

A CHANCE AT STARDOM

Grade Level: Sixth Grade

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Length of Unit: 2-3 Weeks

I. ABSTRACT

Within this unit, students will learn about the formation, position, and life cycle of the different celestial bodies. The students will learn that the sun is an average star in size, age, and strength. They will learn the layers and features of the sun. We will discuss the life cycle of the sun as well as all other stars.

II. OVERVIEW

A. Concept Objectives

1. Students will understand that cyclical changes are a vital part of natural systems, including the solar system.
2. Students will appreciate the dynamic and interactive nature of space and galaxies.

B. Core Knowledge Content

1. Students will judge the relationship between the size, age, and strength of the sun and be able to identify the various layers and features.
2. Students will be able to recognize and name various constellations.
3. Students will have knowledge of how a star is born, the different types of stars, and how the color and temperature of a star is related.
4. Students will understand that the end of a star's life cycle results in a neutron star, a black dwarf, or a black hole.

C. Skills to be Taught

1. Constructing models and diagrams
2. Measurement and graphing
3. Observation and experimentation
4. Creative and descriptive writing

III. BACKGROUND KNOWLEDGE

A. For teachers

1. Barnes-Svarney, P. *The New York Public Library Science Desk Reference*. New York: Macmillan, 1995. ISBN# 0-02-860403-2.
2. Kelly, Kate, & Zeman, A. *Everything You Need to Know About Science Homework*. New York: Scholastic Inc., 1994. ISBN# 0-590-49357-4.
3. Levy, D. *Sharing the Sky*. New York: Plenum Press. 1997. ISBN# 0-306-45638-9

B. For students

1. Prior Core Knowledge studies of the Solar System

IV. RESOURCES

Space by Mary Carson

The New York Public Library Science Desk Reference by Patricia Barnes-Svarney

Sun by Susan Canizares & Daniel Moreton

Constellations by Paul Sipiera

Look to the Sky by Jerry DeBruin & Don Murad

Black Holes by Paul Sipiera

Everything You Need to Know About Science Homework by Kate Kelly & Anne Zeman

Sharing the Sky by David Levy

V. LESSONS

Lesson One: The Sun (2-3 days)

A. Daily Objectives:

1. Lesson Content: The Sun
2. Concept Objective: Students will appreciate the dynamic and interactive nature of space and galaxies.
3. Skill Objectives
 - a. Students will show the strength of the sun by plotting points on a thermometer.
 - b. They will demonstrate they know the layers and features of the sun by constructing a model of the sun.

B. Materials (groups of four)

1. three thermometers
2. masking tape
3. pen or pencil
4. stop watch
5. handout (Appendix A)
6. construction paper
7. glue
8. scissors
9. markers

C. Background Notes

D. Key Vocabulary

1. hydrogen
2. helium
3. Fahrenheit
4. nuclear fusion
5. radiation
6. photosynthesis
7. sunspots
8. solar flares
9. atmosphere
10. solar windstorm
11. core
12. radiation zone
13. convection zone
14. surface
15. corona
16. photosphere
17. chromosphere
18. nuclear energy
19. prominence

E. Procedures/Activities

1. Sun Strength
 - a. Ask students, "Is the sun the biggest star?"
 - b. Make a KWL chart on stars.
 - c. Read orally, page 9, Space by: Mary Kay Carson for background knowledge.
 - d. Pass out three thermometers, masking tape, stop watch, and handout (Appendix A) to each group of four students.

- e. Each group will mark their three thermometers with a masking tape label. Be sure to put your group name on them.
 - f. Locate three places to leave each of the three thermometers: one in direct sun, one in partial shade, and one in full shade.
 - g. At each of the three locations, record your start time on the handout.
 - h. Leave thermometers for thirty minutes in the places you have chosen.
 - i. After thirty minutes, record the finishing times and the temperatures in the appropriate places on the handout.
 - j. As a class, construct a line graph of the results.
2. Sun Model (suggested activity while you wait for thermometers)
 - a. Read orally, pp. 318-320 Science Desk Reference by: Patricia Barnes-Svarney and use overhead to introduce the layers and features of the sun.
 - b. Students will use construction paper to make a two dimensional model of the sun.
 - c. They will label the various parts and features and write a brief description of each.
 - d. On their model, they will list five facts. They must include the size and age of the sun.
- F. Evaluation/Assessment
1. student participation
 2. handout (Appendix A)
 3. constructed model of the sun

Lesson Two: Star Dome (4-5 days)

- A. Daily Objectives:
1. Lesson Content:
 - a. constellations
 - b. stars of Autumn
 - c. stars of Winter
 2. Concept Objective: Students will appreciate the dynamic and interactive nature of space and galaxies.
 3. Skill Objectives
 - a. The students will be able to recognize and name specific constellations.
 - b. The students will demonstrate that they have learned the location and position of various constellations by using computation, graphing, and measuring.
- B. Materials
1. 80' x 40' sheet of black Visqueen (size may vary depending on space)
 2. masking tape (wide and narrow)
 3. scissors
 4. 3-speed electric fan
 5. ice pick or knife
 6. meter stick
 7. Appendix B
- C. Background Notes
- D. Key Vocabulary
1. constellations
 2. planetarium
 3. astronomer
 4. equator
 5. Milky Way
 6. mythology
 7. orbit

- E. Procedure/Activities
1. The day prior to the lesson send home appendix B and challenge students to locate some of the constellations.
 2. Read orally, *Constellations* by Paul P. Sipiera to spark student interest and give the history behind the naming of some of the 88 constellations.
 3. Use teacher made charts of several of the constellations to familiarize students with formations.
 4. To begin star dome activity, spread out the Visqueen and divide it into halves (40' x 40').
 5. Make 4' x 4' grids on half of the Visqueen using masking tape.
 6. Each 4' x 4' square on the Visqueen is represented by a square on Appendix B.
 7. Use the knife or ice pick to recreate (on the Visqueen) the constellation patterns shown on the star chart.
 8. Fold the Visqueen in half. Tape two sides together with wide masking tape. Tape a portion of the third side leaving enough room for the fan and for the students to enter the star dome. The final side is formed by the fold.
 9. Place a 3-speed electric fan in the open area and adjust it to the speed necessary to inflate the dome with air.
 10. Your star dome is now ready to enjoy. Use it to stargaze or read a good book.
- F. Evaluation/Assessment
1. student participation

Lesson Three: The Birth and Life of a Star (2-3 days)

A. Daily Objectives:

1. Lesson Content
 - a. star formation
 - b. stages of the life cycle before death
 - c. relationship of color and temperature in stars
2. Concept Objective: Students will understand that cyclical changes are a vital part of natural systems, including the solar system.
3. Skill Objective
 - a. The students will be able to explain the life cycle of a star before it's death.
 - b. The students will draw and label the steps in the formation of a star.
 - c. The students will be able to describe the relationship of color and temperature in a star through class experiment.

B. Materials

1. Appendix C
2. candle
3. matches

C. Background Notes

D. Key Vocabulary

1. protostar
2. red giant
3. red supergiant
4. magnitude: brightness of a star
5. star: a huge mass of glowing matter

E. Procedures/Activities

1. On the board have students brainstorm ideas on how a star is born.
2. For information on star life cycle and temperatures read and discuss pages F46-F49 in Destinations in Science.
3. Light a candle and have the students observe the flame.
4. With a partner, have the students discuss the different colors observed in the flame.

5. As a class, discuss the different colors observed.
6. Explain that the color of the flame near the wick is bluish in color and hottest in temperature. The outside edge of the flame is yellow or red and is the coolest part of the flame.
7. Tell students that scientists use color to help determine the temperature of a star.
8. Pass out Appendix C. Students will draw and label 3-5 steps in the birth of a star. They will also draw and label the colors of the candle flame. Finally, they will write a reflection on the candle activity describing the relationship between color and temperature.

F. Evaluation/Assessment

1. student participation
2. handout

Lesson Four: The Death of a Star (1-2 days)

A. Daily Objective: To complete the life cycle, students will learn how a star dies.

1. Lesson Content
 - a. nova/supernova
 - b. neutron stars
 - c. white/black dwarfs
 - d. black holes
2. Concept Objective: Students will understand that cyclical changes are a vital part of natural systems, including the solar system.
3. Skill Objective
 - a. Students will demonstrate knowledge of the complete life cycle of a star from life to death by writing a star autobiography.

B. Materials

1. construction paper

C. Background Notes

D. Key Vocabulary

1. nova
2. supernova
3. white dwarf
4. black dwarf
5. black hole

E. Procedures/Activities

1. Review the birth and life of a star and ask the students to brainstorm how they think a star might die.
2. For background information have a class discussion on the complete life cycle of a star. Use Destinations in Science, Science Desk Reference, and Black Holes for reference.
3. Choose different students to help draw and label the complete life cycle of a star on the board.
4. Have students pretend they are a star. Have them write an autobiography (You may need to review autobiographies with your students) with illustrations and mount them on construction paper.

F. Evaluation/Assessment

1. student participation
2. star autobiography

VI. CULMINATING ACTIVITIES

1. Students will write a story or report using information they learned in this unit. Have them illustrate and mount on construction paper. Assemble all work from star unit and create a talking wall.
2. Take a trip to a local planetarium.
3. Unit test, Appendix D

VII. HANDOUTS

See attached Appendices

VIII. BIBLIOGRAPHY

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Barnes-Svarney, P. The New York Public Library Science Desk Reference. New York: Macmillan, 1995. ISBN# 0-02-860403-2.

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Canizares, S. & Moreton, D. Sun. New York: Scholastic, Inc., 1998. ISBN# 0-590-10731-3.

DeBruin, J. & Murad, D. Look to the Sky. Torrance, California: Good Apple, 1988. ISBN# 0-86653-440-7.

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Sipiera, P. Black Holes. New York: Children's Press, 1997. ISBN# 0-86653-440-7.

Sipiera, P. Constellations. New York: Children's Press, 1997. ISBN# 0-516-26167-3.

Appendix A

Start time:

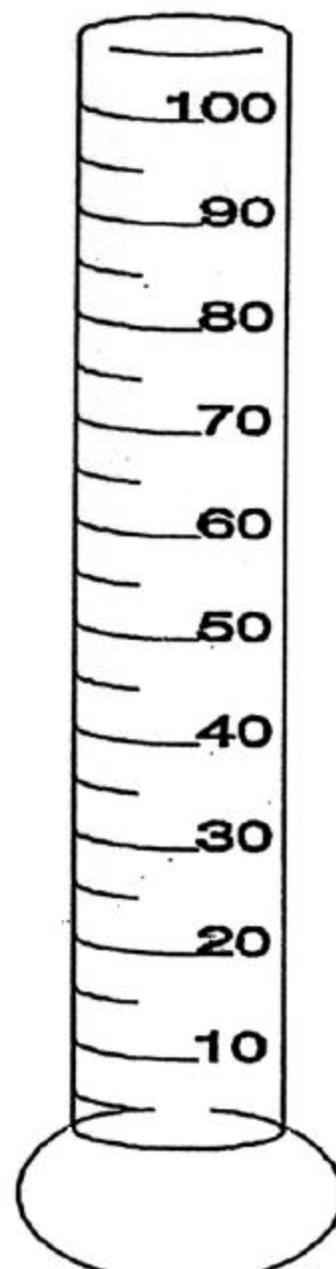
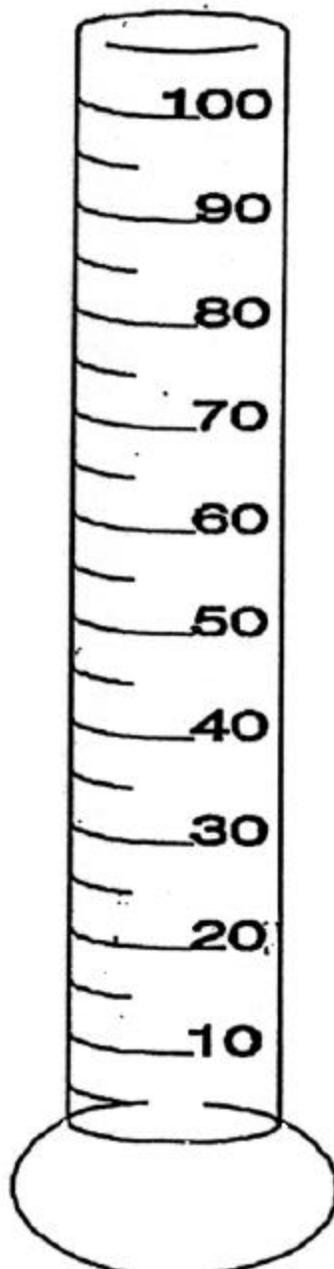
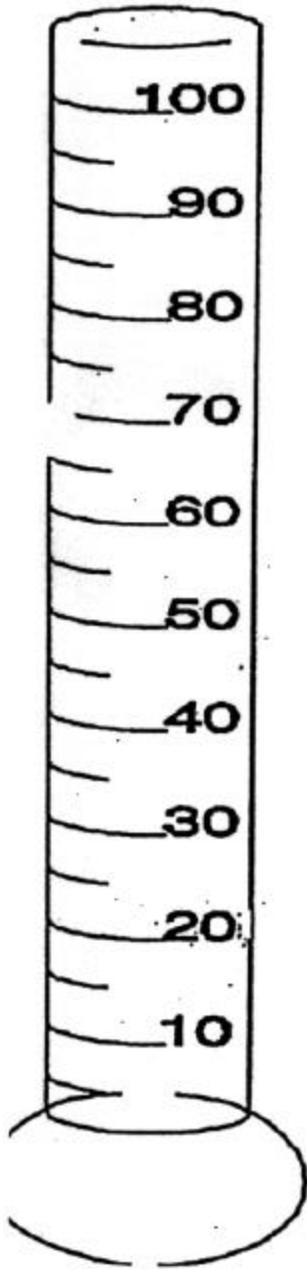
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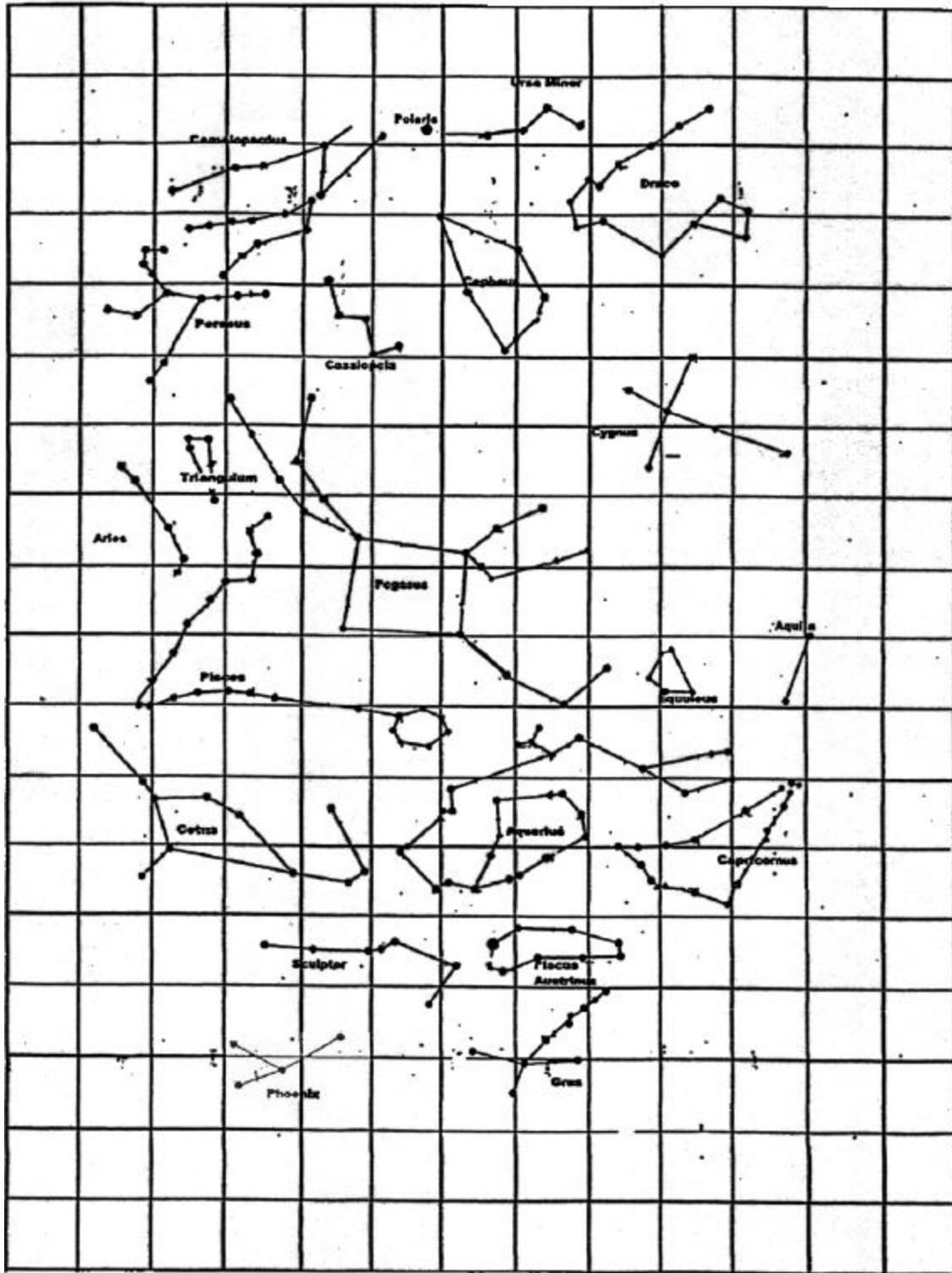
End time:

Start time:

End time:



Appendix B
AUTUMN CONSTELLATIONS

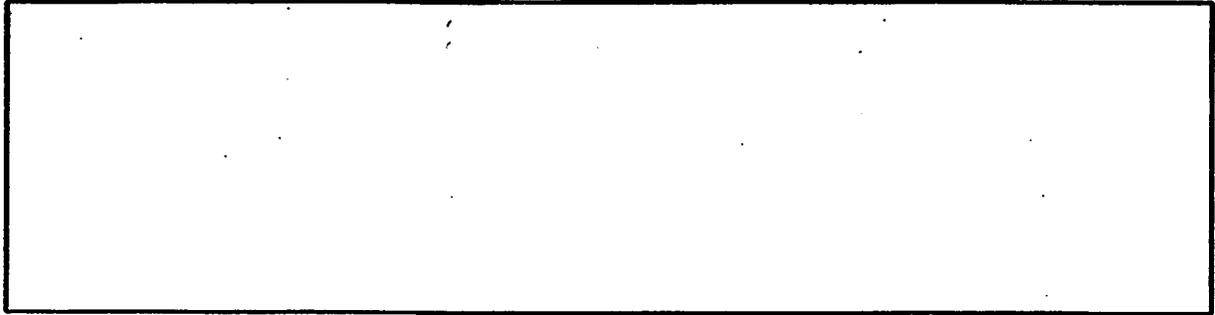


Each grid represents a 4'x4' grid on the Visqueen.

Appendix C

The Birth of a Star

**Draw and label the stages in the birth of a star.
(At least 3 stages)**



How is the Color of a Star Related to its Temperature?

Draw and label the different colors of the candle flame. Write a paragraph about how scientists use color to help determine the temperature of stars.

Appendix D

A Chance at Stardom: Unit Test

1. The sun is mostly made of _____
2. _____ is the fusing of hydrogen atoms to make helium.
3. _____ are dark cool patches on the sun's surface.
4. _____ are streams of hot gas particles escaping from the sun's surface.
5. A _____ is a "baby" star.
6. A star becomes stable when _____ and _____ are balanced.
7. A _____ is very dense and spins rapidly.
8. _____ are extremely dense cores that remain after a massive star explodes.
9. _____ are formed when a white dwarf no longer radiates energy.
10. When a star begins to use up all of the hydrogen it expands and becomes a _____ or _____.
11. _____ are groups of stars that form a pattern or picture.
12. The _____ is located on the tip of the handle of the little dipper.
13. Another name for the North Star is _____.
14. Why is the North Star so important?
15. Tell me your three favorite facts on the sun. Be sure to explain your facts.
16. Draw and label all the parts and features of the sun.
17. Draw and label the life cycle of a star.