



EDUCATION @ MESA ARTS CENTER



**MESA ARTS CENTER PRESENTS**  
**NATIONAL GEOGRAPHIC LIVE!**  
**BETWEEN RIVER AND RIM:**  
**HIKING THE GRAND CANYON**

Ikeda Theater | March 1 | 10:15 AM | Grades: 5 - 8

**2017/2018 EDUCATOR RESOURCE GUIDE**



# EDUCATION @ MESA ARTS CENTER

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## ABOUT PETE MCBRIDE, PHOTOGRAPHER...

National Geographic Live! brings you Pete McBride, a self taught photographer who has traveled to over 75 countries on assignment for various magazines and research organizations. Pete McBride's greatest passion is the Colorado river and he has spent many years exploring, researching, and documenting this important river. In his latest adventure, McBride spent a year hiking the Grand Canyon from end to end – at least 700 miles without a trail! The purpose of the hike was to bring attention to potential development that could greatly impact this national treasure.

## ABOUT KEVIN FEDARKO, WRITER...

Kevin Fedarko shares Pete McBride's passion for the Grand Canyon remaining as free from human development as possible. He joined Pete McBride on the brutal and lengthy journey along the Grand Canyon's floor to add his experience as a travel narrative writer to document their trip. Kevin Fedarko is an experienced writer with publications appearing in Outside Magazine, National Geographic, Esquire, and Time magazine. Fedarko has worked as a part-time river guide in the Grand Canyon, but although he had experience in the canyon, nothing could have prepared him for what ended up being the most difficult undertaking of his life!



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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](mailto:outreach@mesaartscenter.com).

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

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: Between River and Rim: Hiking the Grand Canyon

#### Arizona's College and Career Ready Standards

*These standards can be achieved by using the discussion questions and STEAM lesson included in this guide.*

#### **Speaking and Listening**

**Grades 5-8.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 5-8.SL.2** — Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

#### **Social Studies**

**Grades 5-8: SS-S4C1-03** — Identify or interpret maps, charts, and geographic databases using geographic information.

**Grades 6-8: SS-S4C1-01; SC05-S4C1-06** — Construct maps, charts, and graphs to display geographic information.



#### Arizona's College and Career Ready Standards

*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.

**6.RP.A.3** — Use ratio and rate reasoning to solve mathematical problems and problems in real-world context.

**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: Between River and Rim: Hiking the Grand Canyon

#### Arizona's College and Career Ready Standards

*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 5-8. 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:*

*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.

**SC05-S3C2-03** – Design and construct a technological solution to a common problem or need using common materials.

*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.

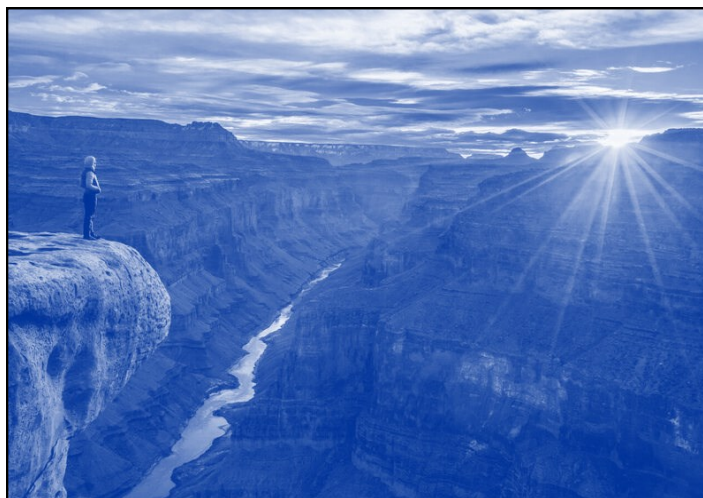
#### Speaking and Listening

**Grades 5-8.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

Pete McBride and Kevin Fedarko feel strongly that the Grand Canyon National Park is the most significant of all National Parks. They fear that tourism and entrepreneurial projects will negatively impact the Grand Canyon. Have you ever been to the Grand Canyon? Do you think it can be ruined by too much tourism?

What is the Grand Canyon like? If your students are unfamiliar with the Grand Canyon, they can explore it on [mapmaker.nationalgeographic.org](http://mapmaker.nationalgeographic.org) using the various layers and views. You can also search for the Grand Canyon on Google Maps and look at the detailed satellite imagery of the canyon.

Pete McBride is a photographer and Kevin Fedarko is a writer. Both had experiences on the Colorado River in the Grand Canyon, as well exploring the wilderness around the world. What do you think makes them a good team to get their message out there about the Grand Canyon?

#### Post Performance Discussion Questions

What was something surprising or interesting you learned from McBride and Fedarko's presentation on the Grand Canyon? Do you have more interest in going to the Grand Canyon? Or if you have already been, do you want to see it again?

In what ways did Pete McBride and Kevin Fedarko demonstrate curiosity, responsibility, empowerment, and persistence in their work? Why do you think these attitudes are important for explorers?

Did McBride and Fedarko make any call to action to support their work? Are there any changes we can make in our day to day lives to support the Earth or preservation of the Grand Canyon? What can we work on together as a group?



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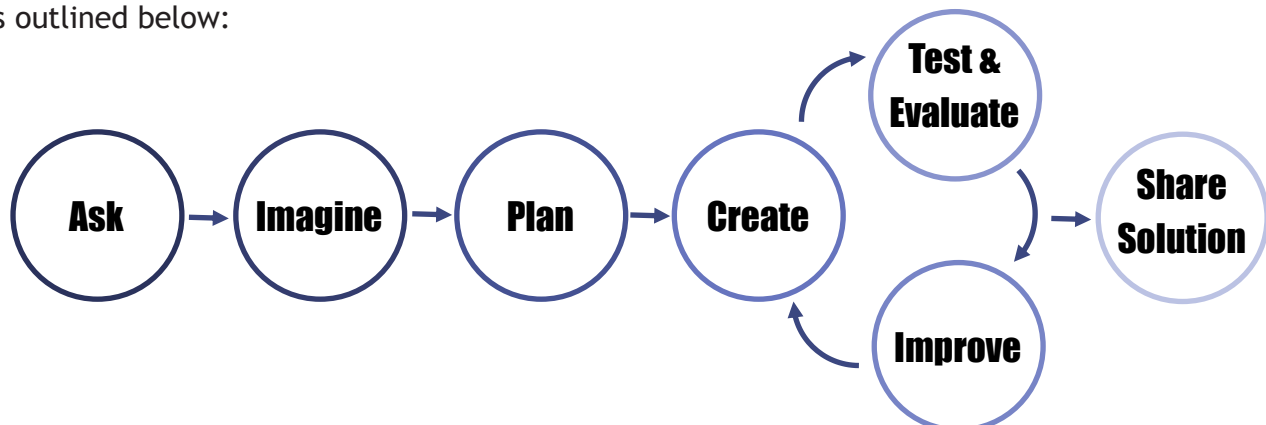
## WHAT IS STEM?

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:

<b>S</b> Science	<b>T</b> Technology	<b>E</b> Engineering	<b>M</b> 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:



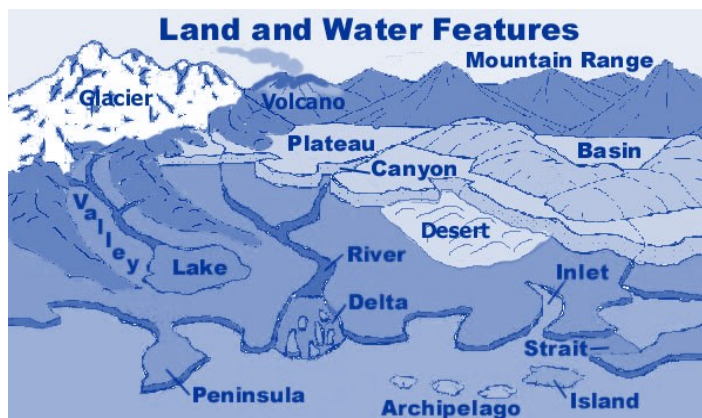
- Adding any type of art component to the lesson changes STEM to STEAM.



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### STEAM LESSON: CARVING A MOUNTAIN

*The Grand Canyon is an example of an extreme landform through which a path is often difficult to traverse. Pete McBride and Kevin Fedarko are fighting to preserve this landform from too much human development, but landforms do need to be taken into consideration and sometimes modified when people are planning roads. In this STEAM lesson, students will create a section of landforms and build a road through it.*




<b>ASK (REAL WORLD PROBLEM)</b>	<p>Once an area of wilderness has been explored, more people usually want to visit that area as well or want to pass through that area to reach another destination. Devising a path through an area with multiple landforms requires careful thinking and planning to create the best route that affects the environment the least but yet still allows for speedy passage. Civil engineers create roads and find ways to create roads around or through landforms. Ask students, “Can you create a landform model (with specific guidelines) and then create an efficient road through it?”</p>
<b>MATERIAL POSSIBILITIES</b>	<p>Students will need a variety of materials to choose from to create their landform model. Each group will need a 2ft by 2ft square of cardboard to create their model on. Other materials they are likely to need to build their landforms include: construction paper, colored markers or paint, papier-mâché or clay/playdoh for landforms, cotton balls for the tops of mountains, glue, scissors, and tape. For the road construction students will need black construction paper and popsicle sticks for bridges.</p>
<b>IMAGINE &amp; PLAN</b>	<p>After students have been grouped and presented with the problem, they will need some background information/research on types of landforms. You can provide this or students can do their own research. When designing, groups should be sure to include a body of water that takes up about a quarter of the area as well as a mountain that is 4 inches in diameter. You can also give students a certain number of other landforms to include if you think that would be helpful to students. Things to consider when designing your landform model: Which materials can you use to create which landforms? In what part of the world would you find this area of land? Do the landforms that you’ve chosen make sense in relation to each other? Students can list out their landforms and materials or make a labeled sketch.</p>



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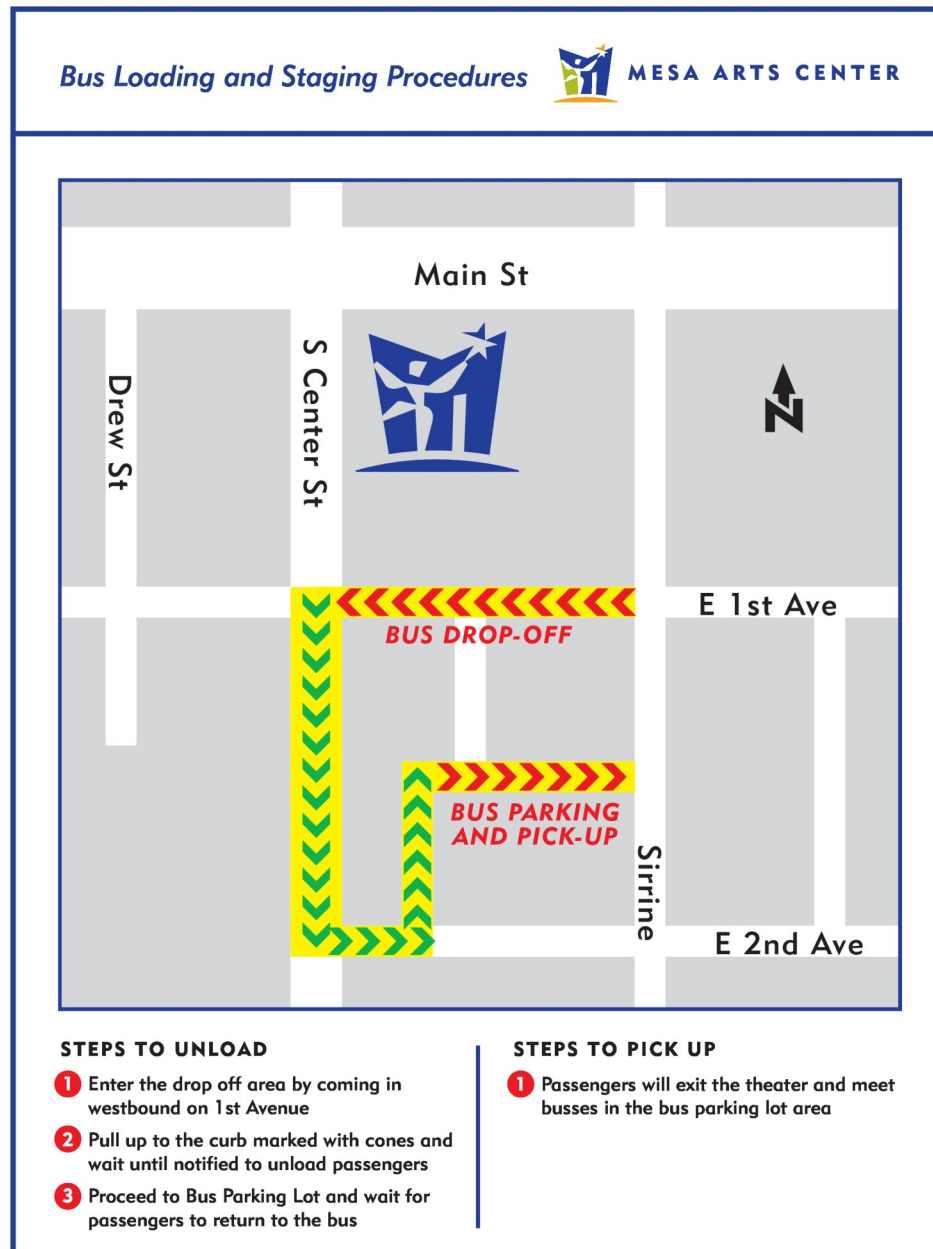
### STEAM LESSON: CARVING A MOUNTAIN

<b>CREATE</b>	<p>After presenting their plan and explaining the design choices to their teacher, students can create their landscape model as a group. Next students should draw out a detailed map of their landscape being sure to include all landforms present. Depending on the age and ability of students, they could also draw the map to scale with elevations. The landscape will likely need to dry overnight, so the next day tell students they will now take on the role of civil engineers and build a road from one corner of the landscape to the other. They should first draw the road out on their maps and discuss how to get around or through landforms with group members. Once consensus is reached on the road, students can use black construction paper and popsicle sticks to build the road and bridges on their landscape. If students are making a tunnel they can show that with circles of black paper at the entrance and exit of the tunnel.</p>
<b>TEST, EVALUATE, &amp; IMPROVE</b>	<p>Since students will not actually be able to test these as true roads on a landscape, instead they can present their landscape and road plan to at least one other group. Students should explain design choices and detail how their road design is efficient and structurally sound. The other group can provide constructive feedback and then, in turn, present their design for feedback as well. Then provide time for groups to improve their design if needed based on the feedback they received.</p>
<b>SHARE SOLUTIONS</b>	<p>Once the landscape models have been explained, evaluated, and improved if needed, students can present their final products to the class. Each student in the group should have a role or part in the presentation. The class can discuss any factors that may contribute to the success or failure of the road on each landscape model.</p>
	<p><b>LITERACY CONNECTIONS</b></p> <ul style="list-style-type: none"> <li>• <i>Students can write an informative paragraph detailing the landforms included in their landscape model. They should include important features of each landform.</i></li> <li>• <i>Students could also write a research paragraph on one landform in particular. Within the paper students could include information about how civil engineers work around this landform when building roads.</i></li> </ul>



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## MESA ARTS CENTER MAP



Mesa Arts Center | One E. Main St. Mesa, AZ 85201 | 480-644-6500 | [MesaArtsCenter.com](http://MesaArtsCenter.com)

**PLEASE NOTE - We ask that buses arrive approximately 30 minutes before the performance begins to allow ample time to unload and seat students.**



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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!

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