the following are examples of space spin-offs? (7- SPACE PRODUCTS- TECHNOLOGY
TEXTBOOK)
forest fire mapping systems - battery powered tools - airline seat cushions - all of the above

Tech-Design

Space & Rocketry

Beginning, Advanced, Comprehensive Levels

Module Guide

Edition 1

37663-E0

FIRST EDITION

First Printing, April 2005

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DIRECTIONS

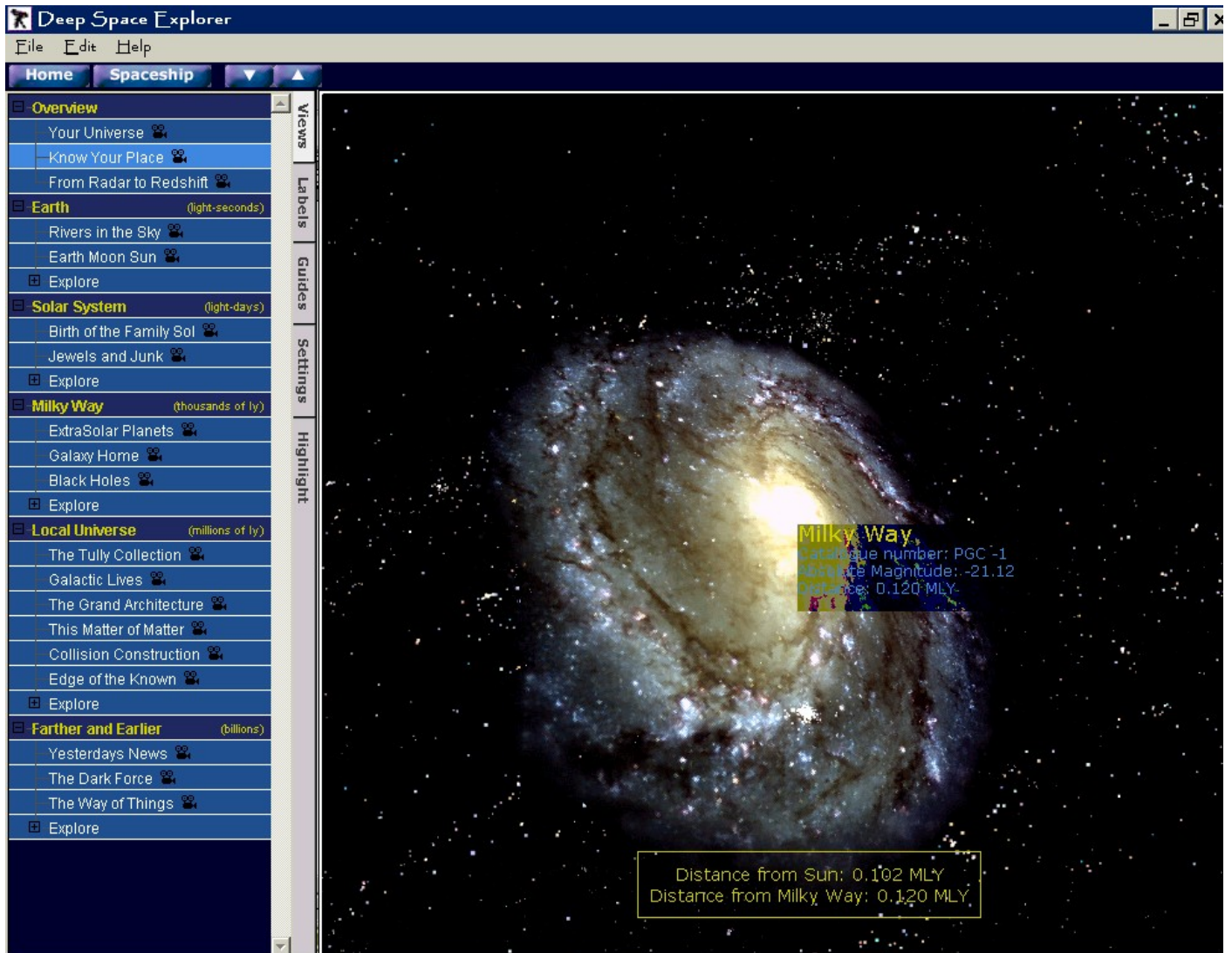
Beginning Level

Lesson 3, How to Start Deep Space Explorer

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.
2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.
3. If you have any questions, ask your teacher or look in the *Deep Space Explorer* User's Guide.
4. Complete the next section, **EXPLORING SPACE**.

EXPLORING SPACE

1. *Deep Space Explorer* should be on your screen. If it isn't, click on the *Application Launch* button and select *Deep Space Explorer* from the menu.
2. To familiarize yourself with the *Deep Space Explorer* interface, read pages 12-18 in the User's Guide. Perform the **Location Exercises** on pages 17-18.
3. If necessary, click the *Home* button at the top left area of the screen. Then click **Your Universe** in the *Overview* section of the *Navigation Bar* to **watch a short movie**. Click the *X* in the movie window to close the window, when the movie is over.

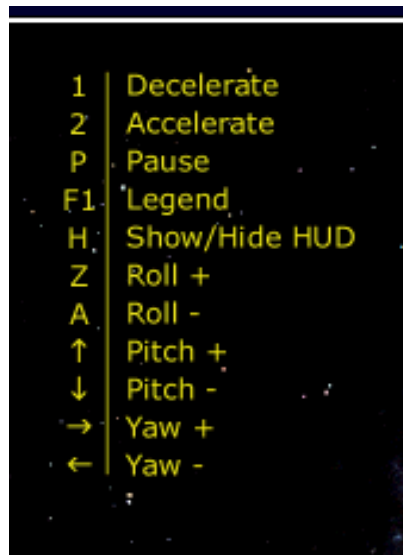


4. Now click the *Spaceship* button at the top left area of the screen. You are now at the helm of the *Deep Space Explorer* spaceship and should see space moving past you as you cruise toward the Milky Way Galaxy.

5. Press the *P* key on the keyboard to pause the space flight. Your screen should display the names of various celestial objects and bodies. At the top left of the spaceship window there is a legend that lists the keyboard keys that serve as your controls for the movements of the spaceship.

6. Take a few moments to study the legend. Then press the *P* key on the keyboard to resume your space travel. Practice using the different keyboard keys to move through space.

7. If you want to stop at a particular area, click the *Spaceship* button again. When you are ready to resume your flight, click the *Spaceship* button once more.



8. When you have become comfortable with your piloting skills, click *Home* at the top left area of the screen.

9. To exit *Deep Space Explorer*, click the *X* button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

10. Once you've exited the software, go to the next section in the presentation.

Lesson 4, Viewing the International Space Station

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.

2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.

3. Find the section of the *Navigation Bar* titled Earth. Click the + sign next to *Explore* in

that section.



4. Select *Space Station Alpha* from the expanded menu. Then click the *Views* tab to minimize the Navigation Bar. You should be viewing an image of the International Space Station orbiting the Earth.



5. Click and drag the space station in its orbit.

6. Click the *Views* tab to open up the *Navigation Bar*. Click ***Know Your Place*** in the *Overview* section to **watch a short movie**. Click the X in the movie window to close the window.

7. Now click ***Rivers in the Sky*** in the *Earth* section of the *Navigation Bar* to **watch a short movie**.

8. When the movie is over, click the *X* in the movie window to close the window.
9. To exit *Deep Space Explorer*, click the *X* button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.
10. Once you've exited the software, go to the next section in the presentation.

Lesson 5, Exploring the Solar System

You will use *Deep Space Explorer* to take a closer look at our solar system. While you are exploring, complete the **OBSERVATION LOG**. Ask your instructor for a blank log

form before entering the solar system.

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.
2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.
3. In the *Solar System* section of the *Navigation Bar*, click **Birth of the Family Sol** to watch a short movie about the beginnings of our solar system.
4. When the movie is over, click the *X* in the movie window to close the window.
5. Click **Jewels and Junk in the Solar System section** of the *Navigation Bar* to watch a short movie about the planets.
6. When the movie is over, click the *X* in the movie window to close the window.
7. If necessary, click the + sign next to *Explore* in the *Solar System* section of the *Navigation Bar*. Then click *Mercury*. (For a larger image, click the *Views* tab.)
8. Right-click on the planet and select **Show Info** from the shortcut menu. Information regarding Mercury appears on the screen. Enter the information in your **OBSERVATION LOG**.

9. For more information on Mercury (if you have Internet access), right-click on the planet and select **Online Info**. When you are finished, click the "X" at the top right corner of the Internet browser to close the browser.

10. Repeat steps 8 & 9 to view and learn more about each of the planets. (To return to the full-size *Navigation Bar*, click the *Views* tab again.)

11. After you have viewed each of the planets, click **Inner Solar System**. Then click the *Spaceship* button to navigate your way through the planets.



12. To end your spaceflight, click either the **Home** button or any of the planet names in the *Navigation Bar*.

13. Next, click ***Outer Solar System***, then repeat steps 11 and 12.

14. You may also use these web sites to find information on the planets. www.Space.com , www.NASA.gov , www.encyclopedia.com , www.dictionary.com , www.wikipedia.org

14. To exit *Deep Space Explorer*, click the X button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

15. Once you've exited the software, go to the next section in the presentation.

Lesson 6, Exploring Deep Space

You will use *Deep Space Explorer* to take a look at the stars. While you are exploring, complete the **STARGAZER'S LOG**. Ask your instructor for a blank log form before entering deep space.

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.
2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.
3. In the *Milky Way* section of the *Navigation Bar*, click *Galaxy Home* to watch a short movie about stars and the galaxy.
4. When the movie is over, click the *X* in the movie window to close the window.
5. If necessary, click the + sign next to *Explore* in the *Milky Way* section of the *Navigation Bar*. Then select *Sun in Milky Way*.
6. Right-click on the sun and select *Centre Sun* from the shortcut menu.
7. Use the *Decrease Elevation* button to move through the Milky Way and get closer to our sun. When you reach approximately 175 au, you will be entering our solar system. Go even closer to the sun until you reach the inner solar system, at approximately 1.805 au.
8. Right-click on the sun again and select *Show Info* from the shortcut menu. On the worksheet, fill in the requested information about the sun.
9. Get as close to the sun as you dare! When you get to approximately .016 au, you can see sunspots. Use the *Location Scroller* to view different areas of the sun. Then right-click on the sun and select *Online Info* from the shortcut menu. Add to your worksheet any data you find interesting.
10. Now, click *Local Stars* in the *Milky Way* section of the *Navigation Bar*. Using either the *Decrease Elevation* button or the *Spaceship*, get a little closer to the stars.
11. Repeat steps 5-8 for five stars of your choice. Make sure you complete each corresponding section of the **STARGAZER'S LOG** as you view and read about these stars.

12. If you have time and wish to view any other deep space objects, browse the *Navigation Bar* and take some deep space journeys.

13. To exit *Deep Space Explorer*, click the *X* button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

14. Once you've exited the software, go to the next section in this Module Guide,

Rocket Simulation.

Lesson 6, Rocket Simulation

In this activity, you will get the opportunity to build your own rocket using *RocketSim*. Click on the **Resource** button and select *RocketSim*.

- When *RocketSim* begins, you are prompted to name your rocket. Enter a name and select *Go*.

Welcome to *RocketSim*. This program is a simulation for building and testing model rockets.

- To use *RocketSim*, you first need to configure your rocket on the "Build Your Rocket" screen. Change the configuration (size) of the Cone, Body, and Fins by dragging the slider.

- **Thrust:** Move the slider to increase or decrease the engine size and thrust for a rocket.

- **Time Delay:** Move the slider to increase or decrease the time between engine shutdown and parachute open.

- **Center of Gravity (CG) and Center of Pressure (CP):** *RocketSim* calculates CG and CP automatically, which are represented by symbols shown on the rocket's body on the "Build Your Rocket" screen.

- After completing your rocket's configuration, click the **Build** button. The rocket is built to your specifications.

- The "Choose Your Colors" screen appears. Here you can decorate your rocket. Select the color for each part and click on the **Apply** button to adopt the color.

- When you are finished decorating your rocket, click on the **Launch** button.

- Click on **Armed** key to arm the system. Click on the **red Launch** button to launch the rocket. When you have finished the launch-landing process, click on the

Rocket Data button to read or print your report. You can modify your design by clicking on the **Try Again** button.

NOTE: *RocketSim* may run slowly on some computers. The performance will depend on CPU speed and how much RAM a computer has. The number of applications running on a computer can also affect performance. It is suggested to run *RocketSim* on a computer with a Pentium 4/1Ghz processor (minimum). It will

run on computers with other processors but with varying results.

- When you are finished, exit *RocketSim* and go to the next section in the

Tech-Design

Space & Rocketry

Beginning, Advanced, Comprehensive Levels

Module Guide

Edition 1

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INTRODUCTION

This Module Guide contains the directions that you will use when you are completing lesson activities. The multimedia curriculum will direct you to this guide and a specific activity. The directions are titled and are organized by Lesson. The table of contents will guide you to the appropriate page.

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DIRECTIONS

Beginning Level

Lesson 3, How to Start Deep Space Explorer

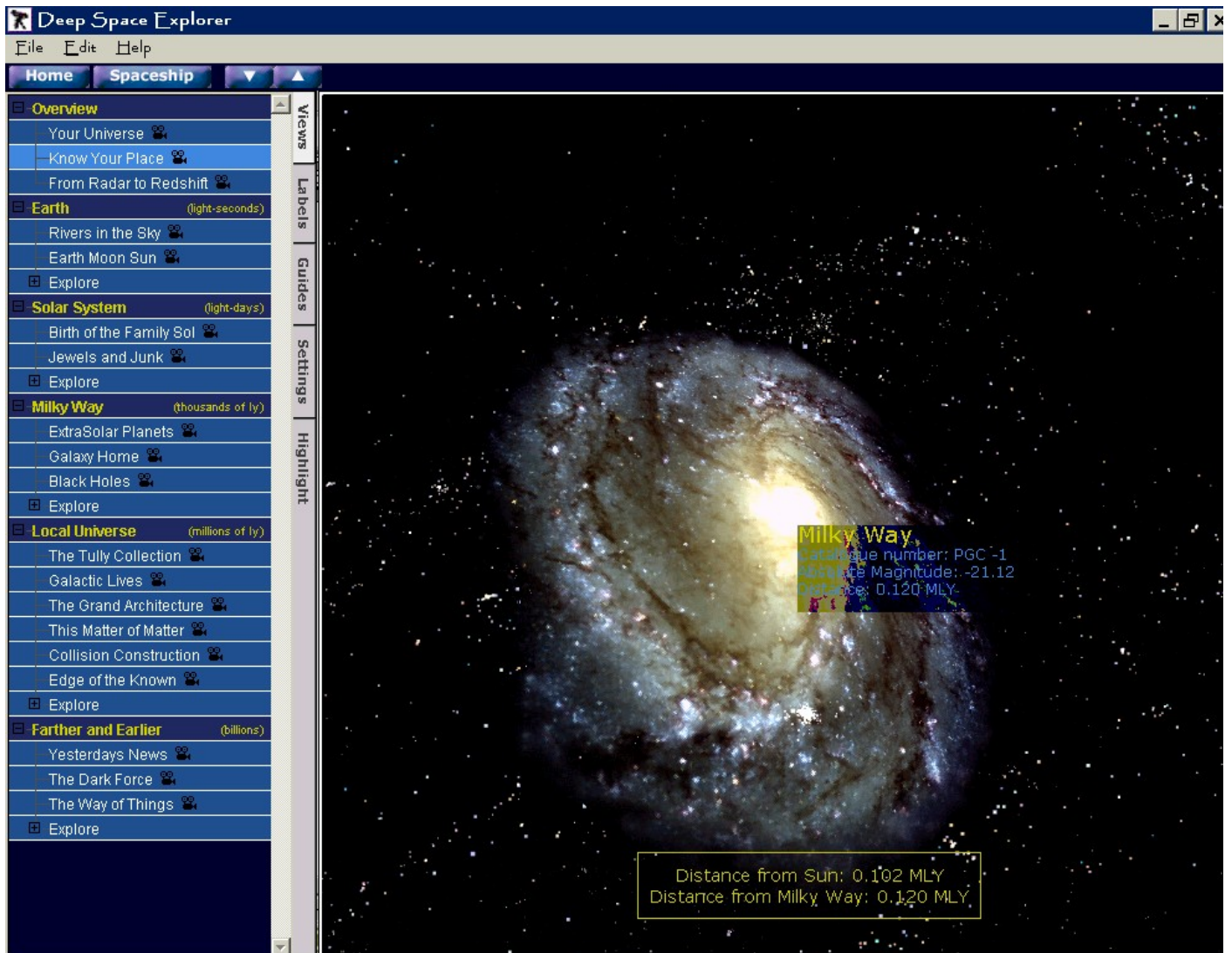
1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.
2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.
3. If you have any questions, ask your teacher or look in the *Deep Space Explorer* User's Guide.
4. Complete the next section, **EXPLORING SPACE**.

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EXPLORING SPACE

1. *Deep Space Explorer* should be on your screen. If it isn't, click on the *Application Launch* button and select *Deep Space Explorer* from the menu.
2. To familiarize yourself with the *Deep Space Explorer* interface, read pages 12-18 in the User's Guide. Perform the **Location Exercises** on pages 17-18.
3. If necessary, click the *Home* button at the top left area of the screen. Then click *Your Universe* in the *Overview* section of the *Navigation Bar* to watch a short movie. Click



the X in the movie window to close the window, when the movie is over.

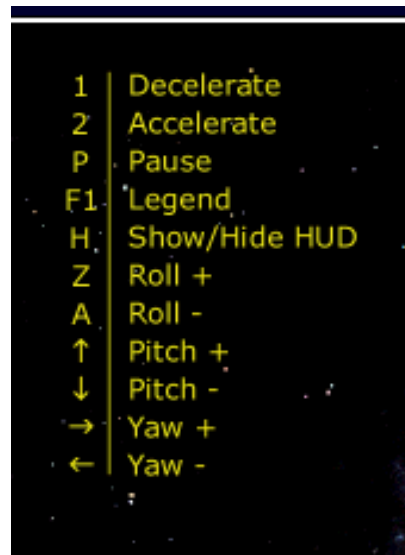
4. Now click the *Spaceship* button at the top left area of the screen. You are now at the helm of the *Deep Space Explorer* spaceship and should see space moving past you as you cruise toward the Milky Way Galaxy.

5. Press the *P* key on the keyboard to pause the space flight. Your screen should display the names of various celestial objects and bodies. At the top left of the spaceship window there is a legend that lists the keyboard keys that serve as your controls for the movements of the spaceship.

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6. Take a few moments to study the legend. Then press the *P* key on the keyboard to resume your space travel. Practice using the different keyboard keys to move through space.

7. If you want to stop at a particular area, click the *Spaceship* button again. When you are ready to resume your flight, click the *Spaceship* button once more.



8. When you have become comfortable with your piloting skills, click *Home* at the top left area of the screen.

9. To exit *Deep Space Explorer*, click the *X* button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

10. Once you've exited the software, go to the next section in the presentation.

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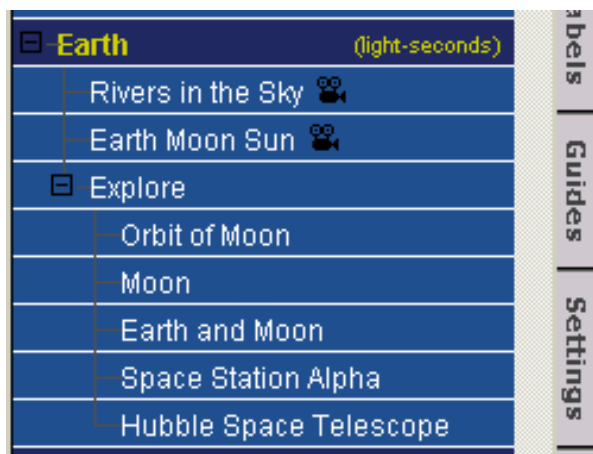
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Lesson 4, Viewing the International Space Station

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.

2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.

3. Find the section of the *Navigation Bar* titled Earth. Click the + sign next to *Explore* in that section.



4. Select *Space Station Alpha* from the expanded menu. Then click the *Views* tab to minimize the *Navigation Bar*. You should be viewing an image of the International Space Station orbiting the Earth.



5. Click and drag the space station in its orbit.

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6. Click the *Views* tab to open up the *Navigation Bar*. Click *Know Your Place* in the *Overview* section to watch a short movie. Click the *X* in the movie window to close the window.

7. Now click *Rivers in the Sky* in the *Earth* section of the *Navigation Bar* to watch a short movie.

8. When the movie is over, click the *X* in the movie window to close the window.

9. To exit *Deep Space Explorer*, click the *X* button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

10. Once you've exited the software, go to the next section in the presentation.

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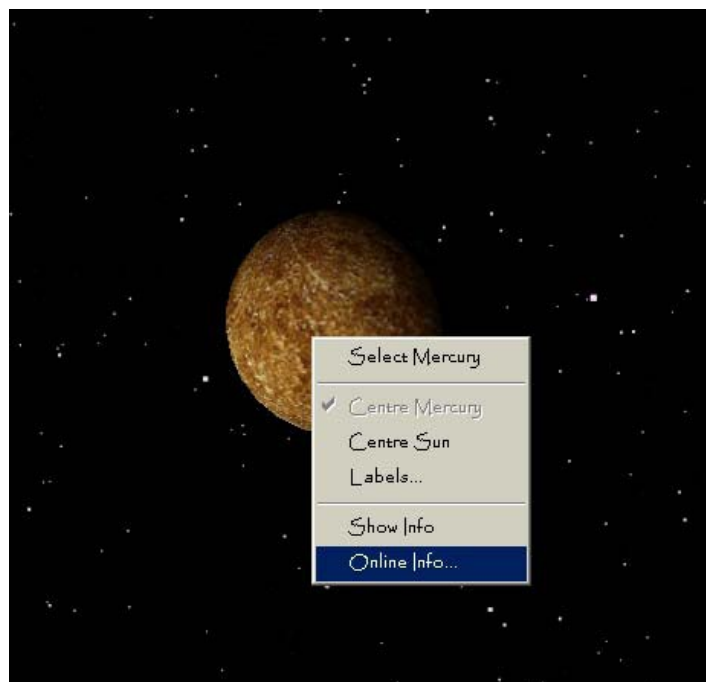
Lesson 5, Exploring the Solar System

You will use *Deep Space Explorer* to take a closer look at our solar system. While you are exploring, complete the **OBSERVATION LOG**. Ask your instructor for a blank log form before entering the solar system.

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.
2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.
3. In the *Solar System* section of the *Navigation Bar*, click *Birth of the Family Sol* to watch a short movie about the beginnings of our solar system.
4. When the movie is over, click the *X* in the movie window to close the window.
5. Click *Jewels and Junk* in the *Solar System* section of the *Navigation Bar* to watch a short movie about the planets.
6. When the movie is over, click the *X* in the movie window to close the window.
7. If necessary, click the + sign next to *Explore* in the *Solar System* section of the *Navigation Bar*. Then click *Mercury*. (For a larger image, click the *Views* tab.)

8. Right-click on the planet and select *Show Info* from the shortcut menu. Information regarding Mercury appears on the screen. Enter the information in your **OBSERVATION LOG**.

9. For more information on Mercury (if you have Internet access), right-click on the



planet and select *Online Info*.
When you are finished, click the

X at the top right corner of the Internet browser to close the browser.

10. Repeat steps 8 & 9 to view and learn more about each of the planets. (To return to the full-size *Navigation Bar*, click the *Views* tab again.)

11. After you have viewed each of the planets, click *Inner Solar System*. Then click the *Spaceship* button to navigate your way through the planets.

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12. To end your spaceflight, click either the *Home* button or any of the planet names in the *Navigation Bar*.

13. Next, click *Outer Solar System*, then repeat steps 11 and 12.

14. To exit *Deep Space Explorer*, click the X button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

15. Once you've exited the software, go to the next section in the presentation.

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Lesson 6, Exploring Deep Space

You will use *Deep Space Explorer* to take a look at the stars. While you are exploring, complete the **STARGAZER'S LOG**. Ask your instructor for a blank log form before entering deep space.

1. Insert the *Deep Space Explorer* CD-ROM in the CD-ROM drive of your computer.

2. Click the *Application Launch* button and select *Deep Space Explorer* from the menu.

3. In the *Milky Way* section of the *Navigation Bar*, click *Galaxy Home* to watch a short movie about stars and the galaxy.

4. When the movie is over, click the X in the movie window to close the window.

5. If necessary, click the + sign next to *Explore* in the *Milky Way* section of the *Navigation Bar*. Then select *Sun in Milky Way*.

6. Right-click on the sun and select *Centre Sun* from the shortcut menu.

7. Use the *Decrease Elevation* button to move through the Milky Way and get closer to our sun. When you reach approximately 175 au, you will be entering our solar system. Go even closer to the sun until you reach the inner solar system, at approximately 1.805 au.

8. Right-click on the sun again and select *Show Info* from the shortcut menu. On the worksheet, fill in the requested information about the sun.

9. Get as close to the sun as you dare! When you get to approximately .016 au, you can see sunspots. Use the *Location Scroller* to view different areas of the sun. Then right-click on the sun and select *Online Info* from the shortcut menu. Add to your worksheet any data you find interesting.

10. Now, click *Local Stars* in the *Milky Way* section of the *Navigation Bar*. Using either the *Decrease Elevation* button or the *Spaceship*, get a little closer to the stars.

11. Repeat steps 5-8 for five stars of your choice. Make sure you complete each corresponding section of the **STARGAZER'S LOG** as you view and read about these stars.

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12. If you have time and wish to view any other deep space objects, browse the *Navigation Bar* and take some deep space journeys.

13. To exit *Deep Space Explorer*, click the X button at the top right corner of the screen. Remove the CD-ROM from the CD-ROM drive and put it back in the case. Return the CD-ROM to the *Deep Space Explorer* box so that it is available next time you need it.

14. Once you've exited the software, go to the next section in this Module Guide,

Rocket Simulation.

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Lesson 6, Rocket Simulation

In this activity, you will get the opportunity to build your own rocket using *RocketSim*.

Click on the **Resource** button and select *RocketSim*.

• When *RocketSim* begins, you are prompted to name your rocket. Enter a name and select *Go*.

Welcome to *RocketSim*. This program is a simulation for building and testing model rockets.

• To use *RocketSim*, you first need to configure your rocket on the "Build Your Rocket" screen. Change the configuration (size) of the Cone, Body, and Fins by dragging the slider.

• **Thrust:** Move the slider to increase or decrease the engine size and thrust for a

rocket.

- **Time Delay:** Move the slider to increase or decrease the time between engine shutdown and parachute open.
- **Center of Gravity (CG) and Center of Pressure (CP):** RocketSim calculates CG and CP automatically, which are represented by symbols shown on the rocket's body on the "Build Your Rocket" screen.
- After completing your rocket's configuration, click the **Build** button. The rocket is built to your specifications.
- The "Choose Your Colors" screen appears. Here you can decorate your rocket. Select the color for each part and click on the **Apply** button to adopt the color.
- When you are finished decorating your rocket, click on the **Launch** button.
- Click on **Armed** key to arm the system. Click on the **red Launch** button to launch the rocket. When you have finished the launch-landing process, click on the **Rocket Data** button to read or print your report. You can modify your design by clicking on the **Try Again** button.

NOTE: *RocketSim* may run slowly on some computers. The performance will depend on CPU speed and how much RAM a computer has. The number of applications running on a computer can also affect performance. It is suggested to run *RocketSim* on a computer with a Pentium 4/1Ghz processor (minimum). It will run on computers with other processors but with varying results.

- When you are finished, exit *RocketSim* and go to the next section in the