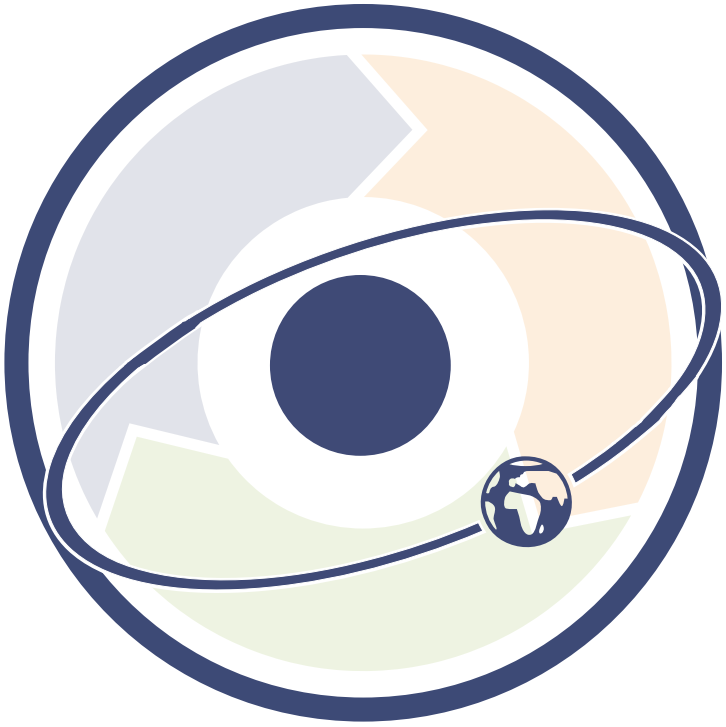
OPEN
Online Physical Education Network



TOOLS FOR LEARNING ABOUT SPACE AND SCIENCE

PRIMARY (K-2)

A Public Service of

US Games

TOOLS FOR LEARNING ABOUT SPACE AND SCIENCE

PRIMARY (K-2)

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In partnership with the SUNY Cortland AMP Lab.
OPEN is a Public Service Organization supported by US Games and BSN Sports.

MODULE OVERVIEW

ABOUT THIS MODULE

Just as classroom teachers have a responsibility to promote physical activity and advocate for physical education programs, physical educators must also infuse STEM subject areas into our outcomes-based instructional schedule. OPEN's Next Gen Connections Modules are designed to incorporate STEM concepts using the Next Generation Science Standards to guide our planning and instruction. This module provides students with an introduction to space and our solar system while reinforcing movement concepts and developing motor skills.

For more information about space and our solar system, visit NASA for Educators: https://www.nasa.gov/audience/foreducators/index.html

NATIONAL STANDARDS AND OUTCOMES FOCUS

- **SHAPE America Standard 1 [E1.K-2]** Performs locomotor skills (hopping, galloping, running, sliding, skipping) while maintaining balance (K); Hops, gallops, jogs, and slides using a mature pattern (1); Skips using a mature pattern (2).
- **Standard 2 [E1.K-2]** Differentiates between movement in personal (self-space) a general space (Ka); Moves in personal space to a rhythm (Kb); Moves in self-space and general space in response to designated rhythms (1); Combines locomotor skills in general space to rhythms (2).
- **Standard 4 [E4.K-2]** Shares equipment & space w/others (K); Works independently w/others in a variety of class environments (e.g., small & large groups) (1); Works independently with others in partner environments (2).
- **Next Generation Science Standard 1-ESS1-1:** Uses observations of the sun, moon, and stars to describe patterns that can be predicted. *The Universe and its Stars.* Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted (ESS1.A); *Earth and the Solar System.* Seasonal patterns of sunrise and sunset can be observed, described, and predicted (ESS1.B).

TABLE OF CONTENTS

PLANNING COMPLETE LESSONS

This mini-module is designed to be delivered in one complete class period. Everything is included for full participation and evaluation of student learning.

Instant Activity: Rocket Launch	*5–10 minutes*
+ Skill Activity: Sunlight, Moonlight, Stars	*10–15 minutes*
+ Skill Activity: Changing Seasons	*10–15 minutes*
+ Check for Understanding	*5 minutes*

Important: Suggestions are what they say they are — *suggestions*. All OPEN materials are offered in MS Word format so that you can easily modify our suggestions to meet the needs of your students.

ASSESSMENT

Two types of assessment are provided as a part of this module. However, there are many different ways for teachers and students to assess and evaluate student learning and skill development.

Final Discussion Questions:
OPEN Connections activities are meant to offer skill-building physical activity as well as a context for discussing Next Generation Science concepts. Use the provided DOK discussion questions to debrief student understanding.

Holistic Performance Rubric:
The Holistic Performance Rubric can be used as both a formative and summative assessment within the module. Providing students with the rubric's criteria at the start of the lesson will allow for discussion and formative evaluation throughout each activity.

CONNECTION NOTES:

(Use this space to make notes to enhance this module for your next implementation.)

MATERIALS LIST

QTY	NAME	CODE	US Games USGAMES.COM
12	Partner Parachutes		Link to e-Store
12	Hoops		Link to e-Store
12	6” Voit Bouncee Foam Balls		Link to e-Store
12	Spot Markers		Link to e-Store
6	Fitness Balls		Link to e-Store
6	Large Cones		Link to e-Store
6	Task Tents		Link to e-Store
6	Foam Dice		Link to e-Store
24	Yarn Balls		Link to e-Store
24	Bean Bags		Link to e-Store
			OPENPhysEd.org
	Changing Seasons Task Cards		OPENPhysEd.org
	Academic Language Cards		OPENPhysEd.org
	Student Discussion Questions		OPENPhysEd.org

ROCKET LAUNCH

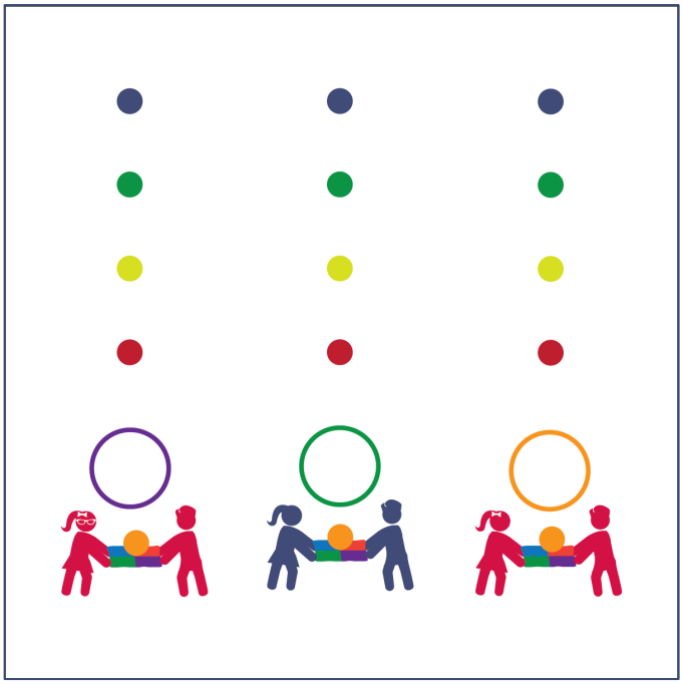
STUDENT TARGETS

- **Skill:** I will move with my classmates to send objects upward.
- **Cognitive:** I will learn about force.
- **Fitness:** I will demonstrate muscular strength and endurance while exploring force with parachutes.
- **Personal & Social Responsibility:** I will share equipment safely with my classmates.

TEACHING CUES

- Work Cooperatively
- Share Safely
- Launch to the Stars

ACTIVITY SET-UP & PROCEDURE



Equipment:

- 1 partner parachute per 2–4 students
- 1 hoop per 2–4 students
- 1 6” Voit Bouncee Foam Ball per 2–4 students
- 4 poly spots (red, yellow, green, blue)

Set-Up:

1. Place hula hoops, parachute, and balls along the perimeter of the boundary area.
2. Place students into groups of 2–4; each group with 1 ball and 1 partner parachute.
3. Measure 4 distances from the hula hoop, each distance marked with a colored spot. Place the red spot 5’ away from the hoop, the yellow spot 5’ away from the red spot, the green spot 5’ away from the yellow spot, and the blue spot 5’ away from the green spot.

Activity Procedures:

1. Today’s activity is called Rocket Launch. Our goal is to launch our rockets (foam balls) into outer space. This will help us learn about how force affects an object. If an object touches or collides with another object, there is a reaction. For example, 1 object can push on another object, which will change the 1st object’s motion. We will use this concept to get our rocket into the outer orbit of the Earth.
2. Begin by placing 1 rocket in the center of the parachute. Your group will work together to launch the rocket into space by sending it flying from your hoop and past your cone. (Now your rocket is in the Troposphere — lower orbit.)
3. Once you’re able to launch into space, work with your team to complete all 3 challenges.
    a. Launch past the red color spot (Troposphere — lower orbit)
    b. Launch past the yellow spot (Thermosphere — middle orbit)
    c. Launch past the green spot (Thermosphere — middle orbit)
    d. Launch past the blue spot (Exosphere — where most satellites orbit the earth)

Grade Level Progressions:

- **K:** Reduce the distance between the spots and reduce the number of challenges to 3 (Troposphere, Thermosphere, Exosphere).
- **1st:** Play the activity as described above.
- **2nd:** Place hoops as “landing pads.” Students try to launch from their “launch pad” to their “landing pad.”

CONNECTION NOTES

SUNLIGHT, MOONLIGHT, STARS

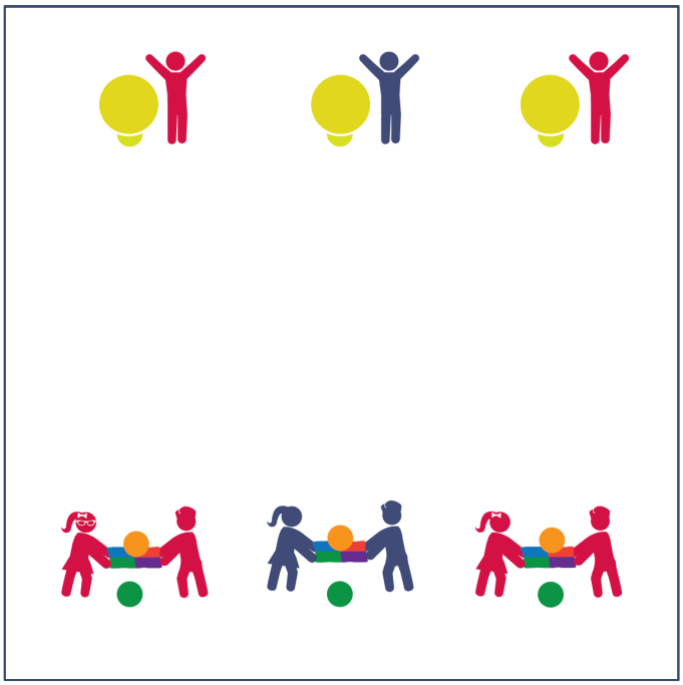
STUDENT TARGETS

- **Skill:** I will use locomotor movements while traveling through general space.
- **Cognitive:** I will discuss the sun and moon's patterns in the sky.
- **Fitness:** I will stay actively engaged while traveling in the gym.
- **Personal & Social Responsibility:** I will work safely with classmates while traveling through personal and general space.

TEACHING CUES

- Eyes Up and Alert
- Move with Control
- Be Safe in Space

ACTIVITY SET-UP & PROCEDURE



Equipment:

- 2 poly spots (1 yellow/red and 1 green/blue) per group of 3 students
- 1 fitness ball per group of 3 students
- 1 mini parachute per group of 3 students
- 1 foam ball per group of 3 students

Set-Up:

1. Create 2 parallel lines of spots (a yellow line and a green line) along opposite far ends of the activity area.
2. Place a fitness ball on top of each yellow spot. It represents the sun.
3. Place a mini parachute and foam ball on each green spot. It represents the Earth.
4. Arrange students into groups of 3; 1 student with the fitness ball and the other 2 with the parachute and foam ball.

Activity Procedures:

1. Today's activity is called Sunlight, Moonlight, Stars. The object of the activity is to work with a partner to move the Earth (foam ball) around the sun (fitness ball).
2. The Earth, moon, and sun move in a pattern through space. The sun is super large compared to the Earth. The Earth travels around the sun every 365 days (1 year). How many times have you been around the sun?
3. This game is a lot like Red Light, Green Light. When the student with the sun says, "Sunlight!" the pair of students with the Earth will safely balance the Earth on the parachute and begin traveling toward the sun.
4. When the teacher calls out, "Moonlight!" the Earth must slow down, freeze, and wait until the sun says, "Sunlight!" again.
5. Keep moving in this way until you make it around the sun and back to your original spot. This will represent 1 year. Then switch roles and start again.

Grade Level Progressions:

K: Students travel safely at walking speed.

1st–2nd: Students use a variety of locomotor movements while traveling with partners.

UNIVERSAL DESIGN ADAPTATIONS

- The class plays as a group with the teacher acting as the sun in the center of the activity area. Allow students to work independently, each carrying 1 foam ball.

ACADEMIC LANGUAGE

Stars, Sun, Planets, Space, Patterns, Locomotor Skill, Orbit, Share

STANDARDS & OUTCOMES ADDRESSED

- **Standard 1 [E1.K-2]** Performs locomotor skills (hopping, galloping, running, sliding, skipping) while maintaining balance (K); Hops, gallops, jogs, and slides using a mature pattern (1); Skips using a mature pattern (2).
- **Standard 2 [E1.K-2]** Differentiates between movement in personal (self-space) and general space (Ka); Moves in personal space to a rhythm (Kb); Moves in self-space and general space in response to designated beats/rhythms (1); Combines locomotor skills in general space to rhythms (2).
- **Standard 4 [E4.K-2]** Shares equipment and space with others (K); Works independently with others in a variety of class environments (e.g., small and large groups) (1); Works independently with others in partner environments (2).

- **Next Generation Science Standard 1-ESS1-1:** Uses observations of the sun, moon, and stars to describe patterns that can be predicted. *The Universe and its Stars.* Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted (ESS1.A); *Earth and the Solar System.* Seasonal patterns of sunrise and sunset can be observed, described, and predicted (ESS1.B).

DEBRIEF QUESTIONS

- **DOK 1:** What is a pattern?
- **DOK 2:** What do you know about the pattern of the Earth, the sun, and the moon (day and night)?
- **DOK 3:** How are the patterns of the Earth, the sun, and the moon related to sleeping?
- **DOK 2:** What do you know about sleep? Why sleep is important?

TEACHING STRATEGY FOCUS

Identify critical content: As primary school students, young children are exploring patterns within our world. One pattern that affects us every day is the movement of the moon and Earth around the sun. However, most students have not explored this content as a pattern and certainly have not drawn the connection to sleep, their daily and nightly routines, and the importance of sleep patterns.

CHANGING SEASONS

STUDENT TARGETS

- **Skill:** I will follow movement pathways and patterns.
- **Cognitive:** I will discuss how the sun's position relative to the Earth affects our patterns of daylight and the temperatures.
- **Fitness:** I will stay actively engaged during the activity.
- **Personal & Social Responsibility:** I will share equipment and space with classmates.

TEACHING CUES

- Take Turns
- Work Together
- Travel Safely
- Have Fun

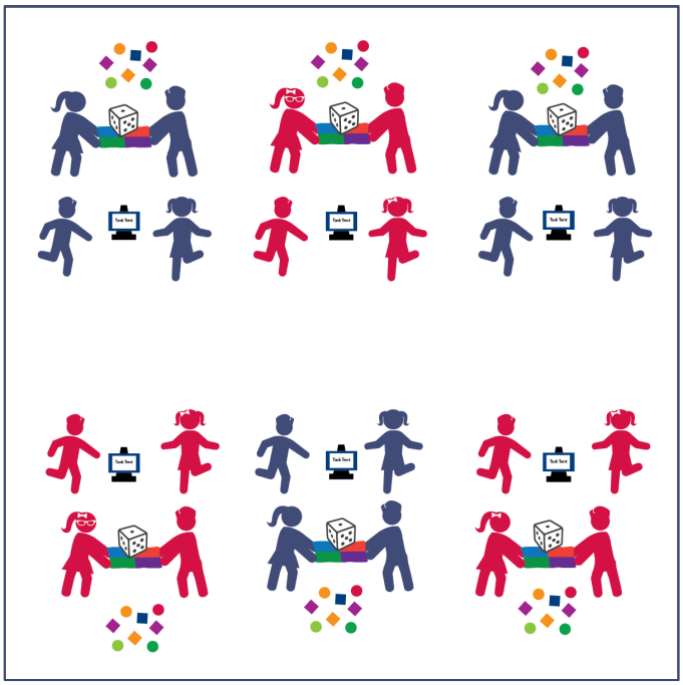
ACTIVITY SET-UP & PROCEDURE

Equipment:

- 6 large cones with task tents
- 6 Changing Seasons Task Cards
- 6 foam dice
- 6 mini parachutes
- 6 hoops
- 1 yarn ball per student
- 1 bean bag per student

Set-Up:

1. Use 6 cones, task tents, and task cards to create a large activity area with 6 stations around the perimeter. Allow enough space to move safely.
2. Create 6 equal groups; 1 group per station.
3. Place 1 hoop at each cone; place 1 mini parachute, 1 die, and enough yarn balls and bean bags for each student inside the hoops.



Activity Procedures:

1. Today's activity is called Changing Seasons. As the Earth orbits around the sun, our weather patterns change, and our daily life changes too. Today we are going to explore different seasonal activities as the Earth orbits the sun and the weather patterns change.
2. The object of the activity is to experience the 4 different seasons of change: winter, spring, summer, and fall.
3. On the start signal, 2 students from your group will use the parachute to toss the die into the air. The die will represent the Earth rotating. When the die falls to the ground, look and see what number is facing up. Then find that number on your task card to see which activity your group will do.
4. When your group has completed the activity, choose 2 new students to use the parachute to toss the die. Continue until you hear the stop signal.

Grade Level Progressions:

K–1st: Play the activity as described above.

2nd: Allow students to create new task cards with seasonal activities they enjoy.

CHANGING SEASONS

UNIVERSAL DESIGN ADAPTATIONS

- Play the activity without the mini parachute. Students take turns throwing the die into the air. Create seasonal activities that meet the needs and abilities of your students.

ACADEMIC LANGUAGE

Seasons, Earth, Winter, Spring, Fall, Summer, Orbit, Rotation

STANDARDS & OUTCOMES ADDRESSED

- **Standard 1 [E1.K-2]** Performs locomotor skills (hopping, galloping, running, sliding, skipping) while maintaining balance (K); Hops, gallops, jogs, and slides using a mature pattern (1); Skips using a mature pattern (2).
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DEBRIEF QUESTIONS

- **DOK 1:** What are the 4 seasons?
- **DOK 2:** How do the seasons affect the physical activities that we enjoy outside?
- **DOK 3:** How can we stay active and healthy during seasons when we can't spend as much time outside?

TEACHING STRATEGY FOCUS

Organize students to interact with content: Basic cooperative activities can be challenging for young children. Sharing and cooperation are social skills that may not be fully developed yet. By providing a small group task that can be easily accomplished, teachers can reinforce and build upon the feeling of collective accomplishment while minimizing frustration and conflict. When challenges do arise, be sure to address matters as building blocks to success and work to establish a growth mindset in a cooperative and supportive culture of learning.

LESSON PLAN

FOCUS OUTCOMES

- **SHAPE America Standard 1 [E1.K-2]** Performs locomotor skills (hopping, galloping, running, sliding, skipping) while maintaining balance (K); Hops, gallops, jogs, and slides using a mature pattern (1); Skips using a mature pattern (2).
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FOCUS TARGETS

- ✓ **Skill:** I will use locomotor movements while traveling through general space.
- ✓ **Cognitive:** I will discuss the sun and moon's patterns in the sky.
- ✓ **Fitness:** I will stay actively engaged while traveling in the gym.
- ✓ **Personal & Social Responsibility:** I will work safely with classmates while traveling through personal space and general space.

ACADEMIC LANGUAGE

Earth, Fall, Locomotor Skill, Orbit, Pattern, Planet, Rotation, Seasons, Share, Space, Spring, Stars, Summer, Sun, Winter

SELECTED ASSESSMENT

- ✓ Rubric
- ✓ Discussion Questions

LESSON PLAN

	TRANSITION NOTES	ACTIVITY	DEBRIEF
1 INSTANT ACTIVITY	As students enter the activity area, prompt them to quickly find a partner, move to a hoop with equipment, and discuss what they know about rockets. When all students have arrived, continue with the Instant Activity.	Rocket Launch	**DOK 1:** What is a rocket? **DOK 2:** What do you know about rockets? **DOK 3:** How is speed important to rockets? How is control related to rockets?
2 LEARNING TASK	Move fitness balls into place. Place students into groups of 3 and organize groups with equipment according to the activity plan.	Sunlight, Moonlight, Stars	**DOK 1:** What is a pattern? **DOK 2:** What do you know about the pattern of the Earth, the sun, and the moon (day and night)? **DOK 3:** How are the patterns of the Earth, the sun, and the moon related to sleeping?
3 LEARNING TASK	Station materials are organized ahead of time around the perimeter of the activity area. Group students and send each group to a station area. Choose 2 students per group to help organize equipment.	Changing Seasons	**DOK 1:** What are the 4 seasons? **DOK 2:** How do the seasons affect the physical activities that we enjoy outside? **DOK 3:** How can we stay active and healthy during seasons when we can't spend as much time outside?
4 EXIT ASSESSMENT	Rubric and Discussion Questions At the conclusion of the final DOK discussion, quickly review the rubric with students, highlighting areas of success. Next, use a white board or large notepad to record student responses to the final discussion questions.		

Earth

(noun)

The planet on which we live; the world.

We live on the planet **Earth**.

Fall

(noun)

Autumn. The season after summer and before winter.

The leaves turn many colors in the **fall**.

Locomotor Skill

(noun)

The basic ways to move your body through space.

We skip through the leaves in the fall.
Skipping is a **locomotor skill**.

Orbit

(noun)

The curved (elliptical) path of a planet or other celestial object around a star, planet, or moon.

The Earth's complete **orbit** around the sun takes 365 days (one year).

Pattern

(noun)

A repeating arrangement or sequence.

We follow a seven-day **pattern** each week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday.

Planet

(noun)

A large celestial body that moves in an elliptical orbit around a star.

We are going to visit the **planet** Mars someday.

Rotation

(noun)

One complete turn.

The earth completes one **rotation** every 24 hours.

Season

(noun)

A period of the year often characterized by changes in weather patterns, temperature, and daylight.

Each year, the watermen have to wait for the crabbing **season** to begin on April 1st.

Share

(noun)

To use, experience, or enjoy with others.

We all **share** the benifits of the natural resources on Earth.

Space

(noun)

The region beyond Earth's atmosphere. A region within physical boundaries.

We launched over 100 rockets into **space** every year.

Spring

(noun)

The season after winter and before summer.

During the **spring** season, we have many rainy days that help the flowers grow.

Star

(noun)

A bright celestial body of great mass that produces energy.

The Big Dipper can be found in the sky by locating the North **Star**.

Summer

(noun)

The season after spring and before fall.

My favorite season is **summer** because we have a long vacation.

Sun

(noun)

The large star that the Earth and other planets orbit.

The **sun** is bright today.

Winter

(noun)

The season after fall and before spring.

I like **winter** because I love to play in the snow.

CHANGING SEASONS TASK CARD

Dice Says	Group Exercise
1 (WINTER)	Balance a snowball (yarn ball) on a body part for 20 seconds.
2 (SPRING)	Jump like a bunny in the field 10 times. (The field is the center of the activity area.)
3 (SUMMER)	Crabwalk around a seashell (bean bag) 5 times.
4 (FALL)	Throw leaves (yarn ball) into the air 20 times. How many times can you catch them on their way down?
5 (ORBIT)	Orbit around the sun 1 time. (Gallop or skip 1 lap around the cones.)
6 (SUN)	The sun is a star. Celebrate the sun with 10 star jumps.

FINAL QUESTIONS

Personal Space vs General Space

DOK 1: How would you describe personal space?

DOK 2: How would you compare and/or contrast personal space with general space?

DOK 3: How is personal space related to safety in physical education class?

Sharing Space and Equipment

DOK 1: What would you include on a list about sharing?

DOK 2: How can you share equipment?

DOK 2: How can you share space?

DOK 3: How is sharing related to fun in physical education class?

Patterns of Earth, Moon, and Sun

DOK 1: What would you include on a list about the sun and the moon?

DOK 2: What do you know about the Earth's relationship with the sun?

DOK 3: How does the pattern of the Earth's movement create day and night? How does it create the changing seasons?

NEXT GEN CONNECTIONS
LEARNING SPACE AND SCIENCE

OPEN Online Physical Education Network

PR INTERMEDIATE (3-5)

HOLISTIC DUAL PERFORMANCE RUBRIC

GRADE: _____ **CLASS:** _____

	Skill	Personal & Social Responsibility (PSR)
Proficient **4**	Consistently demonstrates locomotor skills with balance and displays mature patterns. Fully participates in group discussion with an interest in and understanding of how patterns within our solar system affect our behaviors and routines.	Conducts herself/himself safely and with consideration for others. Shares equipment and space.
Competent **3**	Demonstrates locomotor skills with balance and displays mature patterns. Provides input and actively listens during group discussion with an interest in and understanding of the relationship between the Earth, sun, and moon.	Conducts herself/himself safely without disrupting the learning environment. Shares equipment and space.
Lacks Competence **2**	Has difficulty demonstrating locomotor skills. Has difficulty participating in group discussion about the relationship between the Earth, sun, and moon.	Occasionally creates unsafe situations. Needs safety reminders.
Well Below Competence **1**	Displays unsatisfactory effort toward skill development.	Often breaks safety rules and disrupts the learning environment.

Student Name	Skill	PSR	Comments
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OPEN Online Physical Education Network

NEXT GEN CONNECTIONS
LEARNING SPACE AND SCIENCE

TE INTERMEDIATE (3-5)

TEACHER SELF-EVALUATION & REFLECTION

Teaching Dates of Module:	School Year:
General Comments / Notes for Planning Next Year's Module	
✓ Comment 1 ✓ Comment 2 ✓ Comment 3…	
Self-Reflection Across Danielson's Four Domains of Teaching	
Domain 1: Planning & Preparation	
1a: Demonstrating Knowledge of Content/ Pedagogy	1d: Demonstrating Knowledge of Resources
1b: Demonstrating Knowledge of Students	1e: Designing Coherent Instruction
1c: Selecting Instructional Outcomes	1f: Designing Student Assessments
✓ Reflection 1 ✓ Reflection 2 ✓ Reflection 3…	
Domain 2: Classroom Environment	
2a: Evidence of Respect and Rapport	2d: Managing Student Behavior
2b: Establishing a Culture for Learning	2e: Organizing Physical Space
2c: Managing Classroom Procedures	
✓ Reflection 1 ✓ Reflection 2 ✓ Reflection 3…	
Domain 3: Instruction	
3a: Communicating with Students	3d: Using Assessment in Instruction
3b: Using Questioning and Discussion Techniques	3e: Demonstrating Flexibility and Responsiveness
3c: Engaging Students in Learning	
✓ Reflection 1 ✓ Reflection 2 ✓ Reflection 3…	
Domain 4: Professional Responsibilities	
4a: Reflecting on Teaching	4d: Participating in a Professional Community
4b: Maintaining Accurate Records	4e: Growing and Developing Professionally
4c: Communicating with Families	4f: Showing Professionalism
✓ Reflection 1 ✓ Reflection 2 ✓ Reflection 3…	
Self-Rating with Rationale	
Choose One: **Innovative (4); Proficient (3); Basic (2); Unsatisfactory (1)**	
Provide rationale: ✓ Evidence 1 ✓ Evidence 2 ✓ Evidence 3	