



National Museum of African Art

African Cosmos: Stellar Arts

June 20, 2012 through December 6, 2012



*Astronomic Arts Lesson Plans,
Pre-K and Grade 1*

Exhibit-related lessons and activities for the classroom and home

ASTRONOMIC ARTS

African Cosmos: Stellar Arts, June 20-December 6, 2012
National Museum of African Art

Schedule a Tour

To schedule a tour please call Frank Esposito at 202-633-4633 or email him at espositof@si.edu.

Tours are subject to docent availability.

Ask about our hands-on Jambo! School Tours for younger students. Thematic Tours and Highlights Tours are also available.

Art Workshops and Outreach Programs are offered upon request.

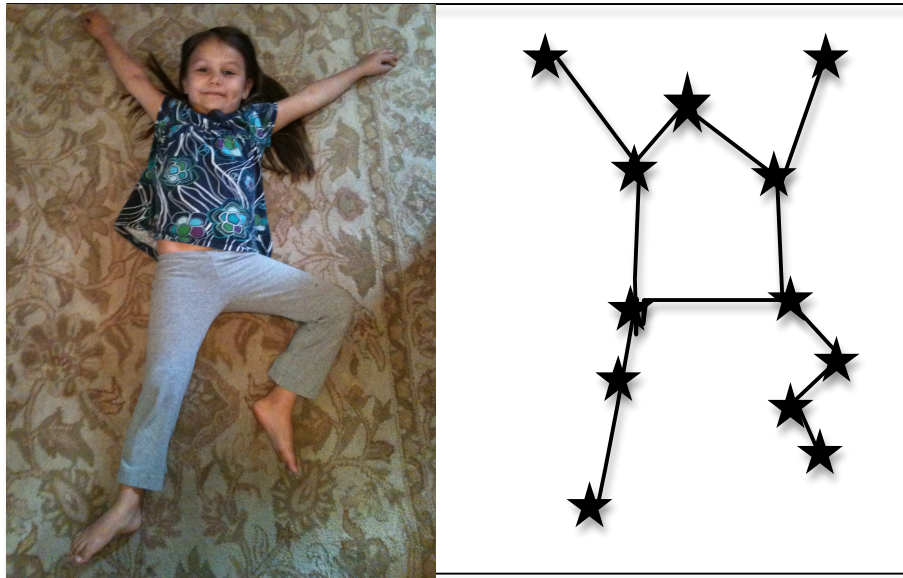
Please see www.africa.si.edu for more information.

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Lesson 1: Kinesthetic Constellations



In this lesson, students will learn about constellations and use their bodies to create a fictional constellation pattern.

Estimated Time: 2 60-minute class periods

Lesson Objectives:

- Define “constellation”
- Identify at least two constellations
- Create own constellation pattern with body
- Work as a class to make-up a myth

Materials:

- Camera
- Glue stick
- White paper
- Star stickers
- Pencils or markers

Images from “Images for *Astronomic Arts* Lesson Plans, Pre-K and Kindergarten PowerPoint (Africa.si.edu):

- Image 1. Orion and Taurus constellation
- Image 2: *Untitled*, Gavin Jantjes, 1989-1990

Key Terms:

Constellation: A Group of Stars that has been given a name based on the shape they form.

Myth: An invented story, idea, or concept.

Character: A person or animal in a story.

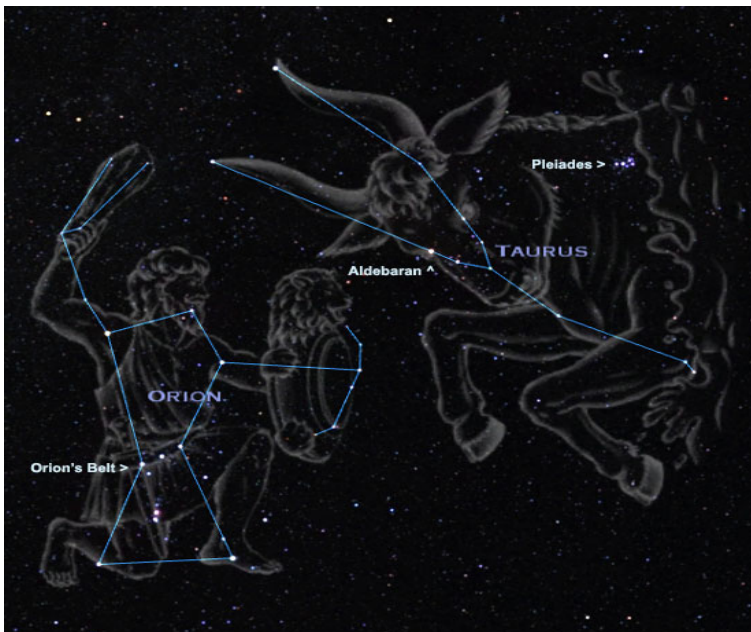
Introductory Discussion

Constellations are groups of stars that are given names. Some groups or stars are named after animals or mythical characters and have accompanying stories. A long time ago people used constellations to find their way. Other constellations were used as part of religion or entertainment. As the earth rotates, you can see different constellations in the night sky. Ask the class:

- Who has looked up at the sky at night?
- What did you see?

Explain that people have been looking at the sky for thousands of years. People began to notice that some of the stars make shapes in the sky—like a dot-to-dot picture. Draw a simple shape using dots on the board. Show the students how the dots can be connected to make a picture. Repeat with a more difficult shape or image. You may wish to compare this to a dot-to-dot exercise found in an activity or coloring book. Show students Image 1 (Orion and Taurus) to illustrate examples of constellations.

Read a constellation myth as a class. (See Appendix A, Suggested Reading List/Additional Resources.) For this age group, define “myth” as an invented story, idea, or concept.



Story of Orion: One version of the myth says that Orion was a great hunter who was banished to the sky for bragging on how many animals he could kill. His hunting dogs, Canis Major and Canis Minor are represented by the bright stars that seem to be following him. Nearby are the constellations Taurus, (the bull) and Lepus (the hare), that he is hunting.

Story of Leo: In the Greek version of the myth, Leo was a vicious lion-monster that couldn't be killed with normal weapons because his golden fur protected him. He also had claws that were as sharp as swords. Leo was heroically killed by the Greek god, Hercules, and put into the sky.

Museum Connection

Share Image 2 (*Untitled*, Gavin Jantjes). This painting by Gavin Jantjes is based on a myth told by the San people of South Africa. The artist was inspired by the San people's strong tradition of telling stories. He based this work on one woman's telling of a creation myth of the stars and the Milky Way.

In the story, a young girl reaches into the fire and throws burning coals into the sky. The coals from the stars and the white ashes become the Milky Way. The sky is the focus of this painting and Jantjes created the Milky Way by using a grayish paint against the darker sky. The outlines of people on the bottom half of the work are drawn in the style of San rock art. This painting is part of the artist's Zulu series. In English, the word *Zulu* means "the space about your head" or "the heavens."

Activity

Day 1 Activity

Procedure:

Have each student lay on the floor in a creative position, with arms and legs flat against the floor. Print out the photos.

Day 2 Activity

Procedure:

Give each student his/her photo mounted on the left side of a large piece of white paper. Have students draw what they look like in the photo, as if they were a constellation, on the blank right side. Pass-out star stickers. Put star stickers on the drawing to represent stars. Invite students to give their constellations names.

Select one student's constellation artwork and gather together as a class. Tell the students that it is now their turn to create a myth. They are going to make up a myth about the selected student's character to explain why there are so many stars in the sky. Remind them that a myth is a made up story and that unrealistic things can happen. Start the story with a few sentences to get the students going. Invite students one at a time to each add one sentence until the myth is complete.

Note: See <http://africa.si.edu/exhibits/gavinjantjes.html> for additional lesson ideas related to Gavin Jantjes.

Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion/story?

Did the student follow directions?

Did the student do his/her best to create a constellation from his/her photo?

Can the student accurately explain his/her work to others?

Can the student define "constellation"?

Did the student participate appropriately in creating the class myth?

Lesson 2: Tubular Telescopes



In this lesson, students will learn about the basic functions of a telescope and create their own telescopes using paper tubes.

Estimated Time: 60 minutes

Lesson Objectives

- Become familiar with the function of a basic telescope
- Recognize that we need telescopes to see into space
- Use art materials to create a model telescope

Materials

- Magnifying glass, microscope (optional)
- Cardboard tubes (from paper towels, toilet paper, wrapping paper)
- Paint, paintbrushes, foil, and other art supplies for decorating
- Aluminum foil, cut into 3" x 3" squares
- Rubber bands
- Paper clips

Key Terms:

Telescope: instrument using light and mirrors to help us see far into space

Solar system: system of planets and other objects orbiting the sun

Images from “*Images for Astronomic Arts Lesson Plans, Pre-K and Kindergarten*” PowerPoint (Available at <http://africa.si.edu>):

- Image 3: Crab Nebula
- Image 4: Infant Star in Nearby Galaxy
- Image 5: Hubble Telescope
- Image 6: The Very Large Array

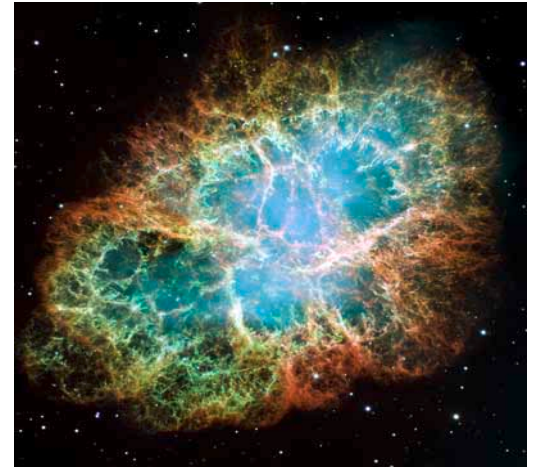
Introductory Discussion

Begin by showing the children a magnifying glass.

- What does a magnifying glass help us do?

Telescopes, like magnifying glasses and microscopes, help us see objects that we can't see with just our plain eyes. Magnifying glasses and microscopes help us see things that are too small and telescopes help us see things that are too far away to see with the naked eye. Telescopes use light and mirrors in a special way to show us what is in space. The word *telescope* comes from Greek. *Tele* means "far" and *scope* means "to see".

• When you look out the window at night, what do you see? Explain that if we looked into a telescope, we might be able to see things like this! Show Images 3-4 (Crab Nebula and Infant Stars).



The Crab Nebula, Image Credit; NASA



Activity

Procedures:

Have each student paint and/or decorate a cardboard tube. Place a piece of aluminum foil at one end of the telescope. Use a rubber band to secure it. Punch several small holes of various sizes into the foil, using a paper clip, pin, or nail. Be careful not to rip the aluminum. Turn off the lights, except for one. Have the students look towards the light to see the "stars" through their telescopes.

Optional Activity

Procedure:

Before the students cover one end of the tube with foil, have them use the tubes as telescopes. Turn off the classroom lights and turn on the PowerPoint of images of space. Have the students pretend to be scientists discovering our solar system. Use the slides to introduce them telescopic images of galaxies, shooting stars, planets, the earth, and meteors. Play "I Spy" with them to develop their observational skills.

NOTE: All images at <http://www.nasa.gov/images> are free to use for educational purposes and can be easily downloaded to be included in a PowerPoint for this activity.



Hubble Observes Infant Stars in Nearby Galaxy, Image Credit; NASA

Reflection:

- What did you learn about space today?
- What surprised you?
- What do you want to learn more about?
- What was your favorite thing we did?
Explain.

Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion?

Did the student follow directions?

Did the student do his/her best to create a telescope?

Can the student accurately explain what a telescope does?

Lesson 3: Outer Space Mural



In this lesson, students will be introduced to the scale and contents of our solar system and create a classroom mural of space.

Estimated Time: 2 60-minute class periods

Lesson Objectives:

- Introduce the scale of our solar system
- Recognize that there are lots of objects that can be found in space
- Define “mural”
- Use stamps to create art
- Work as a group to create a class mural

Materials:

- Butcher paper (dark blue, black, or gray) to cover mural space
- Various sizes and shapes of sponges cut into stars, planets, etc.
- Star stickers
- Paper circles of different sizes and color to represent planets
- Paints (glow-in-the dark, if available)

Key Terms:

Mural: a large artwork painted onto a wall

Solar system: system of planets and other objects orbiting the sun

Planet: an object moving around a star

Star: object that shines by itself through nuclear reactions

Meteoroid: any small object in space, like dust or a rock

Asteroid: rock or little planet orbiting the sun

Galaxy: system of billions of stars, gas, and dust held together by gravity



Adinkra stamps *Asante peoples*

Images from “Images for *Astronomic Arts* Lesson Plans, Pre-K and Kindergarten” PowerPoint (Available at <http://africa.si.edu>):

- Image 1: Orion (constellation)
- Image 7: Moon
- Image 8: Stars (Pleiades Star Cluster)
- Image 9: Planet (Saturn)
- Image 10: Milky Way Galaxy
- Images 11-14: Adinkra stamps of star, moon/star, galaxy, and sun
- Image 15: Solar System

Introductory Discussion

Have several objects of obviously different sizes. Start by showing the students a very small object, such as a paper clip.

- What is something just bigger than this paper clip? (bouncy ball)
- What is something just bigger than this bouncy ball? (book)

Keep going until you run out of objects, but continue to ask the question: *What is bigger than that?* (go from things like an elephant to the ocean, to the whole world, etc.) Then explain that there are things that are bigger than our whole world. Try and give the students an idea of how big our universe really is. For more information, go to http://www.nasa.gov/audience/foreducators/5-8/features/F_How_Big_is_Our_Universe.html.

Introduce the idea that there are lots of different planets and objects in our solar system. (See Appendix A, Suggested Reading List/Additional Resources.) Point out that there are planets, our Earth and its moon, meteors, and other galaxies far away, etc. Draw attention to the different colors and sizes. The solar system existed long before we were born and parts of it are older than the earth. People who lived a long time ago, and people now, like to make art based on things found in the sky.

Show Images 12-15 (Adinkra stamps of star, moon/star, galaxy, and sun). Additional information is in Appendix B, Object Descriptions.

- What do you see?
- What is it made out of?
- Do you like it?
- What do you think this object could be used for?



Adinkra stamp *Asante peoples*

Show the students how a stamp works and tell them that we are going to use stamps to create a big painting of space. Tell them that we need a huge place to work because space is so, so big. Define *mural* and explain that everyone is going to help make a class mural.

QUICK SPACE FACTS:

- ❖ It would take 7 months for a space shuttle to get to the sun.
- ❖ The nearest sun is 70,000 years away on the fastest spaceship.
- ❖ More than 1 million Earths could fit inside the sun.
- ❖ If you wanted to wrap the Moon up like a present, you would need a piece of wrapping paper as big as Africa.

What is a mural? A mural is a 2-D piece of art, like a painting, applied directly to, or attached to a wall, ceiling, or other permanent surface. Murals are often large and compliment the architecture of the building of which it is a part. A famous mural of the sky is painted on the ceiling of Grand Central Station in New York City.

Activity:

Procedure:

Day 1: Mount butcher paper. Invite students to create colorful galaxies and stars using sponge stamps.

Day 2: When the paint is dry, add paper planets, smaller stars (using the star stickers), and anything else that belongs in space (i.e., rocket, shooting stars, meteors, etc.). If you used glow-in-the-dark paints, turn off the lights when finished so students can get



Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion?

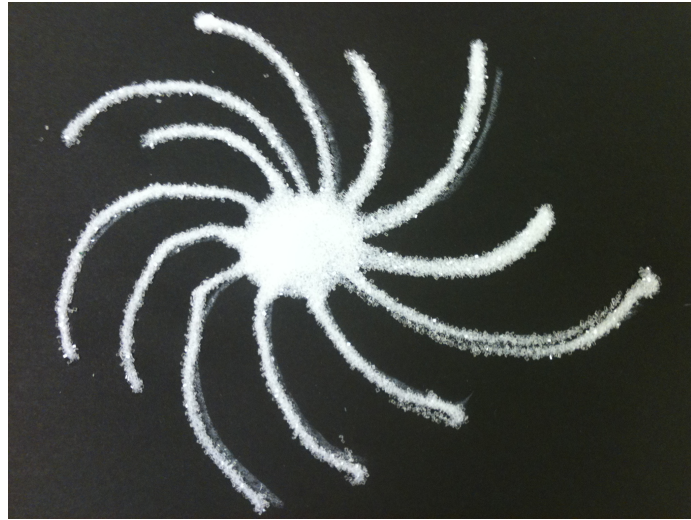
Did the student follow directions?

Did the student do his/her best to contribute to the mural?

Can the student accurately explain his/her work to others?

Can the student identify at least three things found in space?

Lesson 4: Glitzy Galaxies



In this lesson students will learn about our galaxy and use glitter or sand to create the shape of our galaxy.

Estimated Time: 45 minutes

Lesson Objectives:

- Define “galaxy”
- Identify our galaxy as the Milky Way
- Recognize shapes found in space
- Recognize the spiral shape of our galaxy
- Reproduce the spiral shape of our galaxy using glue and glitter or sand

Materials:

- Examples of spiral-shaped objects (shells, flowers, ram’s horns, etc.)
- Black construction paper
- White crayon, chalk, or pencil
- White glue
- Glitter or sand
- Newspaper to cover workspace

Key Terms:

Galaxy: system of billions of stars, gas, and dust held together by gravity

Milky Way: our galaxy

Spiral: winding, curved shape

Images from “**Images for Lesson Plans, Pre-K and Kindergarten**” PowerPoint (Available at <http://africa.si.edu>):

- Image 13 (Galaxy adinkra stamp)

Introductory Discussion:



Adinkra stamp *Asante peoples*

Use images of planets, stars, and moon from Appendix A, Suggested Reading List/Additional Resources to talk about shapes like spheres, stars, and crescents that can be found in space. Then show the students examples of spiral shapes. Observe spirals in your own classroom. Explain that the shape of our galaxy is a spiral.

Show students photos of the Milky Way galaxy. Point out that it is a spiral shape with 5 arms and a very dense center. Introduce Image 15 of the galaxy-shaped adinkra stamp. (Additional information on the stamp is found in Appendix B, Object Descriptions.) Tell students that they are going to practice making their own spiral-shaped galaxy. You can have your students do a more traditional spiral or a 5-armed spiral,

Activity

Procedure:

Cover workspace in newspaper. Hand out a black piece of construction paper to each child. Have each student draw the outline of our galaxy with a white crayon, chalk, or pencil. Instruct the students to cover their drawings with white glue. Cover the glue with glitter or sand. Shake off excess and let dry.



Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion?

Did the student follow directions?

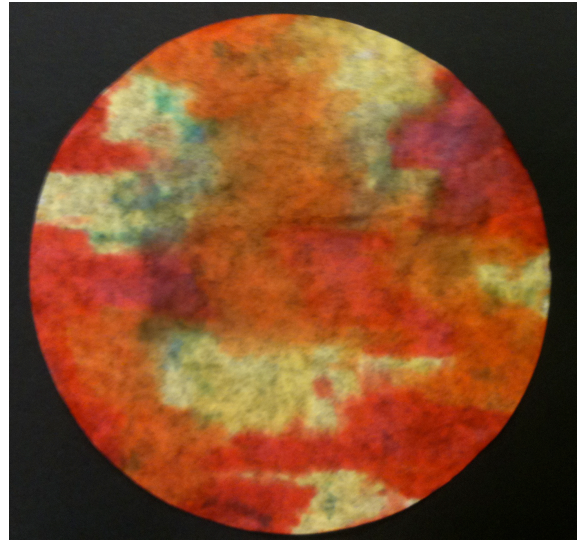
Did the student do his/her best to create a galaxy?

Can the student define "galaxy"?

Can the student accurately identify three shapes found in space?

Lesson 5: Coffee Filter Planets

In this lesson students will learn about our galaxy and use glitter or sand to create the shape of our galaxy.



Estimated Time: 30 minutes (plus 30 minutes for drying)

Lesson Objectives:

- Define “planet”
- Experiment art-making with non-traditional materials to create a “planet”
- Recognize that colors can be mixed to create new colors

Materials:

- Coffee filters
- Plastic plates or washable surface
- Washable markers (or food coloring if working with older children)
- Spray bottles
- Black construction paper
- Newspaper
- Old toothbrushes
- Popsicle sticks
- White paint
- Glue
- Chalk or white crayon

Key Terms:

Galaxy: system of billions of stars, gas, and dust held together by gravity

Milky Way: our galaxy

Spiral: winding, curved shape

Images from “Images for Lesson Plans, Pre-K and Kindergarten” PowerPoint (Available at <http://africa.si.edu>):

- Image 15: Solar System
- Image 16: Planet (Neptune)

Introductory Discussion:

Show students Images 15-16 of planets.

- What colors do you see?
- What do the photos of the planets remind you of?
- What shape are the planets? (Teach the difference between a circle and sphere.)

If you wish, read the children a book about planets. (See Appendix A, Suggested Reading List/Additional Resources.) After reading, tell the students that they are going to have the chance to create their own

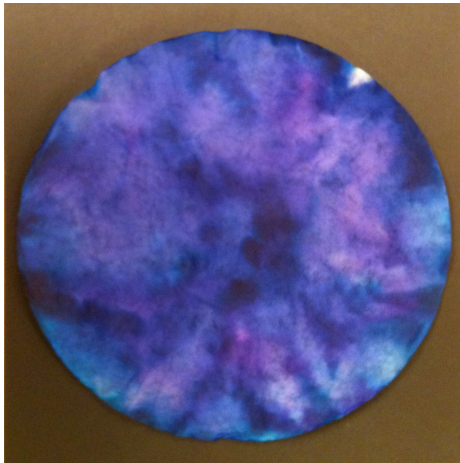
colorful planets.

Activity:

Procedure:

Distribute one coffee filter to each student. Flatten out the coffee filter on a plate. Color coffee filter with desired colors. Squirt water in the middle of the filter and watch the water spread throughout the filter. This will take about 5 minutes. Let the filter completely dry for about 30 minutes. The project works best if you don't over-wet the filter—and it won't take as long to dry.

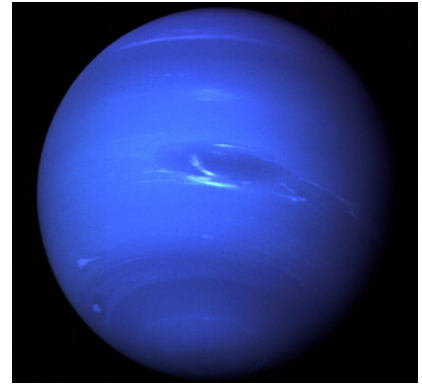
While the filters are drying, work on the dark starry background for your planet. Cover work area with newspaper. Dip toothbrush into white paint. Hold it over the black paper and use the edge of the popsicle stick to rub the toothbrush so paint splatters lightly on the paper. Fill the sky with lots of stars. Let dry. Glue your planet onto the black starry sky.



For older students, demonstrate that they can create new colors for their planets by letting two other colors mix together. Let the students predict what will happen when yellow and blue mix. Test out their hypothesis. Let students experiment with other colors on their own.

When the planets are dry, adhere them to the dark starry background and display.

Note: These planets could also be used to decorate the mural created in Lesson 3—Outer Space Mural.



Neptune, Photo Credit: NASA

Evaluation (On scale of 1-5, 5 being the highest)

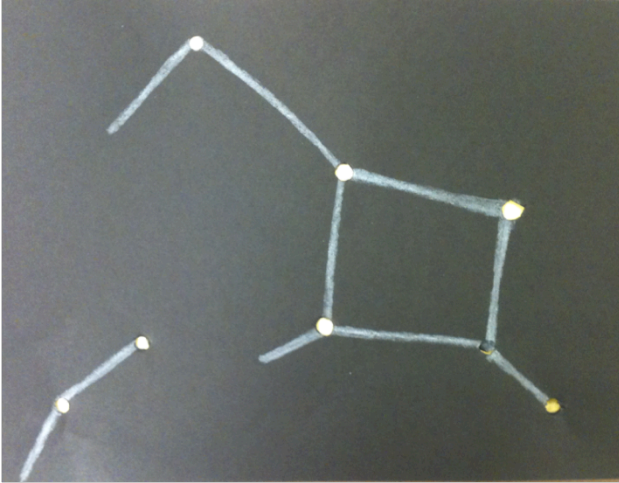
Did the student engage appropriately during the opening discussion?

Did the student follow directions?

Did the student do his/her best to create a planet?

Can the student define "planet"?

Lesson 6: Hole-y Heavens



In this lesson students will explore constellations and create their own constellation using paper and a hole punch.

Estimated Time: 30 minutes

Lesson Objectives:

- Define “constellation”
- Become familiar with a constellation myth
- Create a constellation using paper and a hole punch

Key Terms:

Constellation: a group of stars that has been given a name based on the shape they form

Myth: an invented story, idea, or concept

Materials:

- Black construction paper
- White or yellow paper
- Chalk or white crayons
- Hole punches (long reaching ones work best)

Images from “Images for Lesson Plans, Pre-K and Kindergarten” PowerPoint (Available at <http://africa.si.edu>):

- Image 1. Orion and Taurus constellation
- Image 2. Leo constellation
- Image 3: *Untitled*, Gavin Jantjes, 1989-1990

Introductory Discussion:

(See Lesson I, Introductory Discussion)

Activity:

Procedure:

Have students make several dots with the chalk or crayon on the black paper, creating a constellation. Use the hole punches to make a hole wherever there is a dot. Paste the dark paper over a white or yellow paper, allowing the “stars” to peek through. Connect the “stars” to make a constellation. If you wish, have students name their constellation.

Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion?

Did the student follow directions?

Did the student do his/her best to create a piece of art with the hole punches?

Can the student define “constellation”?

Lesson 7: Magically Appearing Stars

In this lesson students will explore constellations and create their own constellation using crayons and watercolors.



Estimated Time: 30 minutes (plus time for drying)

Lesson Objectives:

- Define “constellation”
- Identify stars in images of the night sky
- Become familiar with a constellation myth
- Create a night sky using the crayons and watercolor paints

Key Terms:

Constellation: a group of stars that has been given a name based on the shape they form

Myth: an invented story, idea, or concept

Materials:

- White paper
- White and yellow crayons
- Black or blue watercolors
- Paintbrushes

Images from “Images for Lesson Plans, Pre-K and Kindergarten” PowerPoint (Available at <http://africa.si.edu>):

- Image 1. Orion and Taurus (constellation)
- Image 2. Leo (constellation)
- Image 3: *Untitled*, Gavin Jantjes, 1989-1990

Introductory Discussion:

(See Lesson I, Introductory Discussion)

Activity

Procedure

Have students draw a night sky on a white piece of paper, using only white and yellow crayons. Paint over the drawing with black or blue watercolor paints, allowing the crayon to resist the paint and show through.

Evaluation (On scale of 1-5, 5 being the highest)

Did the student engage appropriately during the opening discussion?

Did the student follow directions?

Did the student do his/her best to create a wax resist painting?

Can the student define “constellation”?

Appendix A: Suggested Reading List/Additional Resources

Books

Education Reference

Glorieux-Desouche, Isabelle, and Phoebe Dunn. *How to Talk to Children about World Art*. London: Frances Lincoln, 2010.

Astronomy/Cultural Astronomy Reference

(African Cosmos: Stellar Arts, Exhibition Catalog, NMAfA)

Fansler, Judah. *Space: A Visual Encyclopedia*. New York: DK Publishing, 2010.

Goldsmith, Mike. *Amazing Space Q & A*. New York: DK Publishing, 2010.

Davis, Kenneth C. *Don't Know Much About Space*. New York: Harper Collins, 2001.

Sipiera, Diane M. and Paul P. Sipiera. *The Hubble Space Telescope*. Connecticut: Children's Press, 1998.

Stott, Carole. *I Wonder Why Stars Twinkle*. New York: Kingfisher, 2011.

Smithsonian Institution. *First Look at Space*. Connecticut: Soundprints Corp Audio, 2011.

Creation Myths

Anderson, David. *The Origin of Life on Earth*. Maryland: Sights Productions, 1996.

Bryan, Ashley. *The Story of Lightning and Thunder*. New York: Macmillan Publishing Company, 1993.

Dayrell, Elphinstone. *Why the Sun and the Moon Live in the Sky*. Boston: Houghton Mifflin, 1968.

Elkin, Benjamin. *Why the Sun was Late*. New York: Parents' Magazine Press, 1966.

Gatti, Anne. "Why the Moon Comes Out at Night." *Tales from the African Plains*. London: Puffin Books, 2001.

Gerson, Mary-Joan. *Why the Sky is Far Away*. Boston: Little Brown and Company, 1974.

Mollet, Tololwa M. *A Promise to the Sun*. Boston: Little Brown and Company, 1992.

Riordon, James. *The Coming of Night: A Yoruba Creation Myth from West Africa*. London: Frances Lincoln Limited, 1999.

Roth, Susan L. *Fire Came to the Earth People*. New York: St. Martin's Press, 1988.

Stewart, Dianne. *The Gift of the Sun: A Tale from South Africa*. London: Frances Lincoln Children's Books, 2007.

Constellation Myths and Other Books for Children

Driscoll, Michael. *A Child's Introduction to the Night Sky: The Story of the Stars, Planets, and Constellations—and How You Can Find Them in the Sky*. New York: Black Dog and Leventhal Publishers, 2004.

Lee, Fran. *Wishing on a Star: Constellation Stories and Stargazing Activities for Kids*. Utah: Gibbs Smith Publishers, 2001.

Mitton, Jacqueline. *Zoo in the Sky: A Book of Animal Constellations*. Iowa: National Geographic Children's Books, 2006.

Winter, Jeanette. *Follow the Drinking Gourd*. New York: Random House, Inc., 1988.

Books in Braille

Grice, Noreen Simon Steel, and Doris Daou. *Touch the Invisible Sky*. Puerto Rico: Ozone Publishing, 2007.

Grice, Noreen. *The Little Moon Phase Book*. Puerto Rico: Ozone Publishing Corporation, 2005.

Teacher Guides and Online Activities

Chandra X-Ray Observatory

<http://chandra.harvard.edu/edu/>

NASA---Educational Materials

<http://www.nasa.gov/education/materials>

How Big is Our Universe? An Exploration Through Space and Time (Booklet)

Produced by the NASA-SAO Education Forum on the Structure and Evolution of the Universe. 2009. PDF available at: http://www.cfa.harvard.edu/seuforum/howfar/HowBig_PFriendly.pdf

National Museum of African Art

<http://africa.si.edu/exhibits/teachers.html>

Voyage: A Journey Through Our Solar System (Outdoor Exploration Guide)

Produced by the Challenger Center for Space Science Education, the Smithsonian Institutions, and NASA. PDF available at: <http://www.sites.si.edu/exhibitions/exhibits/voyage/main.htm#publications>

Appendix B: Object Descriptions

**OBJECT IMAGES CAN BE FOUND ONLINE AS PART OF A
POWERPOINT PRESENTATION AT WWW.AFRICA.SLEDU**

Image 1:

Orion and Taurus

<http://www.starrynighteducation.com/stargazer/1573.shtml>

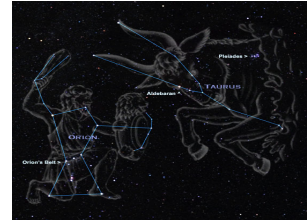


Image 2: *Untitled*, Gavin Jantjes

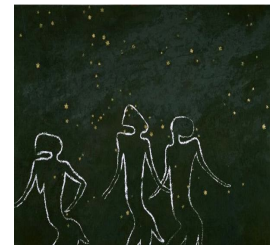
b. 1948, South Africa

Untitled

1989-1990

Acrylic on canvas

National Museum of African Art, Smithsonian Institution, purchased with funds provided by the Smithsonian Collections Acquisition Program, 96-23-1



A Khoi San myth recounts how a girl dancing around an evening fire threw glowing embers into the night sky, where they remained as a wide, shimmering pathway illuminating the celestial firmament – the Milky Way. To set the historic frame of deep time, the artist has rendered the dancing figures in a style reminiscent of southern Africa's ancient rock paintings.

(Artist's Bio) Raised in Cape Town's District Six, Gavin Jantjes received his masters of arts from the Hochschule für Bildende Künste in Hamburg, Germany. Rather than returning to a South Africa under apartheid, Jantjes stayed in Europe where he became a founding member of the German anti-apartheid movement, later served as a consultant for the United Nations High Commissioner for Refugees, and became an active participant in the British arts community. He now lives and works in Norway.

Image 3:

The Crab Nebula is a supernova remnant, all that remains of a tremendous stellar explosion. Observers in China and Japan recorded the supernova nearly 1,000 years ago, in 1054.

Credit: NASA, ESA, J. Hester and A. Loll (Arizona State University)⁸
<http://hubblesite.org/gallery/album/star/pr2005037a/hires/true/>



Image 4:

Hubble Observes Infant Stars in Nearby Galaxy

Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA) - ESA/Hubble Collaboration

<http://hubblesite.org/gallery/album/star/pr2007004a/hires/true/>



Image 5:

Hubble Space Telescope, Final Release Over Earth (2009)

Hubble drifts over Earth after its release on May 19, 2009 by the crew of the Space Shuttle Atlantis. The crew had performed all planned tasks over the course of five spacewalks, making the Servicing Mission 4, the fifth astronaut visit to the Hubble Space Telescope, an unqualified success.

<http://hubblesite.org/gallery/spacecraft/28/>



Image 6:

The Very Large Array

<http://apod.nasa.gov/apod/ap020528.html>



Image 7:

Earth's moon

<http://www.nasa.gov/multimedia/imagegallery/>

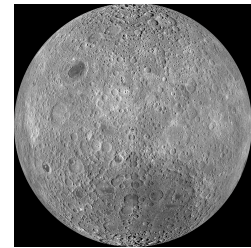


Image 8:

Pleiades Star Cluster

<http://www.nasa.gov/multimedia/imagegallery/>



Image 9:

Planet (Saturn)

<http://www.nasa.gov/multimedia/imagegallery/>

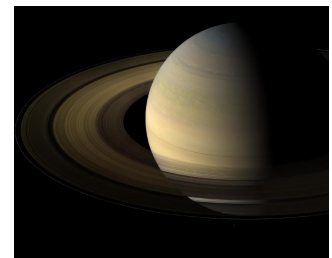


Image 10:

Milky Way Galaxy

http://www.nasa.gov/mission_pages/GLAST/science/milky_way_galaxy.html

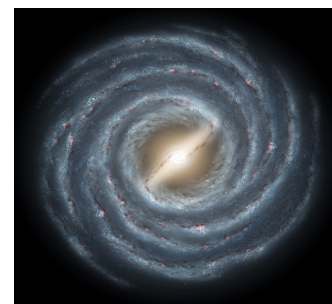


Image 11, Image 12, Image 13, Image 14:

Asante peoples, Ghana

Mid-20th century

Gourd, pigment

National Museum of African Art, Smithsonian Institution, gift of the Roy and Brigitta Mitchell Collection



The moon is a feminine symbol associated with faithfulness. The star recalls a proverb emphasizing the importance of faith and reliance on others: “Like the star, the child of the Supreme Being, I rest with God and do not depend upon myself [alone].” When moon and star are combined, the design conveys interdependence of men and women in marriage or asserts the reliability of the king (star), which is more constant than the changing phases of the moon.

Adinkra stamps are made of dried calabash, cut and shaped to a particular design. The stamp is dipped into a thick dye made from boiled tree bark, iron, slag, and water. A cloth is usually stamped with several *adinkra* signs arranged in registers in a grid-like arrangement and bordered by parallel lines. (More information on the meaning of specific symbols in “Astronomic Art Lessons and Activities for Elementary Students, Grades 1-5”)

Image 15:

Solar System

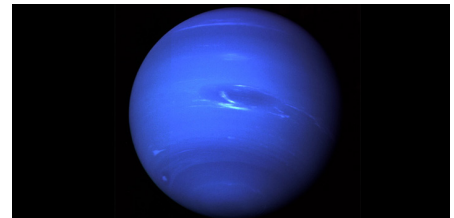
<http://www.nasa.gov/>



Image 16

Planet (Neptune)

<http://solarsystem.nasa.gov/images/Neptune.jpg>



Appendix C: Learning Standards

Lesson 1. Kinesthetic Constellations

Grades K-4

National Visual Arts Standard

- 1.a Use different materials, techniques, and processes to communicate ideas, experiences, and stories.
- 4.a. Know that the visual arts have both a history and specific relationships to various cultures.

Lesson 2. Tubular Telescopes

Grades K-4

VA Science Standard, Kindergarten

K.7 The student will investigate and understand that shadows occur when light is blocked by an object. Key concepts include:

- a) shadow occur in nature when sunlight is blocked by an object; and
- b) shadows can be produced by blocking artificial light sources.

Lesson 3. Outer Space Mural

Grades K-4

National Visual Arts Standard

- 1.a Use different materials, techniques, and processes to communicate ideas, experiences, and stories.

Lesson 4. Glitzy Galaxies

Grades K-4

National Visual Arts Standard

- 4.a. Know that the visual arts have both a history and specific relationships to various cultures.
- 6.b. Identify connections between the visual arts and other disciplines in the curriculum.

Lesson 5. Coffee Filter Planets

Grades K-4

National Visual Arts Standard

- 1.a Use different materials, techniques, and processes to communicate ideas, experiences, and stories.

Lesson 6. Hole-y Heavens

Grades K-4

National Visual Arts Standard

- 1.a Use different materials, techniques, and processes to communicate ideas, experiences, and stories.

Lesson 7. Magically Appearing Stars

Grades K-4

National Visual Arts Standard

- 1.a Use different materials, techniques, and processes to communicate ideas, experiences, and stories.