TOOLS FOR LEARNING ABOUT
ESTUARY CONSERVATION
INTERMEDIATE (3-5)

A Public Service of
US Games
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 Standard to guide our planning and instruction. This module provides students with an introduction to estuary science and conservation while reinforcing movement concepts and developing muscular endurance in the core and upper body.

For more information about estuary conservation efforts, please visit the Chesapeake Bay Foundation’s Website: [www.cbf.org](http://www.cbf.org)

- **SHAPE America Standard 1 [E11.3-5]**: Combines locomotor skills and movement concepts (levels, shapes, extensions, pathways, force, time, flow) (3); Combines locomotors and movement concepts (levels, shapes, extensions, pathways, force, time, flow) (4); Combines locomotor skills and movement concepts (5).
- **Next Gen Science Standard 3-LS4.D**: Populations live in a variety of habitats and change in those habitats affects the organisms living there.
- **Next Gen Science Standard 4-ESS3.A**: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.
- **Next Gen Science Standard 5-ESS3.C**: Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.

### RESOURCES

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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: Estuary Exploration 5–10 minutes
+ Skill Activity: Protecting the Estuary 10–15 minutes
+ Skill Activity: Chesapeake Bay Restoration 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.

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.

**Estuary Exit Slips:**
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 Exit Slips to document student understanding.

As you review completed DOK Exit Slips, take note of topics and concepts for which students need additional instruction. Allow your observations to guide future planning and instruction.

**Holistic Performance Rubric:**
The Holistic 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.

This Dual Holistic Rubric separates skill and PSR characteristics, providing two sets of criteria to be evaluated separately. Next Generation Science Standards are evaluated in the skill portion of this rubric.
CONNECTION NOTES:

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

STUDENT TARGETS

- **Skill:** I will demonstrate balance as I move through open space.
- **Cognitive:** I will learn about activities that occur in an estuary while exploring general space.
- **Fitness:** I will demonstrate muscular strength and endurance while pretending to explore an estuary.
- **Personal & Social Responsibility:** I will work safely with my classmates as we learn about estuaries.

TEACHING CUES

- Scooter Safety (See Poster)
- Active Eyes
- Tag Safely with Noodle

ACTIVITY SET-UP & PROCEDURE

**Equipment:**

- 1 scooter per student
- 12–15 hoops
- 12–15 cones
- 3 pinnies (rain coats)
- 3 noodles (crab nets)
- Scooter Safety Poster

**Set-Up:**

1. Scatter the hula hoops around the perimeter of the bay (activity area) to serve as crab nets. Place a cone next to each hoop.
2. Assign 3 students as “watermen,” each with a pinnie and a noodle.
3. All students begin on scooters. Use the Scooter Safety Poster to remind students of proper positioning and scooter safety.

**Activity Procedures:**

1. This activity is called Estuary Exploration. We’ll learn about estuaries with a chasing and fleeing game.
2. You might have heard the words “harbor,” “bay,” “inlet,” or “sound.” These are all different words for an estuary, a partially enclosed area of water where fresh water from rivers and streams mixes with salt water from the ocean. They are a place where the land and the sea meet. The biggest estuary in the United States is the Chesapeake Bay.
3. The 3 students with pinnies and noodles are watermen. Watermen work the estuary, harvesting crabs and other resources from the bay. All other players are crabs living in the estuary.
4. When I say, “GO,” the watermen will chase and try to tag the crabs with their crab nets (noodles).
5. If a waterman tags a crab, the crab goes to 1 of the crab traps (hula hoops), parks their scooter (wheels up), and performs mummy jacks in the crab trap. Another crab can rescue them by lifting the cone so that the crab(s) can crawl out. If the watermen get all the crabs into traps at once, crab season is over.

**Standards & Outcomes Addressed:**

- **Standard 2 [E1.3-5]:** Recognizes the concept of open spaces in a movement context (3); Applies the concept of open spaces to combination skills involving traveling (e.g., dribbling and traveling) (4a); Combines spatial concepts with locomotor and non-locomotor movements for small groups in gymnastics, dance, and games environments (5).
- **Next Generation Science Standard 3-LS4.D:** Populations live in a variety of habitats, and change in those habitats affects the organisms living there.
PROTECTING THE ESTUARY

STUDENT TARGETS

- **Skill:** I will demonstrate balance as I move through open space.
- **Cognitive:** I will learn about activities that protect the estuary while exploring general space.
- **Fitness:** I will demonstrate muscular strength and endurance while pretending to explore an estuary.
- **Personal & Social Responsibility:** I will work safely with my classmates as we learn about the Chesapeake Bay.

TEACHING CUES

- Scooter Safety (See Poster)
- Work Together
- Reduce, Reuse, Recycle

ACTIVITY SET-UP & PROCEDURE

**Equipment:**
- 1 scooter per 4 students
- 2 half-cut noodles per 2 students
- 30–50 balls of different colors or sizes
- 1 hoop per 4 students
- 3 storage bins

**Set-Up:**
1. Place hoops at the end of the activity area with 1 scooter inside each hoop.
2. Place the storage bins at the other end of the activity area. Label them “trash,” “recycle,” and “compost.”
3. Scatter the balls in general space.
4. Pair students, 2 pairs standing behind each hoop. Give 1 person from each pair 2 noodles.

**Activity Procedures:**
1. Today’s activity is called Protecting the Estuary. In this game, we will learn about conservation and ways to help protect our estuaries.
2. Human activities on land can harm the estuaries' health and often damage living conditions for the creatures that live in and visit the estuaries. Stream and river banks can be damaged by erosion that comes from outdated agricultural or forestry methods, or by construction too close to the stream. Today we are going to be cleaning up the shores and beaches of the bay (gym floor).
3. When I say, “GO!” 1 set of partners at your dock (hoop) will work together to pick up waste (balls) off the beach. Partner 1 will drive the boat, and Partner 2 will work the nets (noodles) to gather the waste. Do not use your hands.
4. After picking up the waste, bring it back to the docks. Then the next pair will complete the activity. Continue until all waste has been cleaned off the beach.
5. Once all the waste has been picked up, work with other students at your dock to sort the trash into 3 piles: waste, recycling, compost. (Teachers, choose a color or size ball to represent each type of waste.)

**Next Gen Extension:** Develop (and/or promote) in-school recycling and composting programs to emphasize the importance of conservation.
PROTECTING THE ESTUARY

Bay, Compost, Conservation, Estuary, Landfill Waste, Reduce, Reuse, Recycle

- Perform the activity without scooters and use only locomotor movements.
- Allow students to pick up and carry objects with their hands.

STANDARDS & OUTCOMES ADDRESSED

- **Standard 2 [E1.3-5]:** Recognizes the concept of open spaces in a movement context (3); Applies the concept of open spaces to combination skills involving traveling (e.g., dribbling and traveling) (4a); Combines spatial concepts with locomotor and non-locomotor movements for small groups in gymnastics, dance, and games environments (5).
- **Standard 2 [E2.3-5]:** Recognizes locomotor skills specific to a wide variety of physical activities (3); Combines movement concepts with skills in small-sided practice tasks, gymnastics, and dance environments (4); Combines movement concepts with skills in small-sided practice tasks/games environments, gymnastics, and dance with self-direction (5).
- **Next Generation Science Standard 5-ESS3.C:** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.
- **Next Generation Science Standard 3-LS4.D:** Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

DEBRIEF QUESTIONS

- **DOK 1:** What are human activities that we could include on a list of things that negatively impact estuaries?
- **DOK 2:** How can human activities positively affect estuaries?
- **DOK 3:** How is the health of our estuaries related to our community’s health?
- **DOK 4:** Let’s create a daily plan that will include 3 things we can do to help keep our environment healthy.

TEACHING STRATEGY FOCUS

**Make Connections:** Learning about the environment and how it links to the health of the planet is very important to understanding our connection to the environment and our community. Without healthy estuaries, the food chain and water supply suffer and negatively impact our way of life. Helping students understand this link will strengthen our communities and help our local ecosystems thrive. If everybody does their part for the environment, we all win.
STUDENT TARGETS

- **Skill:** I will demonstrate balance and coordination on a scooter.
- **Cognitive:** I will discuss ways to keep an estuary healthy.
- **Fitness:** I will apply muscular strength and endurance to scooter activities.
- **Personal & Social Responsibility:** I will work safely with my classmates as we pretend to swim in the Chesapeake Bay.

TEACHING CUES

- Stay in the Channel
- Scooter Safety
- Move in Personal Space

ACTIVITY SET-UP & PROCEDURE

**Equipment:**
- 1 scooter per group of 3 students
- 4–8 green cones
- 4–8 red cones
- 30–50 poly spots (in 6 colors)
- 1 task card per group of 3 students

**Set-Up:**
1. Develop a circular boating channel using cones: 
   Arrange red cones in a circle in the middle of the activity area, and arrange green cones in a circle around on the outside of the room as a safety zone for the shallow water areas of the bay.
2. Create a series of “docks” by placing 1 hoop and scooter together on the perimeter in between the green cones. Place a task card inside each hoop.
3. Scatter poly spots throughout the boating channel.

**Activity Procedures:**
1. Today’s activity is called Chesapeake Bay Restoration. The object of the activity is keep the estuary healthy while driving your boat around the bay as many times as you can.
2. You will take turns with the other students in your group by driving the boat (scooter) safely through the channel. Your goal is to avoid the man-made environmental conditions (poly spots) that are causing illness and damage within the bay. Each color represents a different environmental factor.
3. When I say, “GO!” 1 student from each group will begin driving their boat (laying down on the scooter in the prone position or on bottom with feet propelling them forward). Drive your boat in the zone between the red and green cones while trying to avoid the poly spots. If you touch a spot, remember its color.
4. When you return from your lap around the channel, your group must complete the physical challenges from the task card that matches the environmental hazards you touched with your boat. By completing the challenges, you will be working to actively reduce the amount of pollution in the bay (restoration).
5. Your group will take turns driving the boat around the bay. Keep track of the number of laps your group completes without touching a spot. At the end of the time period, the group with the greatest number of clean laps completed will receive the “most responsible boat on the water” award.

**Next Gen Extension:** Take students on a walking field trip in the community to pick up trash and clean up storm runoffs that drain to local waterways.
Perform the activity without scooters and use only locomotor movements.
Use few (or no) poly spot obstacles.
Use brightly colored spots and boundaries.
Provide auditory signals to help students with visual impairments move around the channel.

Conservation, Dead Zones, Environmental Impact, Estuary, Natural Resource, Plastic, Restoration

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- **DOK 1**: What is restoration?
- **DOK 2**: What does restoration look like in an estuary like the Chesapeake Bay (or name your local estuary)?
- **DOK 3**: How is the use of gasoline related to estuary health?
- **DOK 4**: Let’s identify strengths and weaknesses in our community related to estuary health. What are weaknesses that we can work to improve upon?

**Cause and effect**: While discussing estuary health, it’s important to help students explore the cause and effect relationships that exist between humans’ use of energy and fuels and their effects on the environment.
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**Skill:** I will demonstrate balance and coordination on a scooter.

**Cognitive:** I will discuss ways to keep an estuary healthy.

**Fitness:** I will apply muscular strength and endurance to scooter activities.

**Personal & Social Responsibility:** I will work safely with my classmates as we learn about estuary conservation.

Bay, Compost, Conservation, Dead Zones, Environmental Impact, Estuary, Landfill Waste, Natural Resource, Plastic, Reduce, Reuse, Recycle

**Rubric**

**Exit Slips**
As students enter the activity area, prompt them to quickly find a partner and to review the scooter safety posters on display. When all students have arrived, quickly review scooter safety and then continue with the Instant Activity.

Bins and hoops are pre-set at the start of class and are in position for this activity. Instruct students to return the scooters to the scooter storage stations and then review the lesson word wall with a partner. While students are cleaning up and discussing academic language, place foam balls into position.

All equipment for this activity is staged on the perimeter of the activity area. Post DOK questions on a white board, and prompt students to discuss the questions in small groups or pairs. While students discuss, quickly reset the area for the next activity. When everything is set, quickly review student DOK discussions before moving on to the final activity.

Rubric and Exit Slips
At the conclusion of the final DOK discussion, quickly review the rubric with students, highlighting areas of success. Place Exit Slips in multiple piles with a box of pencils. Students pick up an exit slip, move to personal space to complete each question, and then turn in their slip before lining up (or changing their clothes).

### Activity Notes

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<td><strong>1 INSTANT ACTIVITY</strong></td>
<td>Estuary Exploration</td>
<td>DOK 1: How can you recognize safe scooter behavior? DOK 2: How does speed affect scooter safety? DOK 3: How is scooter safety related to fun and learning?</td>
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### Estuary Exploration

**DOK 1:** How can you recognize safe scooter behavior?

**DOK 2:** How does speed affect scooter safety?

**DOK 3:** How is scooter safety related to fun and learning?

### Protecting the Estuary

**DOK 1:** What are human activities that we could include on a list of things that negatively impact estuaries?

**DOK 2:** How can human activities positively affect estuaries?

**DOK 3:** How is the health of estuaries related to community health?

### Chesapeake Bay Restoration

**DOK 1:** What is restoration?

**DOK 2:** What does restoration look like in an estuary like the Chesapeake Bay (or name your local estuary)?

**DOK 3:** How is the use of gasoline related to estuary health?
BALANCE
(noun)

An even distribution of weight that allows someone or something to stay upright and steady.

Frank maintained his balance while propelling himself through open space.
BAY
(noun)

A part of the sea where the land curves inward.

The San Francisco Bay is a famous landmark in the United States. The Golden Gate Bridge separates the San Francisco Bay from the Pacific Ocean.
COMPOST  
(noun)  
A mixture of food or other organic material that will break down and transfer nutrients back into the soil.

Mr. Wiles explained that the leftover food in the compost would someday fertilize the community garden.
CONSERVATION
(noun)
Preservation, protection, or restoration of something, particularly the natural environment and wildlife.

Conservation efforts are what protect much of our natural environment.
ESTUARY
(noun)
A partially enclosed area of water where fresh water from rivers and streams mixes with salt water from the ocean.

The Chesapeake Bay is the largest estuary in the United States. It is located where the Susquehanna River meets the Atlantic Ocean.
EXPLORATION
(noun)

The act of moving through unfamiliar territory in order to learn about it.

Kevin and Michelle decided to conduct an exploration of the estuary to learn more about it.
IMPACT
(noun)

The effect or influence of a person, thing, or action on another person, thing, or action.

A small action of kindness can make a big impact for those around them.
MUSCULAR ENDURANCE
(noun)

The ability of a muscle to continue to perform without fatigue.

Keira showed the teacher her muscular endurance by shaking the parachute for 3 minutes without stopping.
MUSCULAR STRENGTH
(noun)

The maximum amount of force a muscle can produce in a single effort.

Orion used his muscular strength to throw the ball as hard as he could.
NATURAL RESOURCES
(noun)

Materials or substances that occur in nature and are useful to humans.

The clean water of an estuary is a natural resource because it is essential to the well-being and survival of the people, animals, and plants who live near it.
OPEN SPACE
(noun)
An area of general space with no obstacles where people or objects can move freely.

Max saw an area of open space into which he could safely run.
PERSONAL SPACE

(noun)

The area around a person in which they feel comfortable but would become uncomfortable if someone or something enters.

It’s important to respect everyone’s personal space in physical education class so that we can all learn without feeling uncomfortable.
A synthetic material made from organic polymers of high molecular weight that can be easily shaped or molded.

Johnny removed plastic from the bay because he knows it is bad for the environment.
POLLUTION (noun)
The presence of contaminants in the environment that have harmful or poisonous effects.

Leaving trash in the bay causes pollution to the earth.
RECYCLE

(verb)

An alternative to throwing something in the trash so that it can be re-used for a new purpose.

Bottles and cans can be brought to local redemption centers to be recycled.
**REDUCE**

(verb)

To bring down to a smaller extent, size, amount, number, intensity, or other form of measurement.

Avoiding disposable plates, napkins, cups, and eating utensils is a great way to reduce paper and plastic waste.
REUSE
(verb)
To use again or more than once.

Devon outgrew most of his clothes and shoes from last year, so he brought them to the thrift shop so someone can reuse them.
SAFETY
(noun)
The condition of being protected against physical, social, and emotional harm.

During physical education class, John follows all rules related to safety so that no one will get hurt.
TRASH
(noun)

Discarded matter after use.

Jonah worked hard to collect all the trash and dispose of it in the proper waste container.
WEIGHT TRANSFER

(noun)

A change in the center of gravity beyond its base of support in order to create movement or generate force.

Denise used a weight transfer to propel herself on the scooter in different directions.
SCOOTER SAFETY RULES

✓ Hands are inside the handles.
✓ Listen and follow body position cues.
✓ Keep body parts away from wheels.
✓ Control your speed.
✓ Be respectful and have fun.
## RESTORATION TASK CARDS

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<th>Hazzard Color</th>
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<tr>
<td>RED</td>
<td>20 Jumping Jacks</td>
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<tr>
<td>ORANGE</td>
<td>10 Push-Ups</td>
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<tr>
<td>YELLOW</td>
<td>Aerobic Choice (10 count)</td>
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<tr>
<td>GREEN</td>
<td>10 Crunches</td>
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<tr>
<td>BLUE</td>
<td>20 Mountain Climbers</td>
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<tr>
<td>PURPLE</td>
<td>Stretch Choice (10 count)</td>
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**DOK 1:** What are human activities that we could include on a list of things that negatively impact estuaries?

**DOK 2:** How can human activities positively affect estuaries?

**DOK 3:** How is the health of our estuaries related to our community’s health?

**DOK 4:** Let’s create a daily plan that will include 3 things we can do to help keep our environment healthy.

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**DOK 3:** How is the use of gasoline related to estuary health?

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## Personal & Social Responsibility (PSR)

<table>
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<th>Grade</th>
<th>Skill Description</th>
<th>PSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient 4</td>
<td>Consistently demonstrates locomotor skills and scooter movements in combination with the movement concept of pathways through open space. Fully participates in group discussion with an interest and understanding of how human activities impact the estuary ecosystem.</td>
<td>Conducts herself/himself safely &amp; with consideration for others. Follows all scooter safety rules.</td>
</tr>
<tr>
<td>Competent 3</td>
<td>Demonstrates locomotor skills and scooter movements in combination with the movement concept of pathways through open space. Provides input and actively listens during group discussion with an interest and understanding of how human activities impact the estuary ecosystem.</td>
<td>Conducts herself/himself safely without disrupting the learning environment. Follows all scooter safety rules.</td>
</tr>
<tr>
<td>Lacks Competence 2</td>
<td>Has difficulty demonstrating movement in combination with the movement concept of pathways through open space. Has difficulty participating in group discussion and lacks interest and understanding of how human activity impacts estuaries.</td>
<td>Occasionally creates unsafe situations. Needs scooter safety reminders.</td>
</tr>
<tr>
<td>Well Below Competence 1</td>
<td>Displays unsatisfactory effort toward skill development.</td>
<td>Often breaks safety rules and disrupts the learning environment.</td>
</tr>
</tbody>
</table>

### Student Name | Skill | PSR | Comments
--- | --- | --- | ---
1. | | | |
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Teaching Dates of Module:  

School Year:  

<table>
<thead>
<tr>
<th>General Comments / Notes for Planning Next Year’s Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Comment 1</td>
</tr>
<tr>
<td>✓ Comment 2</td>
</tr>
<tr>
<td>✓ Comment 3…</td>
</tr>
</tbody>
</table>

**Self-Reflection Across Danielson’s Four Domains of Teaching**

**Domain 1: Planning & Preparation**

<table>
<thead>
<tr>
<th>1a: Demonstrating Knowledge of Content/Pedagogy</th>
<th>1d: Demonstrating Knowledge of Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b: Demonstrating Knowledge of Students</td>
<td>1e: Designing Coherent Instruction</td>
</tr>
<tr>
<td>1c: Selecting Instructional Outcomes</td>
<td>1f: Designing Student Assessments</td>
</tr>
<tr>
<td>✓ Reflection 1</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 2</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 3…</td>
<td></td>
</tr>
</tbody>
</table>

**Domain 2: Classroom Environment**

<table>
<thead>
<tr>
<th>2a: Evidence of Respect and Rapport</th>
<th>2d: Managing Student Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>2b: Establishing a Culture for Learning</td>
<td>2e: Organizing Physical Space</td>
</tr>
<tr>
<td>2c: Managing Classroom Procedures</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 1</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 2</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 3…</td>
<td></td>
</tr>
</tbody>
</table>

**Domain 3: Instruction**

<table>
<thead>
<tr>
<th>3a: Communicating with Students</th>
<th>3d: Using Assessment in Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3b: Using Questioning and Discussion Techniques</td>
<td>3e: Demonstrating Flexibility and Responsiveness</td>
</tr>
<tr>
<td>3c: Engaging Students in Learning</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 1</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 2</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 3…</td>
<td></td>
</tr>
</tbody>
</table>

**Domain 4: Professional Responsibilities**

<table>
<thead>
<tr>
<th>4a: Reflecting on Teaching</th>
<th>4d: Participating in a Professional Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>4b: Maintaining Accurate Records</td>
<td>4e: Growing and Developing Professionally</td>
</tr>
<tr>
<td>4c: Communicating with Families</td>
<td>4f: Showing Professionalism</td>
</tr>
<tr>
<td>✓ Reflection 1</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 2</td>
<td></td>
</tr>
<tr>
<td>✓ Reflection 3…</td>
<td></td>
</tr>
</tbody>
</table>

**Self-Rating with Rationale**

Choose One:  
Innovative (4); Proficient (3); Basic (2); Unsatisfactory (1)

Provide rationale:

✓ Evidence 1
✓ Evidence 2
✓ Evidence 3