

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.
4. Teams complete their Space Survey Research Project Report.
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? (365¼)
 - 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?

Implications: What did you learn from your data?

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?

Name: _____

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: