Space Survey: Researching Space

Target Standard

Data Analysis and Probability

• Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them
• Select and use appropriate statistical methods to analyze data
• Develop and evaluate inferences and predictions that are based on data

Prior Knowledge

• Graphing skills
• Data collection and interpretation strategies
• Summarizing and communication skills
• Word processing (optional)
• Electronic graphing (optional)
• Electronic presentations (optional)

Teaching Plan

Purpose

To apply survey strategies and data analysis related to space facts. Students conduct actual surveys related to knowledge of stars.

Materials

Graph paper
Post-it™ notes
Chart paper or poster board
Markers, rulers, pencils
Optional software: graphing (excel), word processor, presentation (powerpoint)

Implementation

Guided Research

1. Guide students through the research planning process using a single question. Teacher should carefully discuss the format options for posing a question (open ended or objective (a, b, c, d) options).
2. Complete the Mission together by surveying the class and following the steps of the Space Survey Research Project Report.
3. Divide students into teams and have them complete the Space Survey Research Plan and collect and record their data.
5. Using poster board, have each team complete a draft report. Compare and contrast the various conclusions and interpretations with the class.
6. Complete the Space Survey Research Assessment.

Independent Research

1. Working in pairs, students select a research question. (See list of possible questions).
2. Teacher should carefully discuss the format options for posing a question (open ended or objective (a, b, c, d) options).
3. Together, teacher and class should set a timeline for the Mission. A posting of the deadline should be clear on all assessments and reports. By planning
from the deadline backwards a date should be set for completion of the plan, report, and presentation.

4. Students should complete the planning sheet and turn in for teacher review. Revisions may be needed before the students are ready to begin working.

5. After completing the survey, students will need work time to organize and analyze their data.

6. Students should draft their reports before gluing to posters or printing from computers. Teachers should assist in editing as possible. (Older children from other classrooms may be able to partner up with research teams to assist in this process.)

7. Students should complete the Space Survey Research Assessment sheet before presenting their projects.

8. Teachers assess student performances as their team presents.

**Assessment**

Students will design a poster or a Microsoft PowerPoint presentation of their research project. They should include all information outlined in the Space Survey Research Report. All information will be shared with an authentic audience and will be evaluated for accuracy, detail, communication skills, organization and interpretation.

**Possible Research Questions:**

What is the closest star? (Alpha Centauri)

How many days does it take the Earth to travel around the sun? (365\(\frac{1}{4}\))

What causes the seasons? (Earth’s tilt)

How many constellations are in the sky? (88)

How many stars can be seen with the naked eye? (3000)

What is the brightest star? (Sirius)

What color are the stars? (White, red, yellow, and blue)

How many planets are in our solar system? (9)

Name the planets in our solar system. (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)

What is a comet? (a dirty snowball)

Do you think there is life on other planets? (Answers will vary)

What is an asteroid? (a rock)

How old is the sun? (4.5 billion years)

What are sun spots? (an area of cooler surface temperature)

How hot is the sun’s core? (15 million degrees)

What is an asterism? (a grouping of stars commonly wrongly referred to as a constellation)

Are the brightest stars the closest? (no)

What color of star is the hottest? (blue)

Why are stars different colors? (different temperatures)

Why do stars twinkle? (earth’s atmosphere)

Do all planets have moons? (no)

What planets are larger than Earth? (Jupiter, Saturn, Uranus, and Neptune)

What planets have days longer than 24 hours? (Venus, Mars, Pluto)

What are stars made of? (gas, H and He)

Can you land on a star? (no)

What is a supernova? (a dying star)

What is a red giant? (a main sequence star like our sun)

What is a black hole? (a dead massive star)

What is the astronomical term for the distance light travels in a year? (a light year)

**students may generate their own questions and answers!
Space Survey Research Project Report

**Question:** What was the key question you researched?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Materials:** What materials did you use to conduct your research and complete your report?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Procedure:** What steps did you take to complete your project?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Data collection:** How did you gather your information?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Data organization:** How did you clearly communicate your data?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Conclusion:** What trends or patterns did you see in your data?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________

**Implications:** What did you learn from your data?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

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Space Survey Research Project Plan

Who will you survey? ____________________________________________________

When? ______________________ Where? _______________________________

How will you state your question? ___________________________________________
_______________________________________________________________________

What type of answers do you expect? (Multiple choice, open-ended, yes/no, etc.)
_______________________________________________________________________

What procedure will you use to gather your information?
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

What materials will you need?
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

What jobs need to be done? How will you share them?
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

How do you plan on sharing your information with others?
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

What help do you need to complete this mission?
_______________________________________________________________________
_______________________________________________________________________
Space Survey Research Project Assessment

Mission Rating Scale:
1 = Mission needs to be revised
2 = Mission in progress
3 = Mission accomplished
4 = Exceeds Mission expectations

Survey Plan:

Survey Report:
  Question: What was the key question you researched? ________
  Materials: What materials did you use to conduct your research and complete your report? ________
  Procedure: What steps did you take to complete your project? ________
  Data collection: How did you gather your information? ________
  Graphing/Data organization: How can you communicate your data easily? What type of graph would you include? ________
  Conclusion: What trends or patterns did you see in your data? ________
  Implications: What did you learn from your data? ________

Mission Presentation: (poster or computer) ________
  Graphics: ________
  Spelling and grammar: ________
  Organization: ________
  Effective communication: ________

Self evaluation of Space Survey Research Assessment: ________

Teamwork/cooperation: ________

Used in class time effectively to accomplish Mission: ________

Mission completed by deadline: ________

Total Score: ________

Comments: ________