EDUCATION @ MESA ARTS CENTER

NATIONAL GEOGRAPHIC LIVE!

CHRISTINA MITTERMEIER: STANDING AT WATER'S EDGE

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

2018/2019 EDUCATOR RESOURCE GUIDE

EDUCATION @ MESA ARTS CENTER

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ABOUT CHRISTINA MITTERMEIER, PHOTOGRAPHER…

National Geographic Live! brings you Christina Mittermeier, a marine biologist and conservationist who uses her photography skills to inspire others to make change in the natural world. Christina's true passion is conservation and her goal with every photograph she takes is to use it to tell a meaningful story about how we can affect positive change in the world we live in. Born in Mexico and educated in Mexico and the United States, Christina has traveled the world documenting environmental issues to bring awareness and change. She has received numerous awards for her work, including the Smithsonian Conservation Photographer of the Year Award. Christina is also the co-founder of Sea Legacy, a non profit whose goal is to protect the ocean and increase ocean conservation awareness.

One concept that Christina focuses on is "enoughness" or only taking what you need. Enoughness is particularly important when related to water use around the world. In this talk Christina will delve into the power of water in various communities around the world. We hope you will enjoy seeing Christina Mittermeier's incredible photographs as well as hearing her fascinating stories about life as an activist, journalist, and photographer 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: Christina Mittermeier: Standing at Water's Edge

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: STEM Lesson

These standards can be achieved by using the STEM 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.

CURRICULUM CONNECTIONS CONTINUED

National Geographic Live: Christina Mittermeier: Standing at Water's Edge

Arizona Academic Standards: STEM Lesson

These standards can be achieved by using the STEM 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 STEM lesson included in this guide, students can become more proficient in the following Competencies:

- **Critical Thinking**
- **Creativity**
- **Communication**
- **Collaboration**

DISCUSSION QUESTIONS

Pre-Performance Discussion Questions

What do you know about water and ocean conservation? Do you do anything in your home or community to conserve water?

Christina Mittermeier is passionate about ocean conservation and uses her photography skills to make others aware of conservation efforts. What are you passionate about? What skills do you have or could develop that can turn your passion into a future job?

In working with and observing indigenous communities throughout the world, Christina Mittermeier has become aware of the idea of "enoughness" and how it helps communities practice conservation. Enoughness is the idea of using only what you need and no more. Do you ever practice enoughness in your daily life? Can you think of a time or situation where practicing enoughness could have a positive impact on your community?

Post Performance Discussion Questions

What was something surprising or interesting you learned from Christina Mittermeier's presentation on water, oceans, and conservation?

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

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

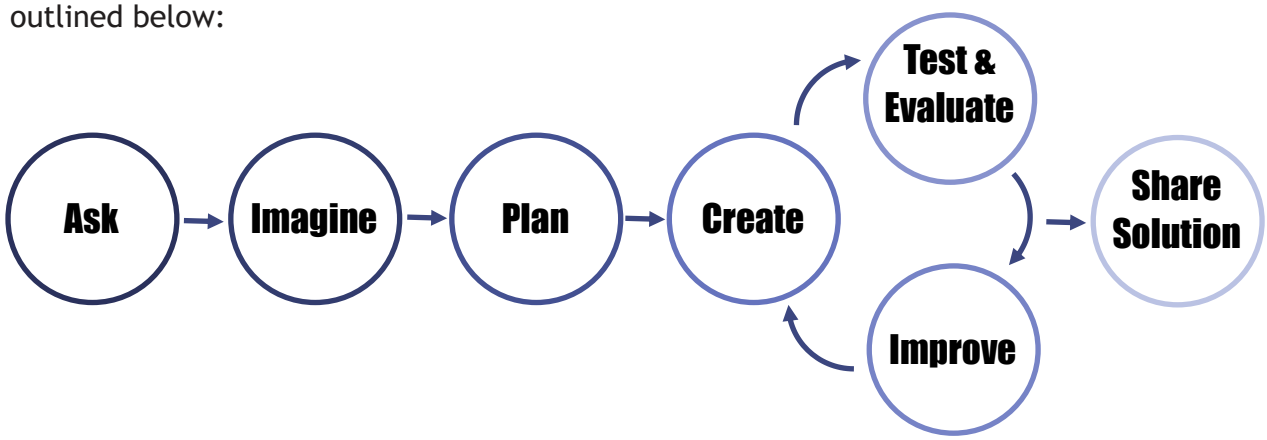
WHAT IS STEM?

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:

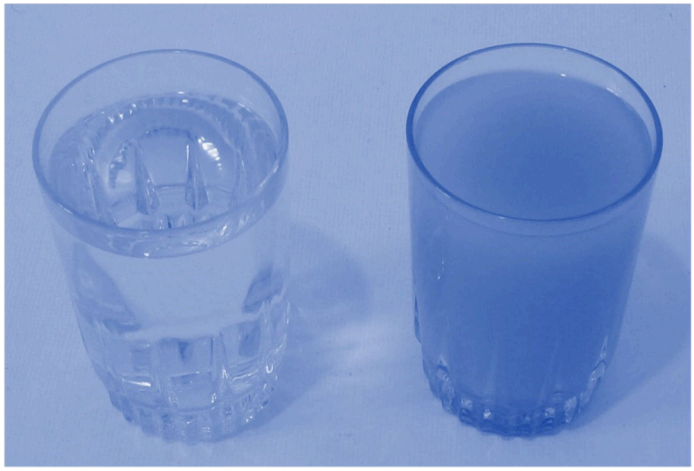
- The lesson focuses on a real world problem/issue.
- Students are working in productive teams.
- Students are engaging in hands-on inquiry and open-ended exploration. Students should be able to redesign as needed (within time constraints) so there should not be an exact end product/result predetermined 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.

STEM LESSON: WATER FILTRATION

Christina Mittermeier has spent part of her career in countries researching how people handle water usage and shortages. Having clean drinking water is a huge problem in many parts of the world. Only using what you need is an excellent practice, but being able to reuse water benefits the community as well. In this lesson, students will design a water filtration device to see how clean they can make some dirty water. The art component is limited to the sketching portion of the project.



ASK (REAL WORLD PROBLEM)	Although about 71% of the earth is covered with water, only about 1% is fresh, drinkable water. With billions of people on the planet needing fresh drinking water every day, it is essential that we find ways to make that other 70% of water on the earth a viable drinking water resource. Water filtration is one way that water can be changed to create drinking water. In less industrialized places around the world, water filtration devices can greatly impact the success of a community. If students need some background information about drinkable water, this playlist on YouTube by the National Science Foundation gives a lot of information: https://www.youtube.com/playlist?list=PL0ujJTaPsv3fFhS_vLXG04xzyATLPxzkf Ask students, "Can you create a water filtration device that will make dirty water visibly cleaner?"
MATERIAL POSSIBILITIES	Each group will need a clear 2-liter soda bottle cut in half. They will also need some dirty water made from water mixed with topsoil, shredded paper, and torn up leaves. To create their filtration device, students should have an assortment of materials available: topsoil, sand of varying texture, gravel, coffee filters, cheesecloth, cotton balls, rubberbands, napkins, and papertowels. If students suggest other reasonable materials and you are able to procure them, feel free to include those as well. It is also helpful to have measuring cups or a scale to help students determine quantities for each of the materials they want to use.
IMAGINE & PLAN	After students have been grouped and presented with the problem, give them a little time do some online research on water filtration. Depending on the age of your students, it also might be helpful to read aloud the book *The Magic School Bus at the Water Works* by Joanna Cole. Things to consider when creating a water filtration device: How many layers of filtration can you fit in the bottle? What will filter out larger contaminants in the water? What will filter out the small contaminants? How much of each filtration layer is most effective? Students should sketch out their water filtration device design to scale, including amounts of each filtration layer, before moving on to the create stage.

Modified from material at: https://www.teachengineering.org/activities/view/uoh_cleandrink_activity1

CREATE	After presenting their design sketch and explaining the design choices to their teacher, students can create their water filtration 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.
TEST, EVALUATE, & IMPROVE	After the water filtration devices are created they will need to be tested. Using the same amount of dirty water for each group, test the effectiveness of each water filtration device by pouring the dirty water into the top of the device. Use the other half of the two liter bottle to collect the filtered water (or any other clear container) so that you can determine if the water is visibly cleaner. If a group runs into problems during the test, allow them to discuss and problem solve if possible. Students should be allowed to modify their designs if a problem is encountered and their solution can be applied within a reasonable amount of time. Even if a group's water filtration device is successful, but they see ways to improve the design, encourage students to modify as they see fit to improve their design.
SHARE SOLUTIONS	Once the water filtration 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 water filtration device.

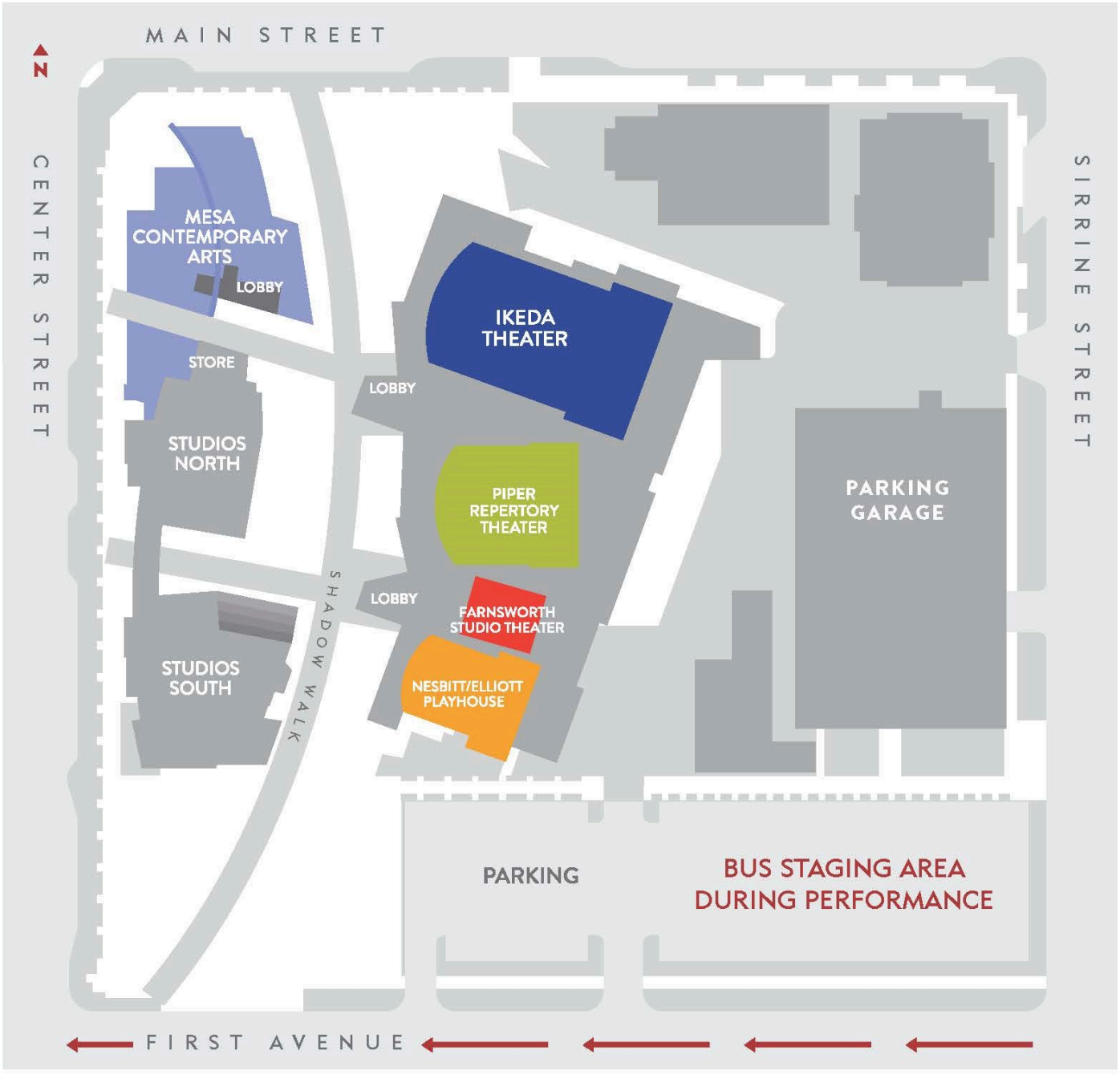
LITERACY CONNECTIONS

- *Students can create an advertisement for their water filtration device. The advertisement should include a diagram and explanation of important features.*
- *Students can make a trifold or poster style report to present their findings and show other classmates or classes how their device works. Students can include information about the need for water filtration throughout the world and current water filtration practices on their report.*

Modified from material at: https://www.teachengineering.org/activities/view/uoh_cleandrink_activity1

BUS PARKING MAP

MESA ARTS CENTER



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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THANK YOU!

Questions? Please contact Engagement at:

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