

Lesson Title: Problems In Space

Curriculum: Science

Grade-Level Span: 5-8

Prerequisites: Basic knowledge of the Internet, spreadsheet, database and word processing.

Washington State EALR Correlation:

Communication: 2.1, 2.2, 2.4

Science: 1.4, 2.2, 3.1, 3.3, 4.1, 4.2, 4.3

Writing: 1.2, 2.1, 3.1, 3.2, 3.3, 3.4, 3.5

National Education Technology Standards for Students – Performance Indicators:

Grades 3-5: 4, 5, 6, 7, 9, 10

Grades 6-8: 5, 6, 7, 8, 10

Purpose:

1. Use problem strategies to answer 3 problems pertaining to the 9 planets and the moon.
2. Use technology as a tool to conduct and evaluate research and then to communicate ideas effectively.
3. Use technology as an integral part of the problem solving process.

Description: This lesson involves students in the process of problem solving. Students will focus on the theme of “space”. They are also gathering data, analyzing information and communicating ideas through the use of technology. Students will collaborate with their classmates.

Activities:

1. Use the Internet to research the following information: Distance from the sun, diameter, average temperature, surface areas and atmosphere.
2. Use the collected data and complete a database on planet characteristics. A solution to problem 1 will then be word-processed.
3. Using a spreadsheet, students will perform calculations that will indicate their weight on the 9 planets
4. Evaluate spreadsheet data on the planets and realize that the more mass a planet has, the more gravity it has.
5. Use the Internet to collect data on the moon phases.
6. Create a spreadsheet showing the correct name of the moon phases and the days on which they occur
7. Discover that the revolution of the moon around the earth causes the moon to appear to change shape.
8. Evaluate the information from the database and spreadsheet to solve and word process the solutions to three specific real world problems

Tools and Resources:

Computer with Internet access.

Spreadsheet application

Database and word processing applications

Procedures:

Problem 1:

If the Earth were no longer able to sustain life, which planet would you suggest we move to and why? In groups of 2–4, students research the planet characteristics, compile a database, collaborate and word process the solution to the process.

Problem 2

How much would you weigh on the planets? Why is your weight different on each planet? Groups of 2-4 are given the percent of gravity for the planets. Next, they enter data into a spreadsheet application and use this spreadsheet to determine a solution to the given problem. Students collaborate and word process solution.

Problem 3

Why are you able to see a Full Moon one night and a Crescent Moon another night? Students use the Internet to research moon phases. Students will enter the name of the phase and the day it occurs on into a spreadsheet and create a graph. Students will use the graph and other information from the Internet to word process the solution to problem 3.



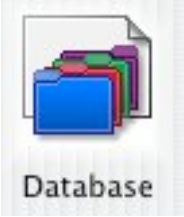
Assessment:





Students will be assessed using a rubric (created by each teacher), which identifies the degree of success to which they investigated and solved each problem successfully

Internet Resources:

- <http://dept.physics.upenn.edu/nineplanets/>
- <http://www.onlineconversion.com/>
- <http://www.digitaldutch.com/unitconverter/>
- <http://aa.usno.navy.mil/data/> (moon phases data)
- <http://home.hiwaay.net/~krcool/Astro/moon/moonphase/> (moon identity)

Software Applications to use:

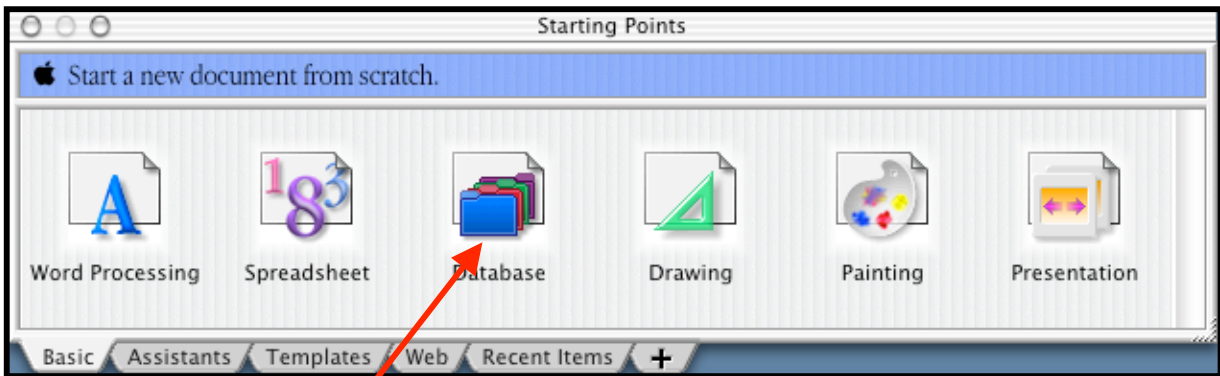
Internet applications:   **Database** 

Spreadsheets:   **Word-processing**  

Problems In Space

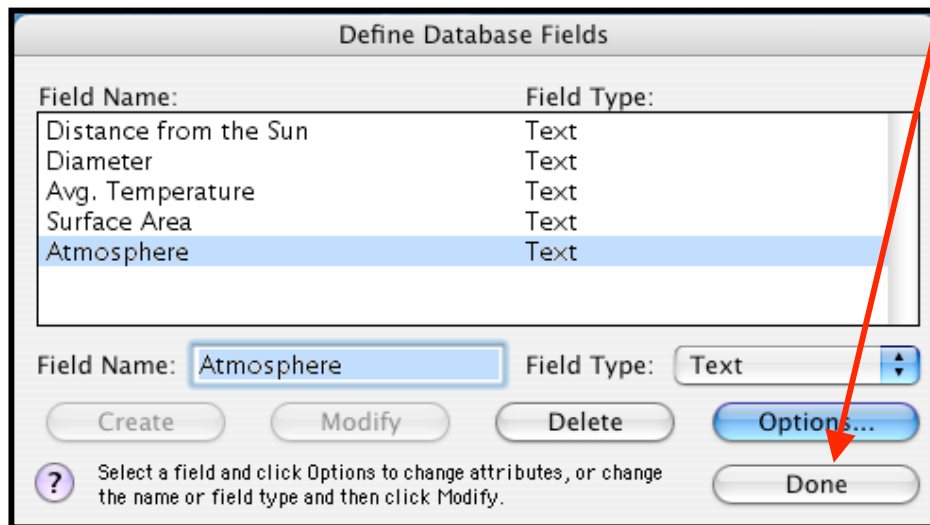
Worksheet examples:

Appleworks database.

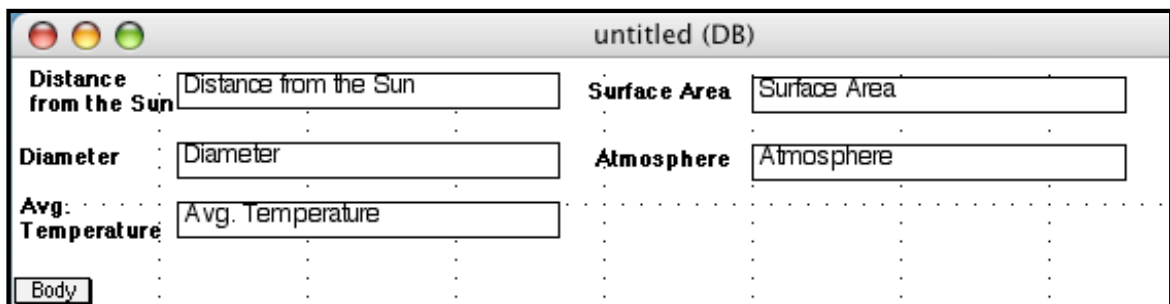


To create an Apple database:

1. Open Appleworks
2. Select the Database icon. When the Define Database Fields window appears, create the the fields in which your information will appear. When finished click the Done button.



3. From the Layout menu, select layout and arrange your fields in the order and style you would like.





4. Launch either Internet Explorer  or  Safari and type the website for the 9 planets (<http://dept.physics.upenn.edu/nineplanets>)





Select the planet you wish to get information from.

orbit: 57,910,000 km (0.38 AU) from Sun
diameter: 4,880 km
mass: 3.30e23 kg

- [Introduction](#)
- [What's New](#)
- [Express Tour](#)
- [Overview of the Solar System](#)
- [The Sun](#)
- [Mercury](#)
- [Venus](#)
- [Earth](#)
 - [The Moon](#)
- [Mars](#)
 - [Phobos](#)
 - [Deimos](#)
- [Jupiter](#)
 - [Metis](#), [Adrastea](#), [Amalthea](#) and [Thebe](#)

* To convert distances from metric to the English system. Use one of the websites from above. A solution to problem 1 can then be word-processed using M.S.  Word or Applework's  word processor

6. Open M.S. Excel  or Appleworks  and create a spreadsheet to analyze the weight of each on the nine planets. Students should be able to recognize that the greater a planet's mass, the greater the gravity.

7. For problem 3, students should use either Appleworks or M.S. Excel to create a spreadsheet showing the correct name of the moon's phases and the days on which they will occur for a given month.

Use the following web pages to answer Problem 3.

- <http://aa.usno.navy.mil/data/>
- <http://home.hiwaay.net/~krcool/Astro/moon/moonphase/>

8. Students should discover that the moon's revolution around the Earth causes the moon to appear to change shape. What is the cause?