



PA – 3 Region **Mathematics and Science Partnership**

UNIT #1 TITLE: The Night Sky

For use with grade: 4th



Developed by:

- **Lucy Knisley**

ROLES AND RESPONSIBILITIES

TEAM NAME: Sacred Heart School

| Team Member | Role | Responsibilities |
|--------------|------------------------|------------------|
| Lucy Knisley | Teacher Coordinator | All |
| | | |
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PA – 3 Region **Mathematics and Science Partnership**

Participant Portfolio **2012 - 2013**

LESSON TITLE: The Night Sky

LESSON AUTHOR: Lucy Knisley

GRADE (S) INSTRUCTING: 4th grade

SUBJECT AREA(S): Science

CONTACT'S SCHOOL: Sacred Heart School, Oxford

REGION COORDINATOR: Dr. Stan Terzopolos

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TEAM CONTACT'S SCHOOL MAILING ADDRESS:
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Unit #1 Outline

| GRADE LEVEL(S): |
|--|
| 4th grade |
| PA COMMON CORE – MATH OR NATIONAL SCIENCE STANDARDS: |
| Archdiocese of Philadelphia: Earth Science: 3.5.4.C |
| ASSESSMENT ANCHORS: |
| <ul style="list-style-type: none">• Processes, Procedures, and Tools of Scientific Investigations• Earth Features and Processes that Change Earth and Its Resources |
| ESSENTIAL QUESTION: (DEVELOP A GLOBAL QUESTION THE UNIT IS DESIGNED TO ADDRESS) |
| <p>How are stars different? How are the many stars arranged in the night sky?</p> |
| UNIT OBJECTIVES: |
| <ul style="list-style-type: none">• To read and state the meaning of certain scientific facts and concepts.• To provide hands-on activities• To demonstrate such scientific attitudes as open-mindedness by considering new facts in making judgment• To use technology such as the iPad to incorporate various apps to further learning• To describe the uses and benefits of science learning• To demonstrate interest in science by reading, collecting, studying, or becoming involved in some scientific activity. |

GENERAL MATERIALS NEEDED FOR UNIT: (include technology, NASA resources, etc...)

- Websites: <http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>
- Brain Pop: Life Cycle of Stars
- iPad apps: Hubble Top 100, NASA App: The Sun
- Smart board
- LCD projector
- Graphic Organizer
- Milk
- Dish detergent
- Plastic plates (flat bottoms)
- Eye dropper
- 4 different colors of food coloring
- Websites: www.astro.wisc.edu/~dolan/constellations/
- www.allthesky.com/constellations (pictures and names of constellations)
- [/http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html](http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html) (additional information)
- <http://starchild.gsfc.nasa.gov/docs/StarChild/questions/question9.html> (definition of a constellation and the official list of recognized constellations)
- <http://spaceplace.nasa.gov/starfinder/redirected/> (To make star finder)
- www.windows2universe.org/mythology/stars.html (Info on constellations and myths)
- www.wvu.edu/skywise/greekmyth.html (Myths and constellations)
- <http://donnayoung.org/f12/science-f/project-files/stars1.pdf> (template for constellation viewer)
- <http://donnayoung.org/f12/science-f/project-files/stars1.pdf> (template for constellation viewer)
- Brain Pop: Constellations
- iPad apps: GoSkyWatch App,
- Smart board
- LCD projector
- Supplies for constellation model: see below
- Rubric for writing: see below

MODELING AND GUIDED INSTRUCTION: (the whole class will be involved in the following learning experience)

- Discuss vocabulary words with students (stars, galaxies, constellations)
- Take notes on definition of stars, galaxies, constellations in science copybooks
- View and listen to *Stars* on the StarChild website
- Discuss our sun as a star
- Share NASA app: The Sun
- Show Brain Pop app (Life Cycle of a Star)
- Share GoSkyWatch app with students. Locate various constellations in the sky and open discussion
- Give directions to create Star finder (will help to locate constellations in sky and to play a game at the end of the lesson)
- Give directions to create Constellation viewer
- Teacher will facilitate as necessary
- Students will go to tech lab to research myth that corresponds with their constellation viewer from assigned websites

COLLABORATION/GROUP WORK: (problem-based/inquiry learning)

- Discuss our sun as a star
- Conduct *Mysterious Milk* experiment in small groups to illustrate and to demonstrate the expansion of gases and energy from stars
- Complete lab report with small group
- Share GoSkyWatch app with students. Locate various constellations in the sky and have open discussion
- Give directions to create Constellation viewer
- Students will create constellation finder.
- Students will go to tech lab to research myth that corresponds with their constellation viewer from assigned websites

INDEPENDENT PRACTICE: (student exploration and elaboration)

- Take notes on definition of stars, galaxies, constellations in science copybooks
- Students will take quiz at the end of Life Cycle of Star
- Write 5 things that you learned today about a star
- Students will go to tech lab to research myth that corresponds with their constellation viewer from assigned websites
- Students will write a short paragraph

ASSESSMENT/EVALUATION: (authentic student products and how assessed)

Formative:

- Completed lab worksheet
- Completed graphic organizer: 5 things that you learned about a star
- Completed constellation model
- Completed starfinder

Summative:

- Quizzes
- Completed writing assignment



PA – 3 Region **Mathematics and Science Partnership**

Lesson #1 TITLE: Stars in the Sky

For use with grade: 4th



Developed by:
• **Lucy Knisley**

Lesson Plan #1 – Unit #1

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|--|
| Author: Lucy Knisley |
| Grade Level: 4th |
| Topic/Title: Stars in the Sky |
| PA Academic Standards: |
| Archdiocese of Philadelphia 3.5.4. C 1-3 |
| Objectives: |
| <p>The student will</p> <ul style="list-style-type: none">• Gain an understanding that stars are sources of energy.• Identify our sun as a star.• Learn new vocabulary words such as star, galaxy, constellations.• View educational apps, videos, and websites to further learning.• Learn about the life cycle of a star.• Conduct an experiment to better understand the expanding gases and energy emitted from stars.• Identify 5 things that they learned about stars at the end of the lesson.• Take a quiz on the life cycle of a star. |
| Materials: |
| <ul style="list-style-type: none">• Websites: http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html• Brain Pop: Life Cycle of Stars• iPad apps: Hubble Top 100, NASA App: The Sun• Smart board• LCD projector• Graphic Organizer• Milk• Plastic plates (with flat bottom)• Detergent• Eye droppers |

Anticipatory Set:

- Intro the lesson by sharing Hubble Top 100 app (auto-play with musical background)
- Create a K-W-L chart with the students (What is a star? What do we know about stars?)

Activities: (modeling, guided practice, independent practice & group work)

- Discuss vocabulary words with students (stars, galaxies, constellations)
- Take notes on definition of stars, galaxies, constellations in science copybooks
- View and listen to *Stars* on the StarChild website
- Discuss our sun as a star
- Share NASA app: The Sun
- Show Brain Pop app (Life Cycle of a Star)
- Students will take quiz at the end of Life Cycle of Star
- Conduct *Mysterious Milk* experiment in small groups to illustrate and to demonstrate the expansion of gases and energy from stars
- Complete lab report with small group
- Write 5 things that you learned today about a star

Wrap-up:

- Review lesson
- Share 1 thing that you learned about a star with the class
- Complete the L on the K-W-L chart
- Preview next lesson in unit: constellations

Evaluation / Assessment:

- Quiz
- Completed lab worksheet
- Completed graphic organizer: 5 things that you learned about a star



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Lesson #2 TITLE: Constellations

For use with grade: 4th



Developed by:
• **Lucy Knisley**

Lesson Plan #2 – Unit #1

Author: Lucy Knisley

Grade Level: 4th

Topic/Title: Constellations

PA Academic Standards:

Archdiocese of Philadelphia 3.5.4. C 1-3

Objectives:

The student will

- Identify various constellations
- Locate constellations in sky
- Review vocabulary words such as star, galaxy, constellations from previous lesson
- View educational apps, videos, websites to further learning
- Create a model of a specific constellation
- Create a starfinder to help locate constellations in the sky
- Write a paragraph about the mythical origin for a specific constellation
- Take a Brain Pop quiz at the end of the lesson

Materials:

- Websites: www.astro.wisc.edu/~dolan/constellations/
- www.allthesky.com/constellations (pictures and names of constellations)
- [/http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html](http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html) (additional information)
- [http://starchild.gsfc.nasa.gov/docs/Star Child questions/question9.html](http://starchild.gsfc.nasa.gov/docs/StarChild/questions/question9.html) (definition of a constellation and the official list of recognized constellations)
- <http://spaceplace.nasa.gov/starfinder/redirected/> (To make star finder)

- www.windows2universe.org/mythology/stars.html (Info on constellations and myths)
- www.wvu.edu/skywise/greekmyth.html (Myths and constellations)
- <http://donnayoung.org/f12/science-f/project-files/stars1.pdf> (template for constellation viewer)
- <http://donnayoung.org/f12/science-f/project-files/stars1.pdf> (template for constellation viewer)
- Brain Pop: Constellations
- iPad apps: GoSkyWatch App,
- Smart board
- LCD projector
- Supplies for constellation model: see below
- Rubric for writing: see below

Anticipatory Set:

- Intro the lesson by reviewing the definition of constellations
- Share the story of Constellations and Myths (select website)
- Describe to students that we will be learning about constellations, the Myths associated with them, and each student will create a constellation viewer along with writing a short paragraph on the myth behind the constellation that each student selected.

Activities: (modeling, guided practice, independent practice & group work)

- Share GoSkyWatch app with students. Locate various constellations in the sky and open discussion
- Give directions to create Star finder (will help to locate constellations in sky and to play a game at the end of the lesson)
- Give directions to create Constellation viewer
- Students will create each of these items in small groups
- Teacher will facilitate as necessary
- Students will go to tech lab to research myth that corresponds with their constellation viewer from assigned websites
- Students will write a short paragraph

Wrap-up:

- Share constellation models with class

- Share written story with class
- Play starfinder game with a buddy
- Review lesson by watching Brain Pop app on constellations
- Take short quiz that accompanies Brain Pop app

| |
|--|
| Evaluation / Assessment: |
| <ul style="list-style-type: none">• Quiz• Completed constellation model• Completed starfinder• Completed writing assignment |

Name: _____

Teacher: _____

Date Submitted: _____

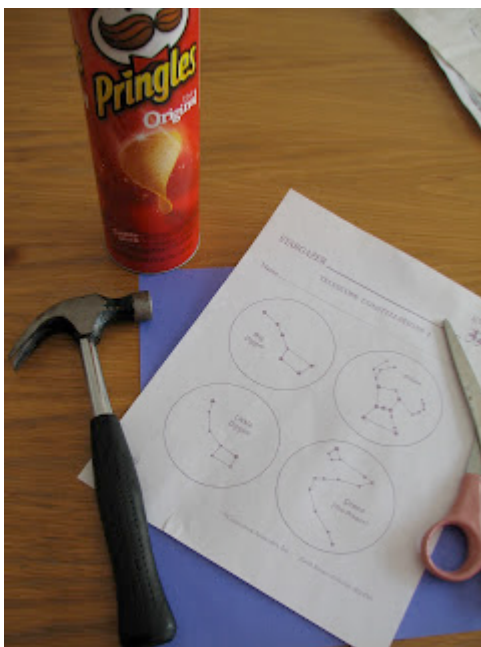
Title of Work: _____

| | Criteria | | | | Points |
|---------------------------------------|--|--|--|--|---------------|
| | 4 | 3 | 2 | 1 | |
| Main/Topic Idea Sentence | Main/Topic idea sentence is clear, correctly placed, and is restated in the closing sentence. | Main/Topic idea sentence is either unclear or incorrectly placed, and is restated in the closing sentence. | Main/Topic idea sentence is unclear and incorrectly placed, and is restated in the closing sentence. | Main/Topic idea sentence is unclear and incorrectly placed, and is not restated in the closing sentence. | _____ |
| Supporting Detail Sentence(s) | Paragraph(s) have three or more supporting detail sentences that relate back to the main idea. | Paragraph(s) have two supporting detail sentences that relate back to the main idea. | Paragraph(s) have one supporting detail sentence that relate back to the main idea. | Paragraph(s) have no supporting detail sentences that relate back to the main idea. | _____ |
| Elaborating Detail Sentence(s) | Each supporting detail sentence has three or more elaborating detail sentences. | Each supporting detail sentence has at least two elaborating detail sentences. | Each supporting detail sentence has one elaborating detail sentence. | Each supporting detail sentence has no elaborating detail sentence. | _____ |
| Legibility | Legible handwriting, typing, or printing. | Marginally legible handwriting, typing, or printing. | Writing is not legible in places. | Writing is not legible. | _____ |
| Mechanics and Grammar | Paragraph has no errors in punctuation, capitalization, and spelling. | Paragraph has one or two punctuation, capitalization, and spelling errors. | Paragraph has three to five punctuation, capitalization, and spelling errors. | Paragraph has six or more punctuation, capitalization, and spelling errors. | _____ |
| | | | | Total----> | _____ |

Teacher Comments:

Constellation Viewer

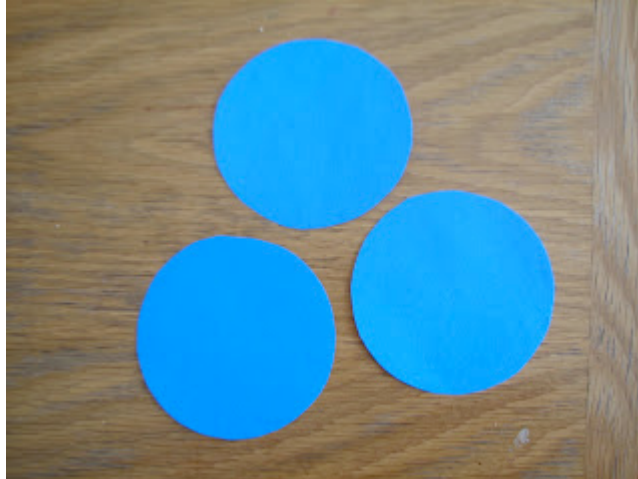
These constellation viewers are pretty simple to make, once you've gathered your supplies. You'll need a Pringles can for each viewer you want to make (ideally, one for each student). I haven't found any good substitutions for this, but let me know if you do. Put the word out early that you're collecting the cans, and you'll probably make out just fine.



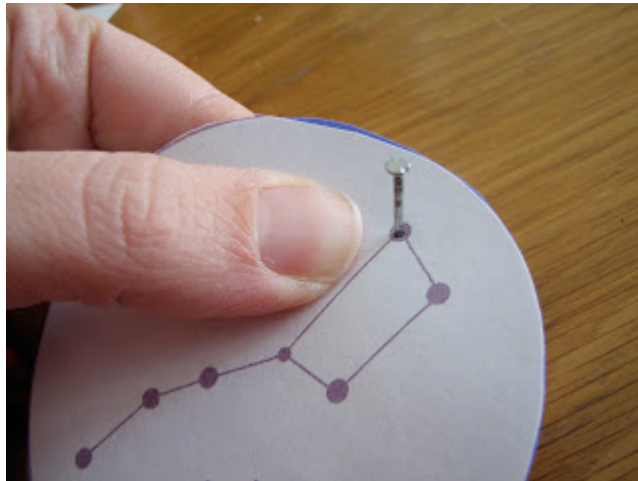
Use a large nail to punch a hole in the bottom of the can.



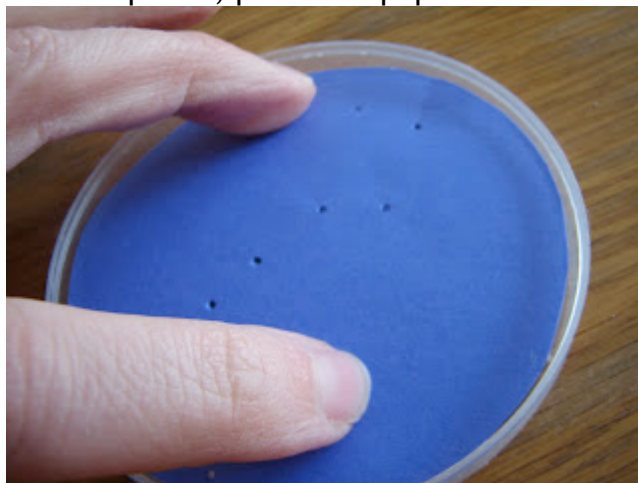
Cut out circles of black paper (and if you don't have any black paper, use another dark color, like blue). The circles should be the size of the can.



Place a diagram of the constellation you want on top of one of the circles and use a nail to poke a hole at each star. Some nice diagrams (the same size as the circles you're using) are found [here](#).



After all the star holes have been poked, place the paper in the can lid.



Then place the lid on the can (or the can on the lid, which may be easier, as pictured below), sandwiching the paper inside.



Hold the can up to the light and look through the hole in the bottom of the can to view your constellation. (Wish I could get a picture of what it looks like, but you'll just have to make one yourself).

You may want to write the name of each constellation on the back of the paper - that way you'll be able to see the name through the lid while it's inside:



Also, unless you're well-versed in constellations, you may want to draw in the lines of the constellation to help you identify what you're looking at.

Found on website: www.semo.edu

IMPLEMENTATION PLAN

Unit #1

A. One videotaped lesson is required per unit, saved on CD-ROM (include in CD ROM sleeves in portfolio).

Anticipated Lesson for Taping: Creating Constellation Viewers

Planned Taping date(s) January 11, 2013

B. Professional development component:

- Shared unit lessons with 5th grade teacher

UNIT PROGRESSION FORM: Unit #1

Group/Coordinator: Lucy Knisley
Date: October 2012 – January 2013

UNIT ASSESSMENT

| The degree to which the lesson(s): | √ | Write a statement to describe how this item was met. |
|--|---|--|
| Identified the prior knowledge required by the students. | | A basic understanding of what a star is. A basic understanding of what constellations are. |
| Identify and/or provide an authentic real-world problem relevant to the students for them to solve | | To identify why constellations are important. |
| Was aligned with PA standards. | | Aligned with the Archdiocese of Philadelphia Science standards |
| Followed problem-based/inquiry learning model. | | Students were allowed to conduct hands-on activities and to infer and explain results. |
| Allowed for student exploration and elaboration. | | Created a model representation of a constellation and conducted mysterious milk experiment |
| Required authentic student products. | | Created a constellation viewer |
| Integrated technology into the lesson(s). | | Websites, iPad, Smartboard |
| Clearly defined how students would be assessed. | | Formative and summative |
| Utilized and incorporated NASA resources throughout lesson(s). | | NASA Viz, NASA website |

GROUP ASSESSMENT (see next page for details)

| The group showed: | √ | Write a statement to describe how this item was met. |
|---------------------------------------|---|--|
| Contributions/participation, Attitude | | N/A |
| Cooperation/Working with others | | N/A |
| Focus on task/commitment | | N/A |
| Team role fulfillment | | N/A |

Group Signatures: _____ Date: _____
 _____ Date: _____
 _____ Date: _____

Group Work Rubric

Team Participant Names: N/A (only one person in group) Lucy Knisley

| Skills | Basic | Sound | Thorough | Extensive |
|--|--|---|--|--|
| Contributions/participation Attitude | Seldom cooperative, rarely offers useful ideas. Is disruptive. | Sometimes cooperative, sometimes offered useful ideas. Rarely displays positive attitude. | Cooperative, usually offered useful ideas. Generally displays positive attitude. | Always willing to help and do more, routinely offered useful ideas. Always displays positive attitude. |
| Working with others/cooperation | Did not do any work – does not contribute, does not work well with others, usually argues with teammates. | Could have done more of the work – has difficulty, requires structure, directions and leadership, sometimes argues. | Did their part of the work – cooperative. Works well with others, rarely argues. | Did more than others – highly productive. Works extremely well with others, never argues. |
| Focus on task/commitment | Often is not a good team member. Does not focus on the task and what needs to be done. Lets others do the work. | Sometimes not a good team member. Sometimes focuses on the task and what needs to be done. Must be prodded and reminded to keep on task. | Does not cause problems in the group. Focuses on the task and what needs to be done most of the time. Can count on this person. | Tries to keep people working together. Almost always focused on the task and what needs to be done. Is very self-directed. |
| Team role fulfillment | Participate in few or no group meetings. Provided no leadership. Did little or no work assigned by the group. | Participated in some group meetings. Provided some leadership. Did some of the work assigned by the group. | Participated in most group meetings. Provided leadership when asked. Did most of the work assigned by the group. | Participated in all group meetings, assumed leadership role as necessary. Did the work that was assigned by the group. |
| Communication/listening Information sharing | Rarely listens to, shares with, or supports the efforts of others. Is always talking and never listens to others. Provided no feedback to others. Does not relay any information to teammates. | Usually listens to, shares with, and supports the efforts of others. Sometimes talks too much. Provided some effective feedback to others. Relays some basic information – most relates to the topic. | Almost always listens to, shares with, and supports the efforts of others. Seldom talks too much. Provides good feedback to others. Relays solid basic information – usually relates to the topic. | Always listens to, shares with, and supports the efforts of others. Provided effective feedback to other members. Relays a great deal of information – all relates to the topic. |

<http://www.google.com/#hl=en&q=group+work+rubric&aq=f&oq=&aqi=g4&fp=flbC24gbdiA>