



EDUCATION @ MESA ARTS CENTER



MESA ARTS CENTER PRESENTS
NATIONAL GEOGRAPHIC LIVE!
THOMAS PESCHAK: WILD SEAS, SECRET SHORES

Ikeda Theater | March 21 | 10:15 AM | Grades: 3 - 8

2018/2019 EDUCATOR RESOURCE GUIDE



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ABOUT THOMAS PESCHAK, PHOTOGRAPHER...

National Geographic Live! brings you Thomas Peschak, a marine biologist turned National Geographic photographer who thinks sharks are a reason to get in the water — not out of it! Thomas's love for the ocean started at a very young age. He learned to snorkel at 6, started diving and taking underwater pictures at 12, and felt his life changed with a Nikonos V camera on his 16th birthday. These early ocean adventures drove Thomas to pursue a career in marine biology where he studied global ocean conservation while continuing to use photography to capture visuals of ocean life.

Thomas worked as a marine biologist until 2004, when he realized he could have a greater impact on wildlife and marine conservation by sharing stories through his photographs as a marine life photojournalist. Thomas has written and photographed five books, most of which deal with the topic of shark and human interactions and relationships. Thomas also works on assignment with National Geographic to bring the world images which are both beautiful and provoking so that viewers will see and act upon the need for marine conservation. You will no doubt enjoy seeing Thomas Peschak's incredible photographs as well as hearing his fascinating stories about life as a marine conservation photojournalist in this presentation by National Geographic Live!



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WELCOME!

Dear Educator,

Thank you for selecting a **National Geographic Live!** field trip with the Mesa Arts Center. We have a dynamic season planned and we look forward to connecting you to our many speakers and presentations. With National Geographic Live, students are able to experience dynamic presentations and make educational connections well beyond the classroom.

We also recognize and appreciate the energy and time spent on your part in coordinating field trips. In this guide we have provided information to help make this the best experience possible.

In addition, the Mesa Arts Center has many open and inviting spaces that make good places to hold a brown bag lunch. Prior arrangements for lunch accommodations need to be made by either calling (480) 644-6540 or emailing outreach@mesaartscenter.com.

Please contact our offices should you have any additional questions (contact info on last page).

Enjoy the show!

TEACHER AND CHAPERONE INFORMATION

Chaperones

- ♦ Assign each chaperone a designated group of students and provide him/her with a written list of the students in that group.
- ♦ Ask chaperones to stay with their assigned group throughout the field trip. Adult chaperones are responsible for the students' conduct and behavior throughout their visit to the Center.
- ♦ Please review theater etiquette rules and responsibilities with all chaperones.
- ♦ Have the phone numbers of every chaperone in your group to quickly access each other in case of emergency.

Theater Etiquette

- ♦ No Food or Drink inside the theatre (besides bottled water).
- ♦ Students must be accompanied by chaperones at all times.
- ♦ Cameras and recording devices may not be used during the performance.
- ♦ Please silence cell phones and resist the urge to text message.
- ♦ Listening and following the House Managers and Ushers will help the seating and dismissal process.
- ♦ Feel free to laugh, clap and enjoy the show but also to be respectful of those around you.



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CURRICULUM CONNECTIONS

National Geographic Live: Thomas Peschak: Wild Seas, Secret Shores

Arizona Academic Standards: Discussion Questions

These standards can be achieved by using the discussion questions included in this guide.

Speaking and Listening

Grades 3-8.SL.1 — Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Grades 3-8.SL.2 — Ask and answer questions about key details in a text read aloud or information presented orally or through other media.



Science

Grades 7 & 8: SC-S2C1-04 — Evaluate career opportunities related to life and physical sciences.

SC03-S3C1-02 — Describe the beneficial and harmful impacts of natural events and human activities on the environment.

SC04-S3C1-01 — Describe how natural events and human activities have positive and negative impacts on environments.

SC05-S3C-03 — Evaluate the possible strengths and weaknesses of a proposed solution to a specific problem relevant to human, animal, or habitat needs.

SC06-S4C3-02 — Describe how the environmental conditions such as water quality, climate, population density, and smog affect the quality of life.

SC07-S3C1-01 — Analyze environmental risks caused by human interaction with biological or geological systems.

SC08-S3C1-01 — Analyze the risk factors associated with natural, human induced, and/or biological hazards.

Arizona Academic Standards: STEAM Lesson

These standards can be achieved by using the STEAM lesson included in this study guide.

Math

5.MD.A.1 — Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems.

7.RP.A — Analyze proportional relationships and use them to solve mathematical problems and problems in real-world context.

7.G.A.1 — Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Mathematical Practice 1 — Make sense of problems and persevere in solving them.

Mathematical Practice 2 — Reason abstractly and quantitatively

Mathematical Practice 6 — Attend to precision.



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CURRICULUM CONNECTIONS CONTINUED

National Geographic Live: Thomas Peschak: Wild Seas, Secret Shores

Arizona Academic Standards: STEAM Lesson

These standards can be achieved by using the STEAM lesson included in this study guide.

Science

Strand 1 of the Science standards lays out the Inquiry process for students in grades 3-8. Performance objective details vary by grade but the general goals of each Concept are below:

SC-S1C1 – Observe, ask questions, and make predictions.

SC-S1C2 – Participate in planning and conducting investigations, and recording data.

SC-S1C3 – Organize and analyze data; compare to predictions.

SC-S1C4 – Communicate results of investigations.

Additionally these standards support the Engineering Design Process:

Grades 3-5:

SC-S3C2-03 – Design and construct a technological solution to a common problem or need using common materials.

Grade 5:

SC05-S3C1-02 – Propose a solution, resource, or product that addresses a specific human, animal, or habitat need.

SC05-S3C1-03 – Evaluate the possible strengths and weaknesses of a proposed solution to a specific problem relevant to human, animal, or habitat needs.

Grades 6-8:

SC-S3C2-01 – Propose viable methods of responding to an identified need or problem.

SC-S3C2-02 – Compare possible solutions to best address an identified need or problem.

SC-S3C2-03 – Design and construct a solution to an identified need or problem using simple classroom materials.

Speaking and Listening

Grades 3-8.SL.4 – Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

21st Century Learning Skills

By using the STEAM lesson included in this guide, students can become more proficient in the following Competencies:

- Critical Thinking
- Creativity
- Communication
- Collaboration





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DISCUSSION QUESTIONS

Pre-Performance Discussion Questions

What do you know about marine conservation? Why is marine conservation important?

Thomas Peschak had a fascination with the ocean, especially underwater photography, as a child. He became a marine biologist and then a photojournalist, which allows him to combine marine conservation and his passion for photography together. What are you fascinated by? What would your dream job be?

When talking about conservation photography Thomas Peschak says he has to find the balance between “carrot-and-stick”. Which do you think is more effective for others to act: the carrot — photographs showing the beauty of nature which we want to preserve, or the stick — photographs depicting the unpleasant effects of humans on the environment? What feelings do either of these types of pictures invoke?

Post Performance Discussion Questions

What was something surprising or interesting you learned from Thomas Peschak’s presentation on marine life and conservation?

In what ways did Thomas Peschak demonstrate curiosity, responsibility, empowerment, and persistence in his work? Why do you think these attitudes are important for explorers?

Did Thomas Peschak make any call to action to support his work? Are there any changes we can make in our day to day lives to support the Earth or marine conservation? What can we work on together as a group?



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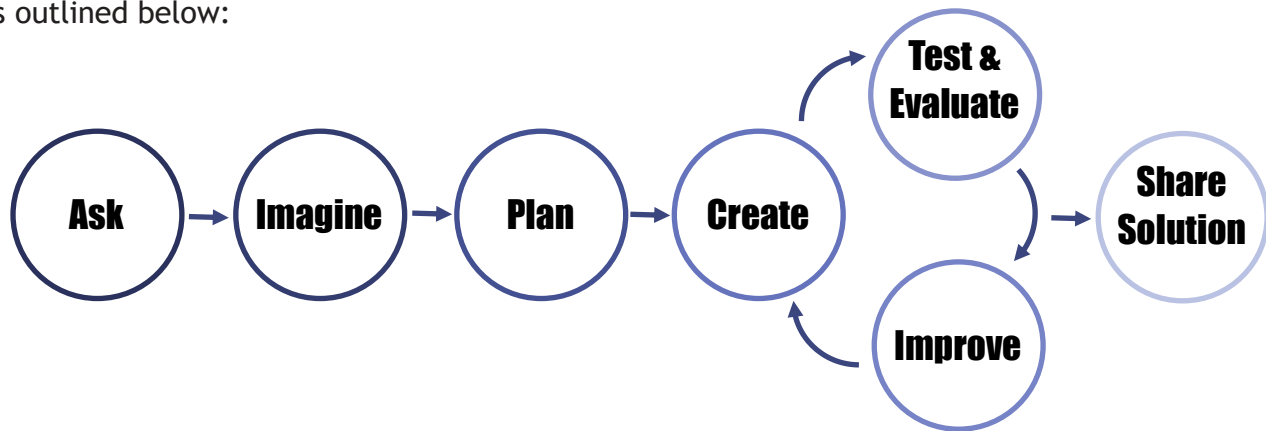
WHAT IS STEM?

STEM is a common buzzword in education these days, so it is important to know what exactly STEM is, and also what it is not. A true STEM lesson not only incorporates different subject areas, but also works to develop students' abilities to think creatively, reason, investigate, and work as a team. Here is a breakdown of what STEM means:

S Science	T Technology	E Engineering	M Math
The study of the natural world.	While traditional digital technology meets this part of STEM, technology is any product made by humans to meet a want or need. Any product created by students to solve a problem can be considered technology.	The design process students use to solve problems.	The study of numbers, equations, functions, and geometric shapes and their relationships.

A science experiment is not necessarily a STEM lesson. The requirements below need to be met as well for a lesson to be STEM based learning:

- The lesson focuses on a real world problem/issue.
- Students are working in productive teams.
- Students are engaging in hands-on inquiry and open-ended exploration. Students should be able to redesign as needed (within time constraints) so there should not be an exact end product/result predetermined by the teacher in mind.
- Students understand that there are multiple right answers to the posed problem and that failure can be used to reevaluate and make changes towards discovering a solution.
- The lesson uses the *engineering design process (EDP)*. EDP is similar to the scientific method and is outlined below:



- Adding any type of art component to the lesson changes STEM to STEAM.



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STEAM LESSON: BYCATCH

Thomas Peschak has photographed sharks and sea turtles to bring awareness to conservation efforts for this marine life. One problem facing sharks and sea turtles is the damaging nature of bycatch and questionable fishing practices. Although bycatch is a large and difficult problem, students can seek solutions and build awareness, even with how they shop for seafood in the future, by participating in this lesson. The art component is in the sketching portion of the project as well as a marine backdrop for the final project if desired.



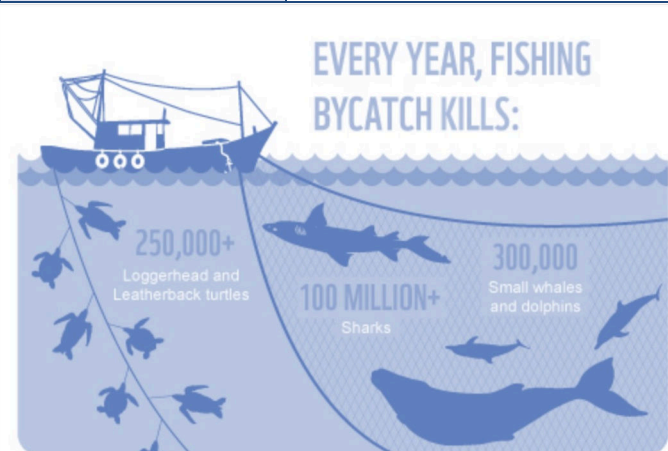
ASK (REAL WORLD PROBLEM)	Since the industrialization of fishing in the 1950's, unsustainable fishing practices have caused some large global stocks of fish such as tuna and swordfish to fall by about 90%. This does not leave a large population for reproduction. These fishing practices also have other consequences such as bycatch, the unintentional catching of other fish or marine life that is often killed or wasted. Sharks, sea turtles, whales, dolphins, and even birds are affected by bycatch. Ask students, "Can you design and create a fishing device or net that reduces bycatch?" If your class already has awareness of this problem, continue on to the Imagine & Plan section. If your class could benefit from background knowledge, check out the game on page 10 and/this YouTube video: https://www.youtube.com/watch?v=NklxOhr2fal
MATERIAL POSSIBILITIES	Students will need a variety of materials to choose from. Generally students will need net-like materials such as string, twine, or yarn but could also utilize natural materials like palm fronds, willow branches, or reeds. Students could also use materials like milk cartons or possibly plastic bottles, but remember the goal is that fish or other creatures would not be injured trying to escape the device. If students come up with other material suggestions in their design process or research that are available to the classroom, feel free to include those as well. If students will be making a marine life backdrop for their device they will need craft materials such as construction paper, markers, crayons, glue, scissors, etc.
IMAGINE & PLAN	After students have been grouped and presented with the problem, they will need to choose a target fish to catch as well as do a bit of research on types of nets and current fishing practices. They can look this up online using keywords such as dredging, trawling, purse seine, long-lining, trolling, turtle extruder devices, circle hooks, and gillnets. Things to consider when creating a fishing device: What is the target animal for your device? What other sea life lives in the same marine habitat as your target fish? How will your device be put into the water? Will the device need to be moved or will it be stationary? What features will allow other marine life to escape or to avoid being caught in the device? Students should sketch out their fishing device design to scale before moving on to the create stage.



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STEAM LESSON: BYCATCH

<p>CREATE</p>	<p>After presenting their design sketch and explaining the design choices to their teacher, students can create their fishing device as long as the materials are available to them. If after presenting the design plan, the students are informed that a material is not available to them, they will need to reevaluate their plan and revise it to work with available materials. Remind students that they should be measuring materials to match their design so that they are not using more than necessary or being wasteful with materials. If you are incorporating art into this lesson by having students create a marine backdrop for their fishing device, offer students materials to create such a backdrop.</p>
<p>TEST, EVALUATE, & IMPROVE</p>	<p>After the fishing devices are created, your locale impacts how they may be tested. If you are in an environment where, with permission from local game and fish, students may be allowed to try their fishing device in water with live fish or other target animals, this would be the truest test of the device. Alternatively, you can also try them in a tank or large bin of water with a few feeder goldfish or other small fish. Fishing devices would need to be evaluated beforehand to be sure they could not hurt the fish. If no testing with live fish is possible, students can manipulate them in a tank or large bin of water to see how they interact with the water. If problems are noted, have students re-evaluate their designs and see if they can be improved.</p>
<p>SHARE SOLUTIONS</p>	<p>Once the fishing devices have been tested, evaluated, and improved if needed, students can present their findings to the class. The class can discuss any factors that may have contributed to the success or failure of each fishing device. The class can also discuss what they can look for on seafood products at the store to ensure that they are purchasing fish and seafood caught with sustainable and ethical fishing practices.</p>



LITERACY CONNECTIONS

- Students can create an advertisement for their fishing device. The advertisement should include a diagram and explanation of important features.
- Students could also write a persuasive paragraph or paper on sustainable fishing practices or the best way to resolve the problem of bycatch. They should include information about how fishing practices impact the environment.



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BYCATCH FISHING GAME

This is a summary of the game within the Banishing Bycatch lesson from the California Academy of Sciences. If you liked to view the full lesson, you can find it here:

<https://oceanconnectors.org/wp-content/uploads/2013/01/Banishing-Bycatch-Activity-all.pdf>

Materials:

Depending on class size: 1 bag of popped, plain popcorn, 1 or 2 bags of oyster crackers, 1 or 2 bags of Goldfish crackers

1 per student: small cup, spoon, Fishing Log handout

1 per group: medium sized bowls or dinner plate, spatula, tongs

Watch (for timing activity)

Activity:

Introduction: Tell students that today they're going to go fishing and explore the sustainability of ocean fishing practices. Ask them what sustainability means. "To do something sustainably means meeting the needs of people who live now without limiting the ability of people in the future to meet their own needs." How might this apply to fishing?

1. Explain the game rules: a. Each student will be a "fisher" whose livelihood depends on catching fish. b. Oyster crackers, popcorn, and Goldfish will represent different ocean animals. c. Each fisher must catch at least five of the target fishery in each round to survive to the next fishing season. There will be at least four fishing seasons total. d. When the fishing begins, students will use a spoon to represent a seine net to collect (crackers, popcorn, goldfish) from the "ocean" (bowl) and deposit them into their "boat" (cup). e. The ocean animals remaining in the ocean after each fishing season represent the reproductive population, and thus one new cracker/popcorn/goldfish will be added for every ocean animal left in the ocean (bowl).
2. Divide the class into groups of five to seven students and have each group choose an ocean in which to fish such as Atlantic, Arctic, Southern, Pacific or Indian Ocean.
3. Give each group one bowl and each student one cup, one spoon, and one copy of the handout Fishing Log.



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BYCATCH FISHING GAME

4. Put 60 goldfish pieces, 40 oyster crackers, and 40 popcorns in each group's bowl. These represent the ocean life.
5. Remind students only to use spoons and not to collect with their fingers.
6. Students have to wait until the teacher says "start fishing!" Give the students 20 seconds for the first "season" of fishing. (Note: If students are not depleting their oceans, you may increase the "season" to 30 seconds.)
7. Have each fisher count his or her target fish catch (goldfish in their cup), other fish catch (popcorn), and bycatch (such as sea turtles, represented by oyster crackers) and record the data in their Fishing Log.
8. In order to survive to the next fishing season, fishers must catch at least five of the target fishery (goldfish). Fishers who did not catch the minimum must sit out for the following round or "fishing season".
9. Add one of each for every food item left in the bowl (ocean), explaining that the organisms reproduced themselves in between the seasons.
10. Allow one fisher per group to use the spatula during the second season to represent "trawling." Record catches on the Fishing Log. a. Repeat for season three, but have someone else use the spatula in the group. b. In the fourth season, students use the spoons again plus one student per group uses a set of tongs (represents a hook and line).
11. What happened when an ocean ran out of fish? How are the fishers going to survive now?" (One option is to move to another ocean.) Allow students to "invade" other ocean groups when their ocean is depleted, but don't tell them that they can do this beforehand. Fishers may either go as a group to another ocean or they may disperse separately to other oceans.
12. Repeat fishing, recording, and replenishing fish stocks until all (or most) groups fish out their ocean. Fishing log allows for up to six seasons, but focus on at least four.
13. Conduct a discussion about the concept of bycatch. Ask students to look at the composition of their catch. Explain to students that the oyster crackers represent bycatch such as sea turtles, and the popcorn represents other fish catch, such as sharks. Have each group of students brainstorm ways that they might have made the fisheries more successful while avoiding bycatch.



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FISHING LOG

Fishing Log

Adapted from www.facingthefuture.org

Ocean: _____ Fisher: _____

Record your catch and fish left in the ocean after each season:

Season	Your Catch				Fish left in Ocean
	Target Fish Catch	Other Fish Catch	Total Catch	Bycatch	
1					
2					
3					
4					
5					
6					

Fishing Log

Adapted from www.facingthefuture.org

Ocean: _____ Fisher: _____

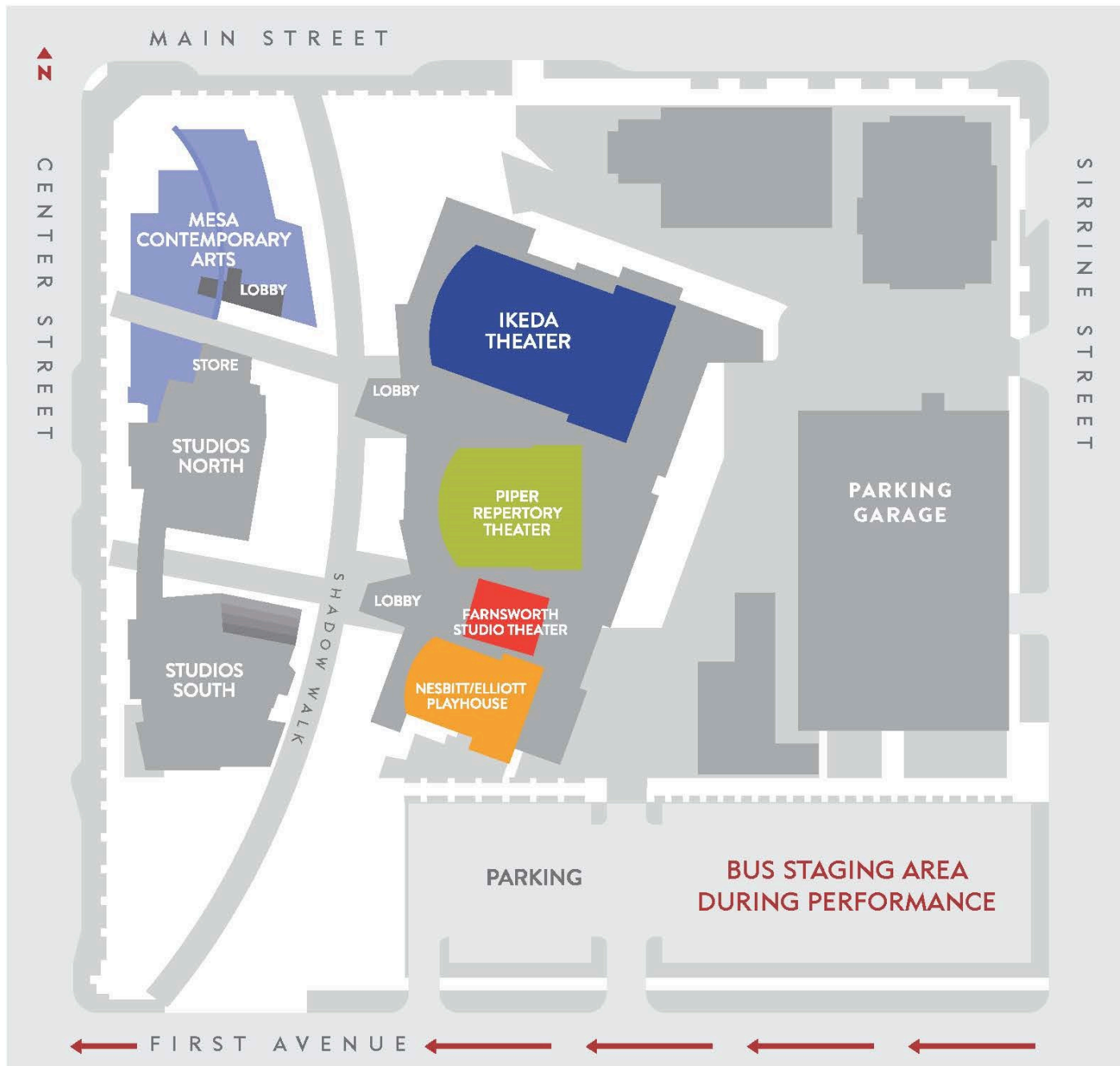
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Season	Your Catch				Fish left in Ocean
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1					
2					
3					
4					
5					
6					

BUS PARKING MAP



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STEPS TO UNLOAD

- 1 Enter the drop off area by coming in westbound on 1st Avenue.
- 2 Pull up to the curb marked with cones and wait until notified to unload passengers.
- 3 Await parking direction from MAC security

STEPS TO PICK UP

- 1 Passengers will exit the theater and meet buses in the bus parking lot area.
- 2 Wait for clearance to depart.



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SHARE YOUR EXPERIENCE!

We'd love to hear your students' response to our shows.
We especially appreciate pictures and letters!

THANK YOU!

Questions? Please contact Engagement at:

P 480-644-6540 | F 480-644-6503

engagement@mesaartscenter.com