Van Wezel

THE CITY OF SARASOTA'S PERFORMING ARTS HALL

ARTWORKS FOR SCHOOLTIME

2024-25 Learning Module Series 5

to accompany the Van Wezel Schooltime Performance of

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TABLE OF CONTENTS:

LESSON 1

SHOOT FOR THE MOON: MAKING A MODEL ROCKET SHIP

by Katelyn McKelley

STANDARDS:

SC.2.P.13.4: Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object.

VA.2.C.2.1: Use appropriate decision making skills to meet intended objective.

SC.3.P.10.2: Recognize that energy has the ability to cause motion or create change.

SC.3.E.5.4: Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.

SC.4.P.10.2: Investigate and describe that energy has the ability to cause motion or create change.

SC.5.P.13.2: Investigate and describe that the greater the force applied to it, the greater the change in motion of a given object.

STUDENT LEARNING INTENTIONS AND SUCCESS CRITERIA:

Today I will...

- Use my imagination to play the part of a rocket scientist.
- Design and build my own rocket ship model out of recycled materials.
- Explore the science behind its propulsion and investigate how its flight is affected by the angle from which it is launched.

I will know I am successful when...

- I have constructed a model rocket ship.
- I can describe how air pressure propels my rocket ship.
- I can identify how the angle of the launch point affects its trajectory.

GOALS:

Students will provide space for their own imaginative play and creativity. Students will identify various components of a rocket ship and create their own model that is propelled by air pressure. Students will identify factors that allow the rocket will fly farther, such as it being launched at an angle as opposed to directly vertical.

MATERIALS:

- **Attachment 1** – Rocket Science Concepts
- **Attachment 2** – Rocket Ship Templates
- **Attachment 3** – Rocket Ship Construction Example Images
- Plastic bottle with sports cap*
- One smaller straw (a regular drinking straw)
- One larger straw (a smoothie straw)
- Play-Doh
- Scissors
- Tape
- Cardstock
- Materials to design and decorate (markers, stickers, etc.)
- Optional: rocket ship template
- Regards to the Man in the Moon by Ezra Jack Keats (**see skill building)

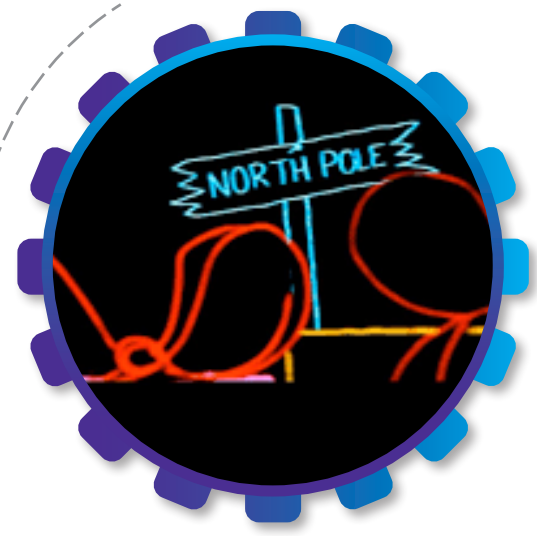
**It is possible to use a regular water bottle with a flat cap, but the area around the straw must be sealed so a sports cap is easier. Otherwise, a small hole will need to be drilled in the center of a flat cap to stick the straw through.*

GUIDING QUESTION(S):

1. What is the importance of using our imaginations? How is it helpful, even in the world of science?
2. In designing a rocket ship, what are some of the factors a rocket engineer must consider? (i.e.: shape of the aircraft, the amount of energy it takes to launch, etc.)

SKILL BUILDING AND PROCEDURE FOR LESSON:

Begin with a discussion about space aircraft in general. Use **Attachment 1** as a guide for discussion. There are many scientific concepts that can be explored within this main activity. **Attachment 1** contains some of these concepts and vocabulary that can be discussed per students' ages and current academic curricula.



***Particularly for younger students, reading aloud Regards to the Man in the Moon by Ezra Jack Keats is a great creative launchpad and introduction to this project. The book tells the story of a young boy who builds a rocket ship out of his father's "so-called junk" (much like how the main activity of this lesson utilizes commonly found and recyclable materials). Fueled by imagination, the boy and his friends then embark on a wondrous space exploration.*

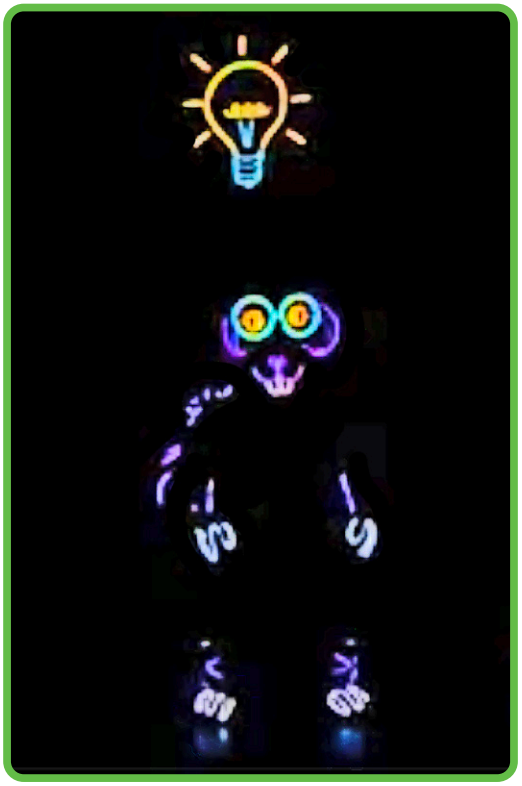
MAIN ACTIVITY – Construction of the Rocket:

(Refer to **Attachment 3** for image examples)

1. Depending on age and skill level, students will either choose a rocket ship template from **Attachment 2** (sheets are printable and accurate to size) or may design and draw their own rocket ship concepts.
2. Once either the template or the ship of their own design is cut out, allow students time to decorate their aircraft, using whatever art supplies are available (markers, colored pencils, crayons, stickers, watercolors, etc.)
3. Next, shift focus to the materials that will power the aircraft. Insert the smaller straw through the sports cap opening (or through the hole poked through a flat cap).
4. Mold Play-Doh around the straw and around the opening of the cap to seal it completely. If the Play-Doh is not holding firmly, use masking tape to secure the straw to the cap and then apply the Play-Doh to prevent any air from passing through around the straw.
5. Next, cut off a small section of the bigger straw (approx. 2.5 inches in length). Use tape to seal off one end of the straw.
6. Tape the bigger straw section to the back of the rocket (be sure the closed end of the straw is pointing towards the nose or top of the rocket).
7. Place the rocket with the straw (open-end down) on the smaller straw affixed to the cap on the bottle.
8. Once the rocket is on its launchpad, it is ready for take-off. Instruct students to squeeze the bottle with some force to launch the rocket into the air.

REFLECTION QUESTIONS (EXIT TICKET):

1. How does the amount of pressure applied when squeezing the bottle affect the trajectory of the rocket ship? If lightly squeezed, how far does the rocket ship launch? How about when it is squeezed quickly and with a greater amount of force?
2. Explore what happens when the bottle is squeezed at an angle as opposed to vertically (be sure the same amount of squeezing pressure is applied to each position as a controlled variable). Why do you think the rocket ship trajectory is different, even though the amount of force applied is the same?



ATTACHMENT 1
Rocket Science Concepts

These simple squeeze bottle rockets demonstrate the basic principle of rocket propulsion: **Newton's Third Law**.

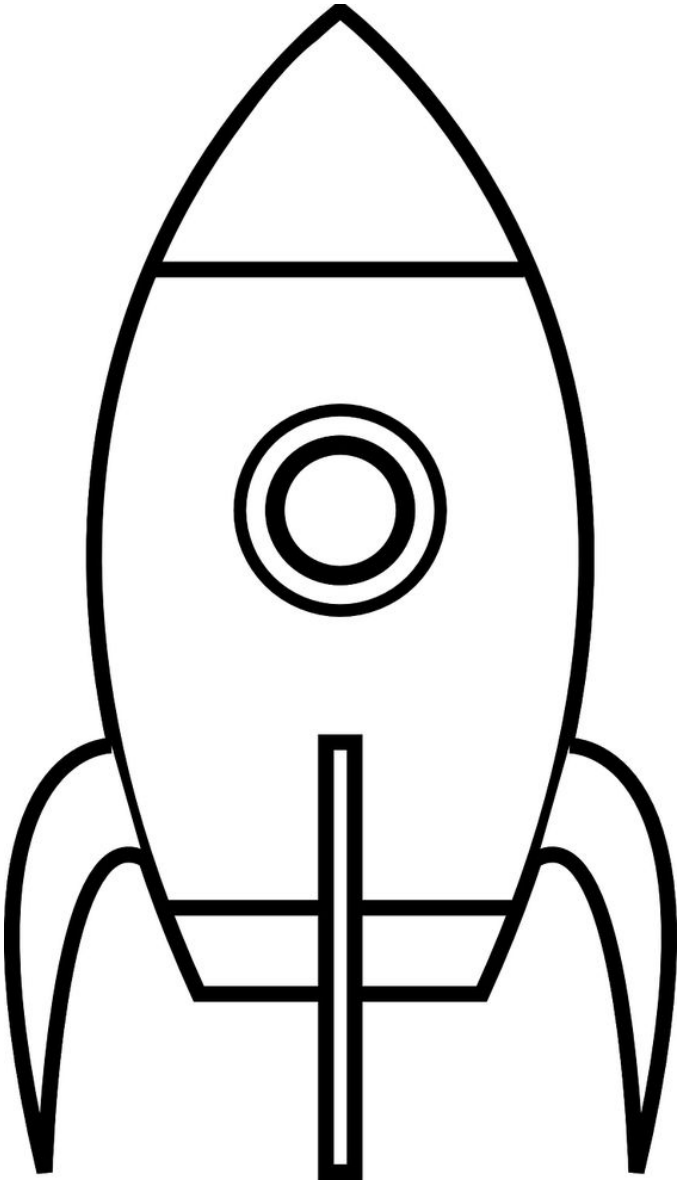
Newton's Third Law: Explains that every action has an equal and opposite reaction. In the case of rockets, the action is the fuel being blasted downward and the resulting reaction is the rocket ship itself being launched upward. The more fuel used, the greater the action and reaction.

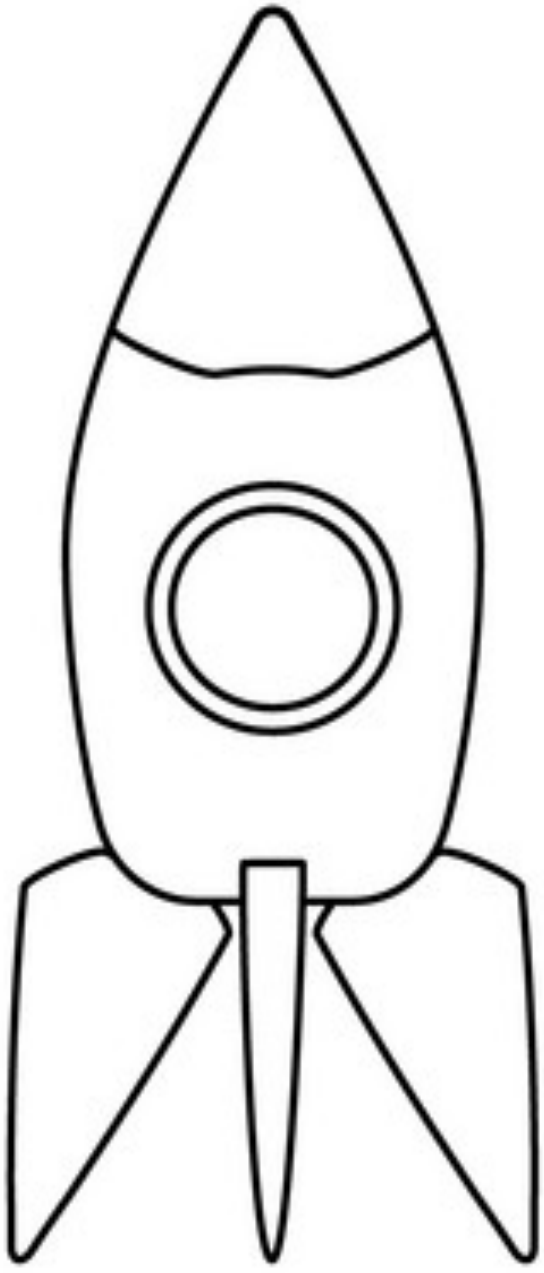
With regards to the squeeze bottle rockets, the "fuel" used is air pressure. When the bottle is squeezed, the internal air pressure is reduced, resulting in a net force that pushed the rocket upward.

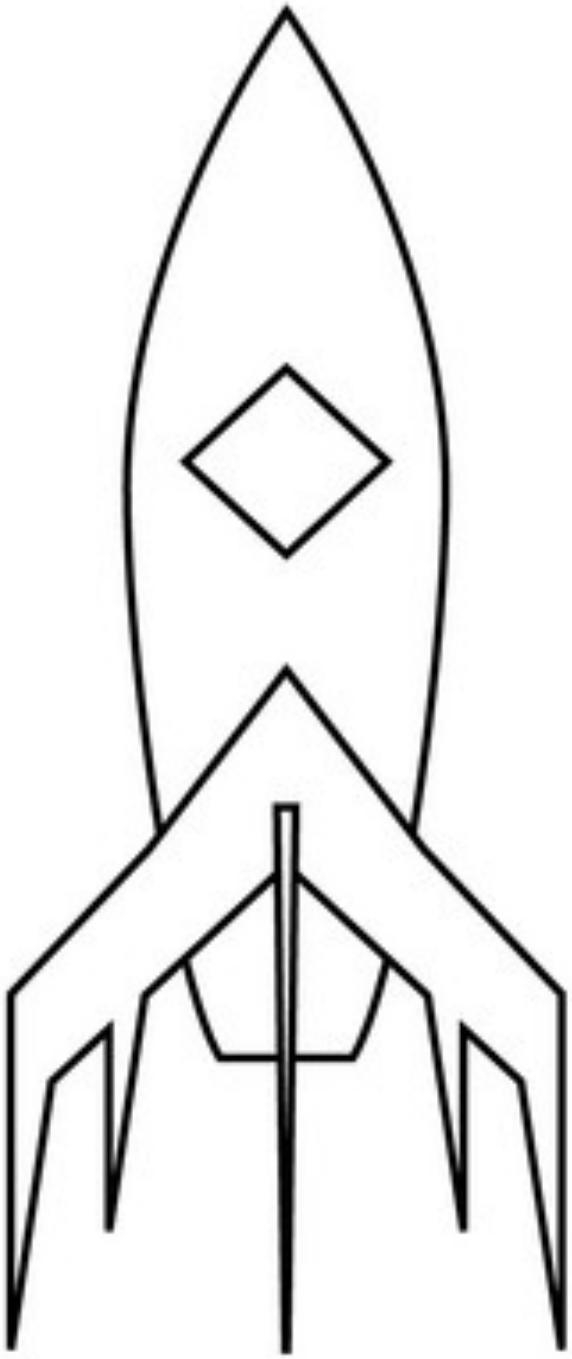
The harder the bottle is squeezed, the more air is forced out of the straw, and thus the rocket will fly higher and/or farther.

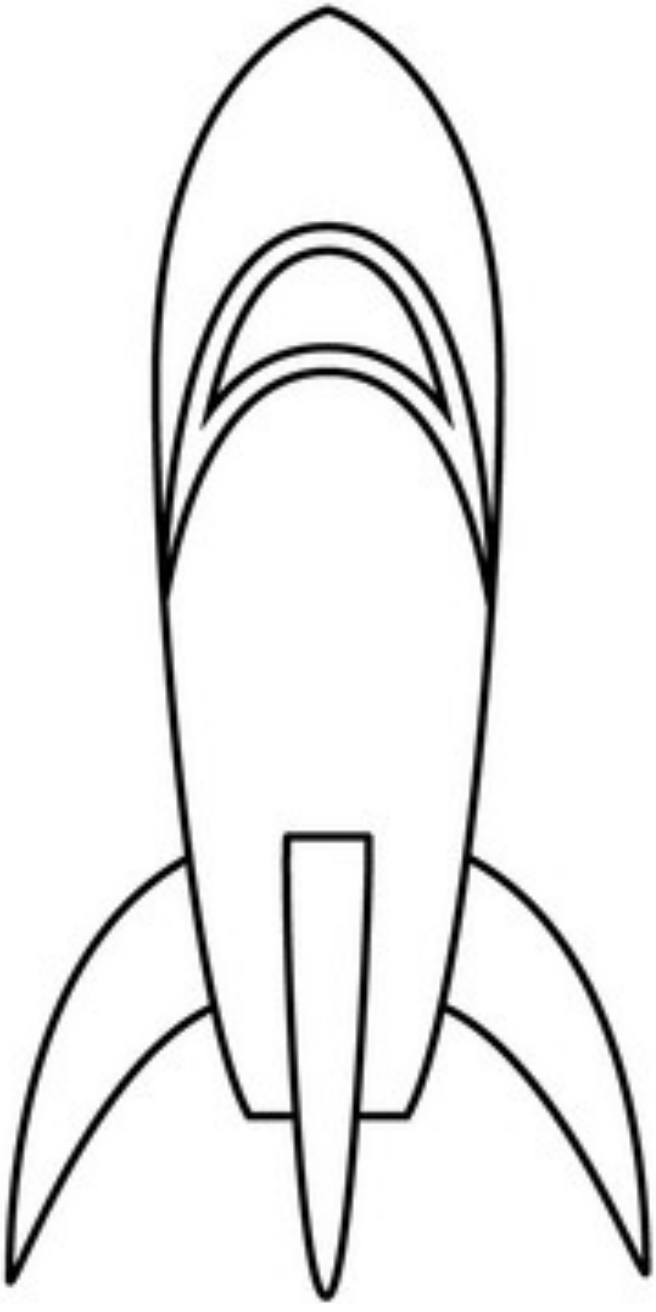
The squeeze bottle rockets will fly farther if launched at an angle (tipping the bottle slightly) rather than straight up. This is because of gravity and the forward force created by the air pressure being squeezed out of the straw acting together to create a curved flight path.

ATTACHMENT 2
Rocket Ship Templates





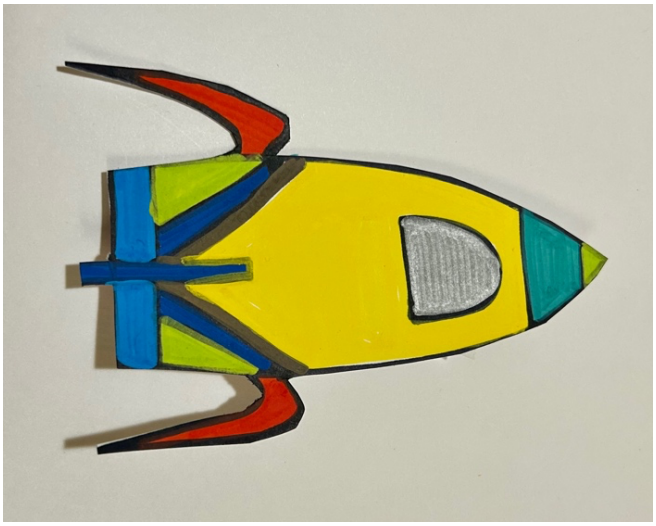




ATTACHMENT 3
Rocket Ship Construction Example Images

Example of sports cap.

Alt text = A close-up image of a blue bottle cap with a transparent flip-top cover, placed on a white surface.



Example of Steps 1 and 2. Alt text = An illustration of a colorful rocket ship with a yellow body, green tip, silver window, and blue accents at the base. The rocket has red and black fins on both sides and is set against a plain background.

Example of Steps 3 and 4. Alt text = A transparent plastic bottle is placed on a white surface, with a red straw inserted through the blue cap. The background has a partially visible yellow and white wall. The bottle's label is partially visible.

Example of Steps 5 and 6. Alt text = A rocket ship cutout made from thin white cardboard with two fins. A red straw is taped vertically to the center of the cutout.

Example of Step 7. Alt text = A homemade rocket made from a plastic bottle, a red straw, and paper. The bottle serves as the base, with the paper cut into the shape of a rocket and attached to the top via the straw. The setup is placed against a yellow and white background.

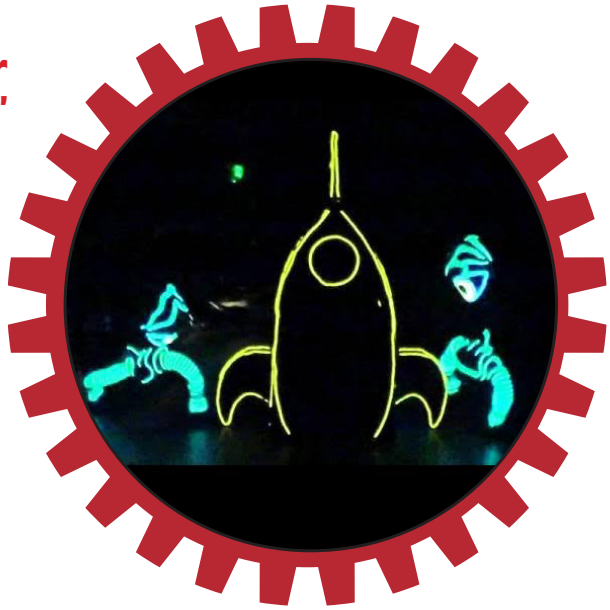
Example of Step 8. Alt text = A handcrafted rocket made from paper colored brightly, attached to a red straw, is inserted into the opening of an empty plastic bottle, making the bottle appear as the rocket's launch pad. The background is yellow and white.

LESSON 2

CELEBRATING DIFFERENCES WITH "MOON MOUSE: A SPACE ODYSSEY"

by Jenna Outerbridge

"We are all stars in our own way, and our differences make our universe more beautiful."



STANDARDS:

ELA: ELA.3.V.1; ELA.3.C.5; ELA.3.F.1 ; ELA.K.R.3.3

DANCE: DA.K.H.1.1; DA.2.H.1.1; DA.4.H.1.1; DA.3.C.1.1; DA.3.C.1.In.a; DA.3.C.1.Pa.b; DA.3.H.1; DA.4.S.1.3; DA.1.S.1.1

STUDENT LEARNING INTENTIONS

- I can identify traits about myself that make me unique.
- I can recognize how being different is a strength.
- I can follow verbal instructions focusing on specific movement qualities.
- I can create movement using B.E.S.T. (Body, Energy, Space and Time) dance elements.

SUCCESS CRITERIA

I will know that I am successful when I can create movement that represents my unique personality and interests.

GOALS

- Students will identify their unique traits and abilities.
- Students will explore multiple movements and gestures in a sequence to represent an idea.
- Students will work together using dance elements (B.E.S.T.).
- Students will develop spatial awareness, kinesthetic awareness, social awareness, and improvisational skills.

MATERIALS

- Glow sticks or flashlights
- Objects to mark the location of movement stations (cones, beanbags, etc.)
- Clear space for Skill Building and Main Activity
- Space themed music and slow music for cool down

GUIDING QUESTIONS:

- What are some things that make each of us unique?
- What are some ways that we can express our individuality?
- How can being different be a good thing?

SKILL BUILDING

Share a brief synopsis of "Moon Mouse: A Space Odyssey." Highlight the theme of celebrating differences and how the main character, Marvin the Mouse, embarks on an adventure to the moon despite feeling different from others.

WARM-UP:

Space Stretch (non-locomotor)

Ask students to spread out in the space and extend their arms wide to the side, creating their own space bubble to move and stretch in. Lead the students in a series of space-themed stretches:

- Reach for the stars (stretch arms up high)
- Moon bends (side stretches)
- Rocket launch (jumping in place)
- Floating in space (gentle swaying and twisting)

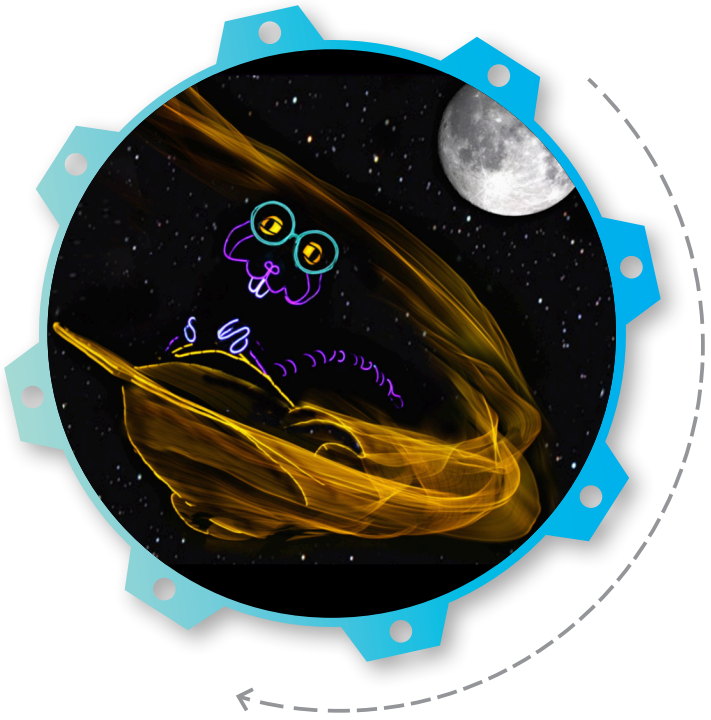
Moon Bounce Movement Exploration (locomotor)

Tell students that together you will explore the surface of the moon. Remind them that there is no gravity in space and they should create light, bouncy movements, as if walking on the moon. Guide students through soft and slow bounces, then speed up, increasing the height and force of their jump. Point out to the students how the speed changes the rise and fall.

Ask when they feel light, and when they feel heavy. Are they moving fast or slow?

Galactic Journey (locomotor)

Create a simple obstacle course or a series of movement stations (e.g., crawling through a "wormhole," hopping over "craters," balancing on a "comet tail"). Tell the students that each station represents a different part of Marvin's journey. Emphasize different movements to try that correlate with each station.



MAIN ACTIVITY

Spread students out in the classroom. Give them five minutes to work on the following:

Ask the students to create alien movement, inspired by something that makes them unique. Offer suggestions (i.e. physical traits, personality traits, things they like to do). For younger kids, start with one movement at a time. Make sure they have practiced it a few times, then invite them to create another. For older kids start with three movements. They should practice and memorize all of their movement. After they create and practice three movements in succession, ask the students to create a linking movement between each of their chosen movements, so that it becomes a movement phrase. Remind them to be creative and try using different levels, speeds and shapes. Emphasize that they have a clear beginning, middle and end, and that the movements happen in the same succession each time.

Optional - Invite the students to perform their movement with the lights on, then in the dark with glow sticks or flashlights.

Celebrate each performance by pointing out the unique and creative movements you see performed and encourage the students watching to do the same.

Encouraging Sidenotes

- Remind the students that there is no right or wrong.
- Think about different categories you can add or questions you can ask to prompt different movement choices.
- Point out what you see as the students move, i.e. "You're shooting off the ground with so much force, just like a rocket!"

REFLECTION QUESTIONS

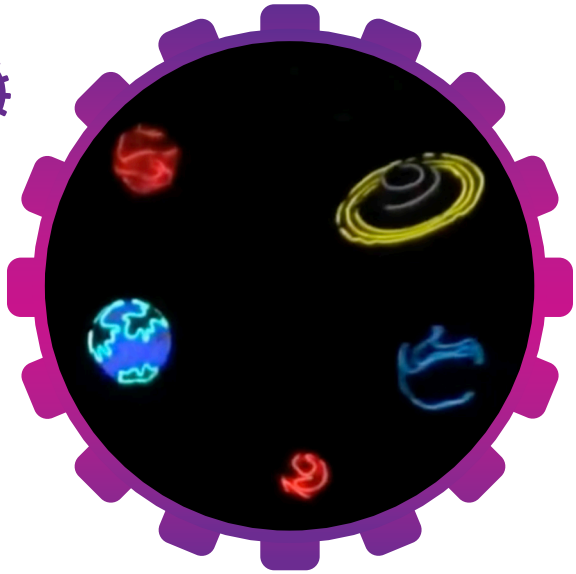
Return to the guiding questions:

- What is unique about me?
- How are my differences my strengths?
- How did the movement change (the feeling, the mood, etc.) when the lights were turned on versus turned off? What looked different and what looked the same?

COOL DOWN

Star Gaze Relaxation

Play soft music. Ask the students to lie on their backs and close their eyes. Guide the students through a body scan using space imagery and encouraging them to relax different parts of their body. (I.e. spread fingers wide like a star, relax; stretch your legs straight like a rocket blasting off, relax; etc.) Finish with the students relaxing their bodies, feeling so light, they could float up to space.



LESSON 3

CONSTELLATION TEE SHIRTS

by Freda Williams Kmak

STANDARDS

SC.3.E.5.5. Investigate that the number of stars that can be seen through telescopes is dramatically greater than those seen by the unaided eye.

SC.3.E.5.1. Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.

VA.3.S.2.1. Integrate the structural elements of art and organizational principles of design with sequential procedures and techniques to achieve an artistic goal.

STUDENT LEARNING INTENTIONS AND SUCCESS CRITERIA

Today I will ...learn that stars vary in size and color. Stars make constellations that can be seen at different times throughout the year. I will learn to use patterns in my composition.

I know I am successful when ...I create a unique constellation with a pattern with shape and color. My constellation will have a title and description found in my artist statement.

GOALS

Students will observe and review facts about stars- and their proximity to Earth. Students will make observations about existing constellations. They will create their own constellation with a set of criteria. They will consider the pattern of their stars as well as the color choices to create their glow-in-the-dark constellation tee shirt.

MATERIALS

- Black tee shirts
- Glow in the Dark Dimensional fabric paint (Puffy Paint)
- Planning sheet
- Pencils
- Artist Statement handout

GUIDING QUESTIONS

- How does using the imagination help an artist create a constellation?
- What are some different meanings other than heat and size, that stars convey?

SKILL BUILDING AND PROCEDURE FOR LESSON

1. Review the basic science concept that stars are different sizes and colors depending on their age and heat. Show an image of stars from a telescope. **(Attachment 1 and 2)**
2. Lead a discussion about constellations focusing on the idea that constellations are made up of a series of stars and the imagination. **(Attachment 3)**
3. Review the art element of pattern. **(Attachment 4)**
4. Show example of Van Gogh's Starry Night to discuss how the "masters" of art interpret the night sky including stars. **(Attachment 5)**

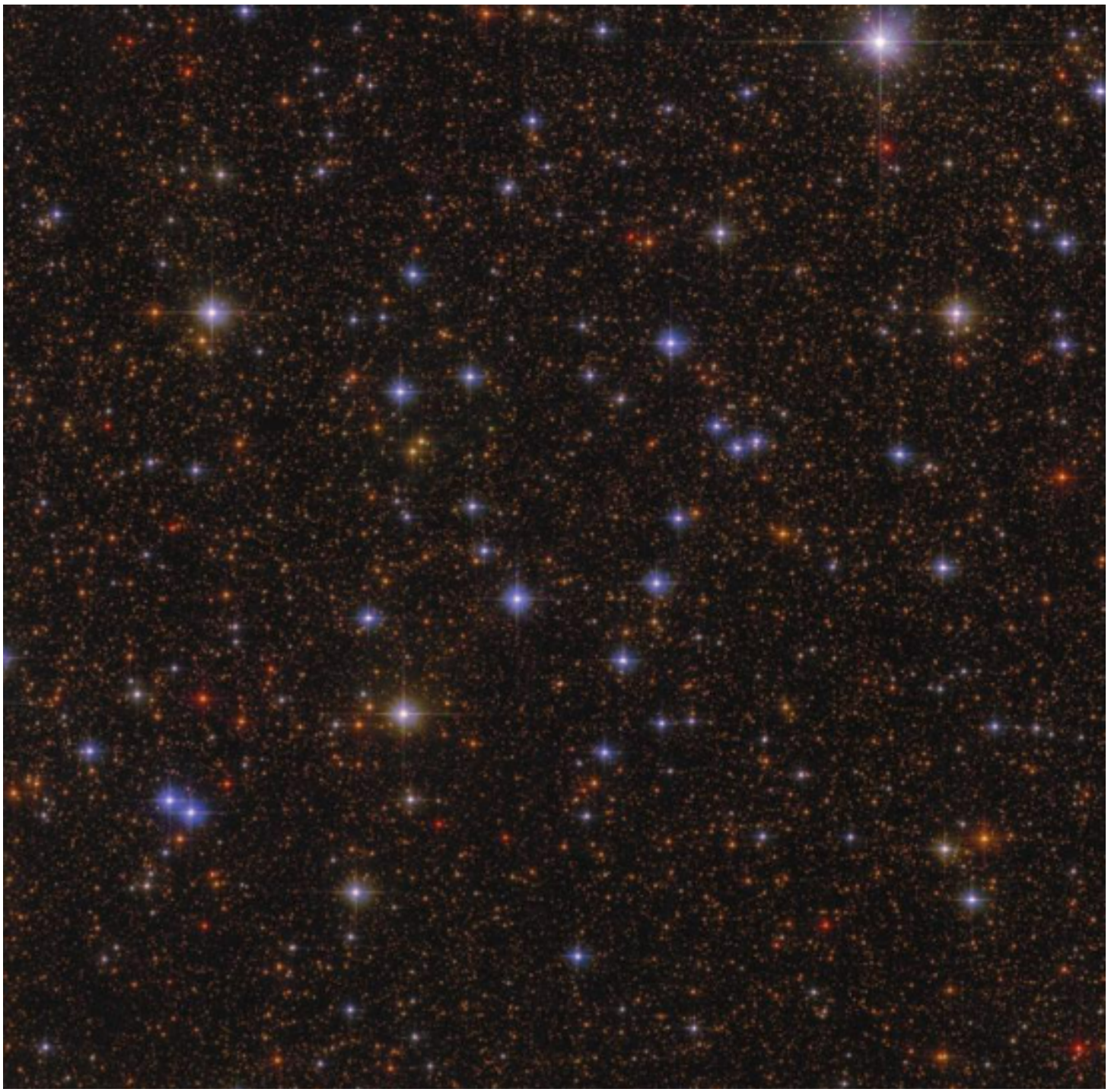
MAIN ACTIVITY

1. Students will use the Think Sheet to help design their constellation. **(Attachment 6)**
2. Lead a group discussion about each question to help the students brainstorm ideas.
3. As they are creating their own constellation be sure to check in with the students one at a time to encourage pattern building through shapes and colors.
4. Display examples of constellation tee shirts so students will remember to center their design on the front. **(Attachment 7)**
5. Before passing out the fabric paint here are some general reminders: the paint is permanent so wearing aprons would be a good option, keep the design on the front 2/3 of the tee shirt, do not add designs to the sleeves, and start with the stars first.
6. It will take between 24-48 hours for the paint to dry so keep this in mind for planning purposes.
7. When everyone has completed their tee shirts have everyone change into their shirts for a mini fashion show. Allow time for each student to present their design and explain their creative choices.
8. Once complete have each student fill out an exit ticket. **(Attachment 8)**

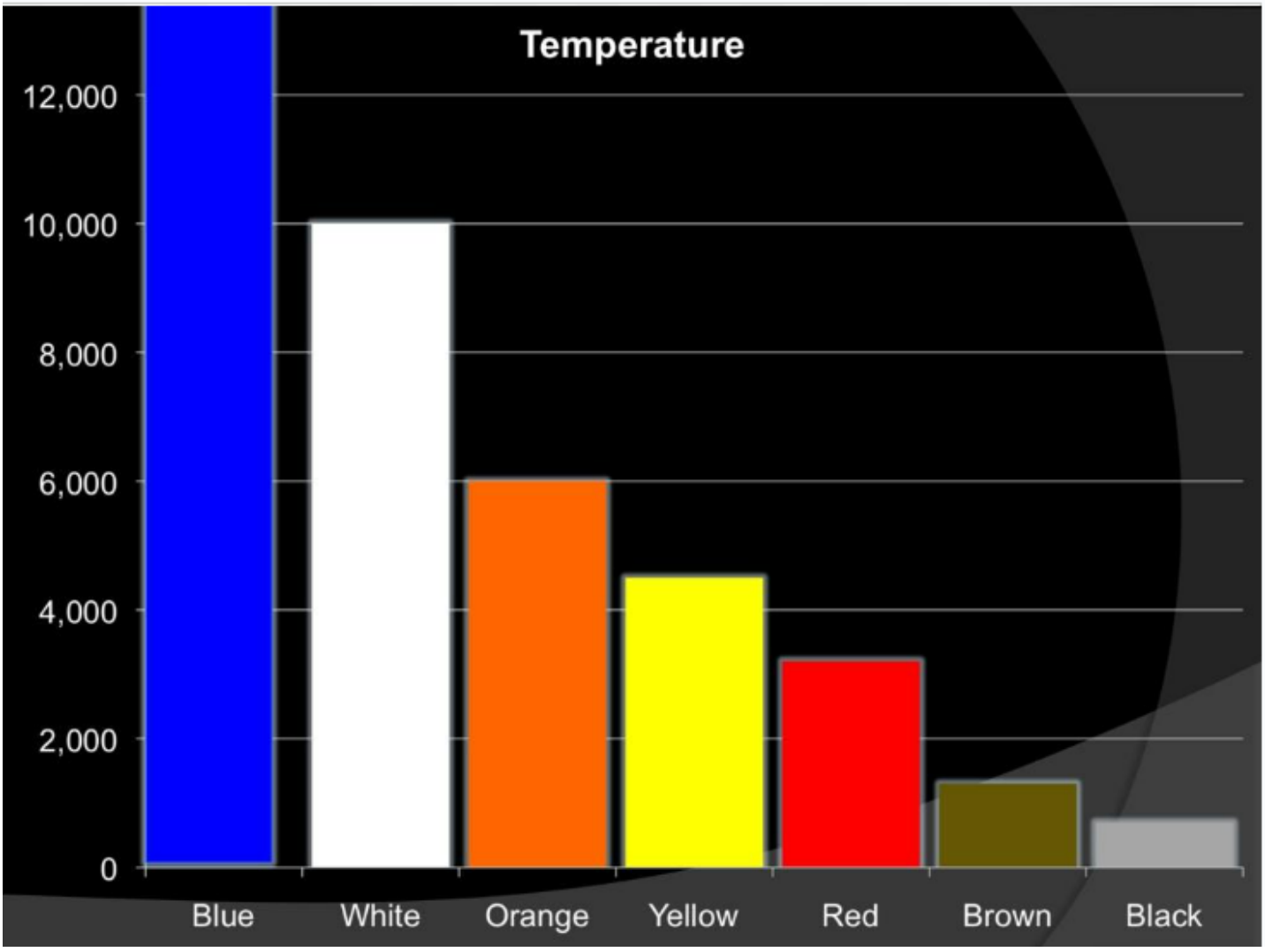
REFLECTION QUESTIONS (EXIT TICKET)

1. Use **Attachment 8** for reflection questions.

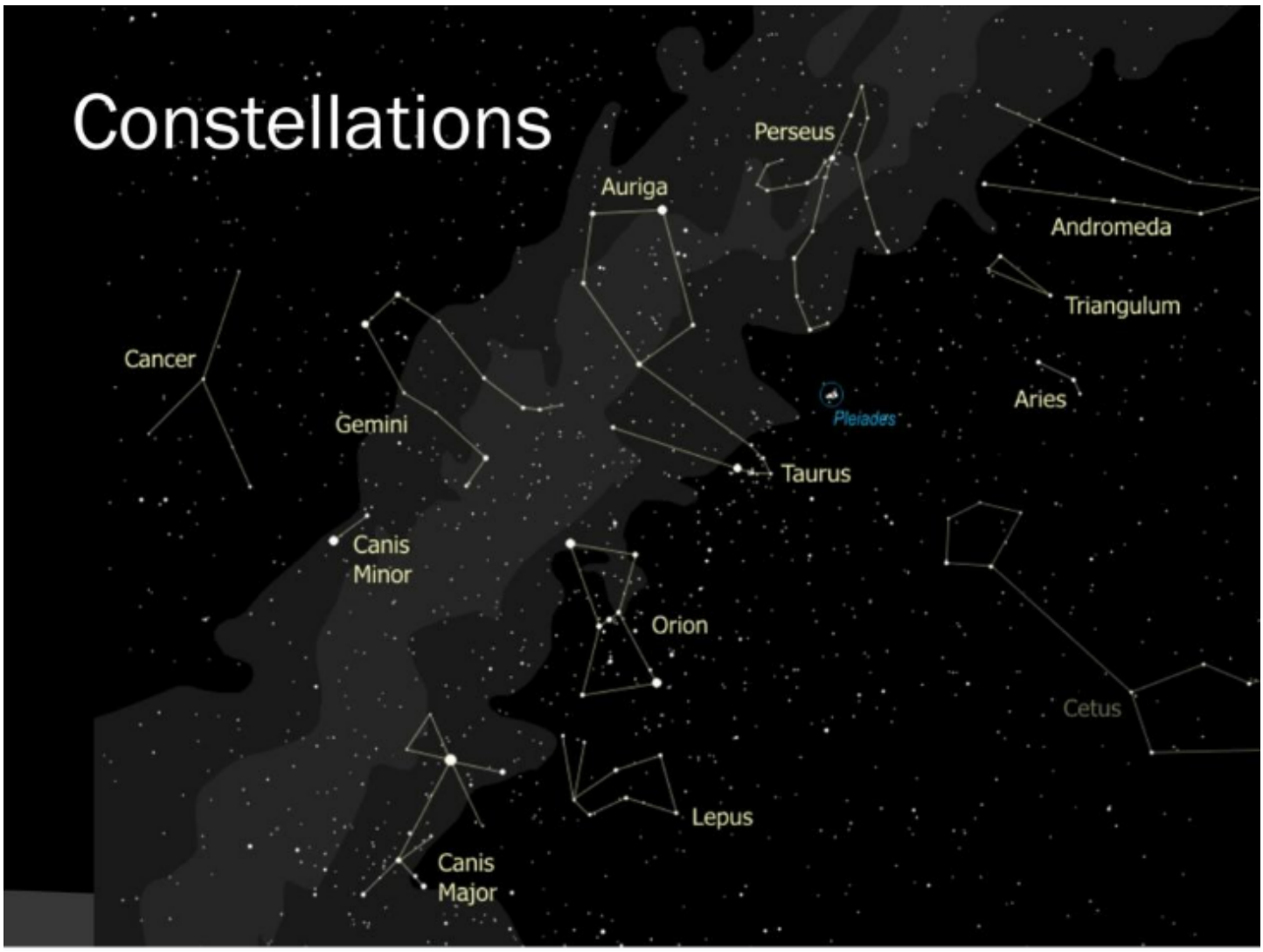
ATTACHMENT 1



ATTACHMENT 2



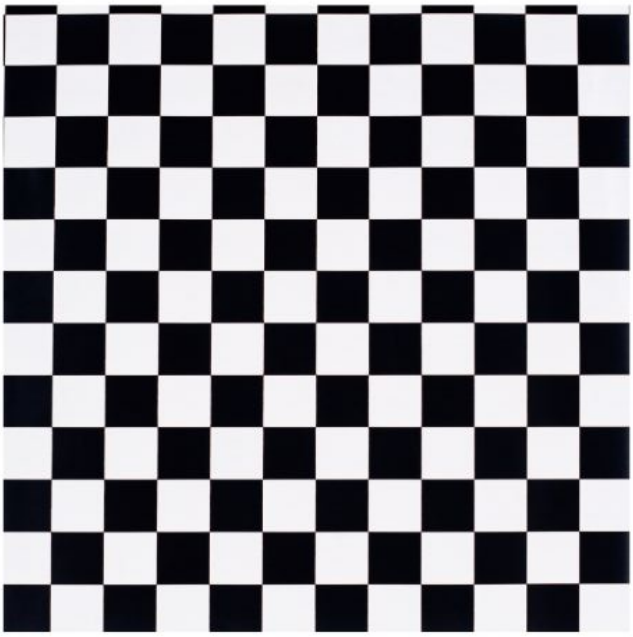
ATTACHMENT 3

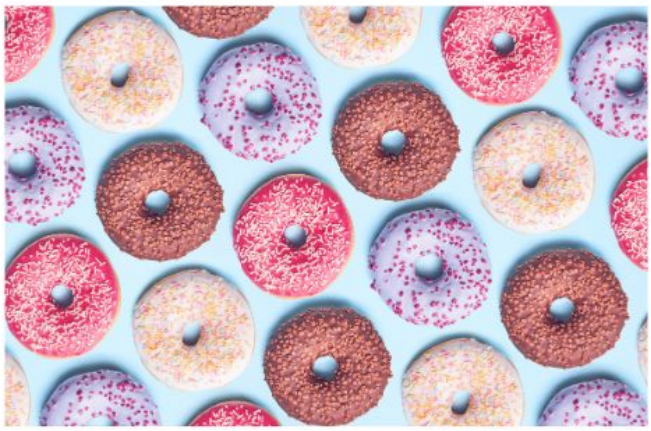


ATTACHMENT 4

Pattern

The repitition of visual elements such as colors, shapes, or textures found in art.





ATTACHMENT 5

ATTACHMENT 6

Constellation Tee Shirt Think Sheet

1. What is the name of your constellation? _____

2. What time of year do you see your constellation? _____

3. What does your constellation mean? _____

4. Which country or continent sees your constellation as the clearest? _____

5. Create your constellation outline with 14 stars.

6. Think about the size and color of your stars.

7. Once created draw lines to connect your stars.

Use the space below to make your sketch.

ATTACHMENT 7

ATTACHMENT 8

Name: _____ **Exit Ticket**

1. What connection did you make between art and space science by participating in this activity? _____

_____

_____

_____

2. What is most important to remember when thinking about constellations? _____

_____

_____

_____

3. What was your favorite part about this activity?_____

_____

_____

_____