



EDUCATION @ MESA ARTS CENTER



MESA ARTS CENTER PRESENTS LUMA

Ikeda Theater | September 24 | 9:30AM & 11:45AM | Grades: 3 - 5

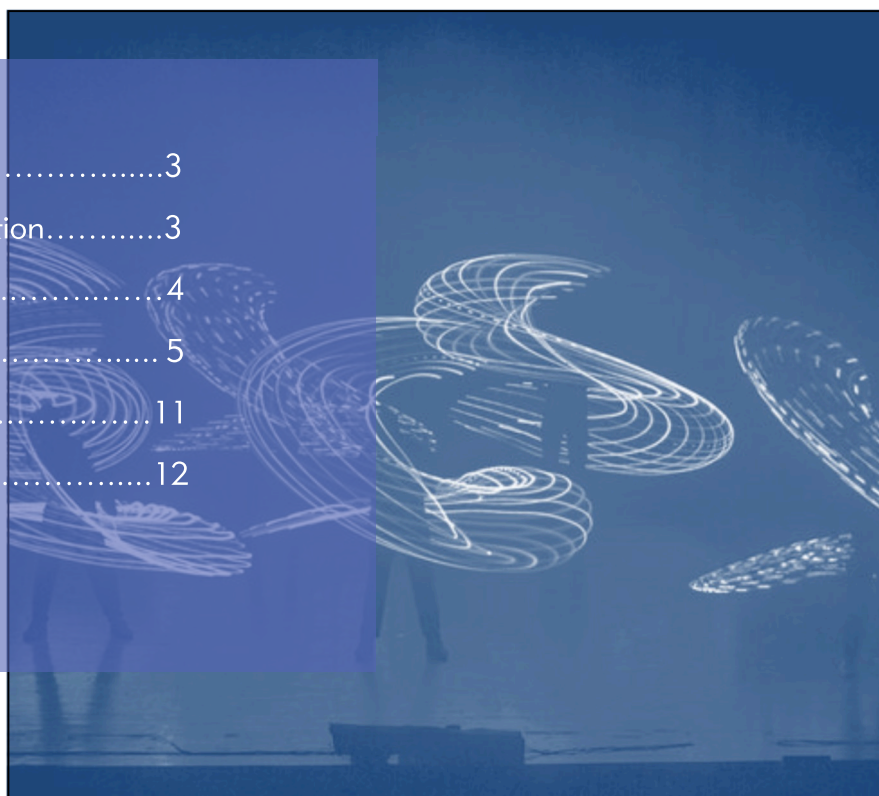
2018/2019 EDUCATOR RESOURCE GUIDE



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ABOUT LUMA.....

Take the giant leap into a surreal world of light, color and motion where thinking stops and astonishment begins. Luma is an exhilarating light spectacle that captures the audiences' imagination by using the dark as the canvas and light as the brush to create colorful illusions by combining rhythmic gymnastics, dance, magic, puppetry, and physics with well-coordinated motion. It is an experience that will leave you mesmerized and full of wonder.

The viewer experiences artistic depictions of natural, artificial, and metaphysical light. Fireflies dance, shooting stars flash across a darkened stage, screen savers undulate, carnival rides spin, and EKG monitors pulse the heartbeat of the body electric. We hope you enjoy this unique experience with light and darkness that uses persistence of vision, optical illusions, and the interplay of shadow and light to entertain and amaze you.



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WELCOME!

Dear Educator,

Thank you for selecting a Performing Live for Students! field trip with the Mesa Arts Center. We have a dynamic season planned and we look forward to connecting you to our many artists and performances. With Performing Live, students are able to experience live theatre 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. No prior arrangements need to be made.

Please contact our offices at engagement@mesaartscenter.com or 480-644-6564 should you have any additional questions.

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

LUMA

Arizona Academic Standards in the Arts

These standards can be achieved through discussion questions included in the study guide.

Theatre

TH.CN.11.3-5a — Identify or explore similarities and differences in stories in a guided theatrical experience.

Arizona Academic Standards

These standards can be achieved by participating in discussion questions and activities in the study guide.



Writing

Grades 3-5.W.1 — Write opinion pieces to support opinions in response to a topic or text, using grade appropriate expectations of evidence.

Grades 3-5.W.2 — Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

Speaking and Listening

Grades 3-5.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 3-5.SL.2 — Ask and answer questions about key details in a text read aloud or information presented orally or through other media. Grades 2 & 3 focus more on narrowing to main idea and key details.

Science

Strand 1 of the Science standards lays out the Inquiry process for students in grades 3-5. 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.



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PRE-PERFORMANCE CLASSROOM ACTIVITIES

Included in this resource guide are a variety of activities created to correspond with the Arizona English Language Arts and Performing Arts Standards to enhance the students' growth, reading skills, and overall comprehension.

Questions to Ponder....

Question 1 — What do you know about light? What are some sources of light that you are familiar with? (Grades 3-5.SL.1)

Question 2 — Have you heard of an optical illusion before? Can you think of a time when your eyes tricked your brain? (Grades 3-5.SL.1, 3-5.SL.4)

Activities to Explore....

Understanding how white light can be broken down into individual colors plays an important role in Luma's performance. Have students shine a flashlight through a prism onto a white piece of paper so they can observe the white light broken down into the rainbow spectrum. Students can draw a diagram of the white light as it goes through the prism and the color breakdown on the other side.

Standards Implemented: SC03-S5C3-01

Approximate time: 10 - 15 minutes

Materials Needed: clear prism(s), flashlight(s), white paper

Luma uses optical illusions in their performance to amaze you. Optical illusions are pictures or designs that trick the brain while it is processing information from the eyes. To help students know what to look for in the performance, have them check out the optical illusions on page 8. Check out more fun optical illusions here: <https://www.optics4kids.org/illusions>

Standards Implemented: Grades 3-5 SC-S1C1, SC-S1C2, SC-S1C3, SC-S1C4

Approximate time: 10 - 15 minutes

Materials Needed: Page 8, rulers

Another illusion trick you can play on your eyes has to do with negative image. Ask your students what they think will happen if they look at a black and white photo for 15 seconds and then look at a white paper or screen. Most likely they will be surprised by the result! Look at page 9 for an example of negative image and an explanation of what is happening.

Standards Implemented: Grades 3-5 SC-S1C1, SC-S1C2, SC-S1C3, SC-S1C4

Approximate time: 5 - 10 minutes

Materials Needed: Page 9



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POST-PERFORMANCE CLASSROOM ACTIVITIES

Questions to Discuss

- Question 1 — How did you notice light being used in the performance? Were there different types of light? (Grades 3-5.SL.1, 3-5.SL.2)
- Question 2 — What was your favorite part of the performance? Can you figure out how the Luma artists created that part of the performance? (Grades 3-5.SL.1, 3-5.SL.2)
- Question 3 — If your class tried out any of the optical illusion activities before seeing the performance, did the students notice any optical illusions in the performance? If so, what parts of the show involved optical illusions? (Grades 3-5.SL.1; TH.CN.11.3-5a)

Activities for the Classroom

A specific type of optical illusion used in the show is persistence of vision. This is when your brain holds on to an image for a short time after you are no longer looking at it. This is what makes motion pictures and animation seem like one smooth image instead of many individual images. Try out the persistence of vision activities on page 10 to help your students understand this type of optical illusion.

Standards Implemented: Grades 3-5 SC-S1C1, SC-S1C2, SC-S1C3, SC-S1C4

Approximate Time: 20 - 30 minutes

Materials Needed: Cardboard tube, x-acto knife, post-its or small paper squares, pencils

Luma's performance happens in darkness so that the light effects show up clearly. This is a time when darkness is preferred. Darkness and light have other interesting properties related to heat. Try out the experiment on page 11 to find out more about heat absorption.

Standards Implemented: Grades 3-5 SC-S1C1, SC-S1C2, SC-S1C3, SC-S1C4

Approximate time: Initially 10 min, then revisit several hours later

Materials Needed: See page 11 for full materials list

Light pollution happens when the light from cities and towns is so bright at night it can disrupt the environment and nature life cycles. Have students research to find out more about light pollution. They can write an informative paragraph and may want to search for terms such as skyglow, glare, clutter, and light trespass. Alternatively, students can write a persuasive paragraph on a solution to help reduce light pollution. Younger students can participate in a shared writing or write a detailed sentence.

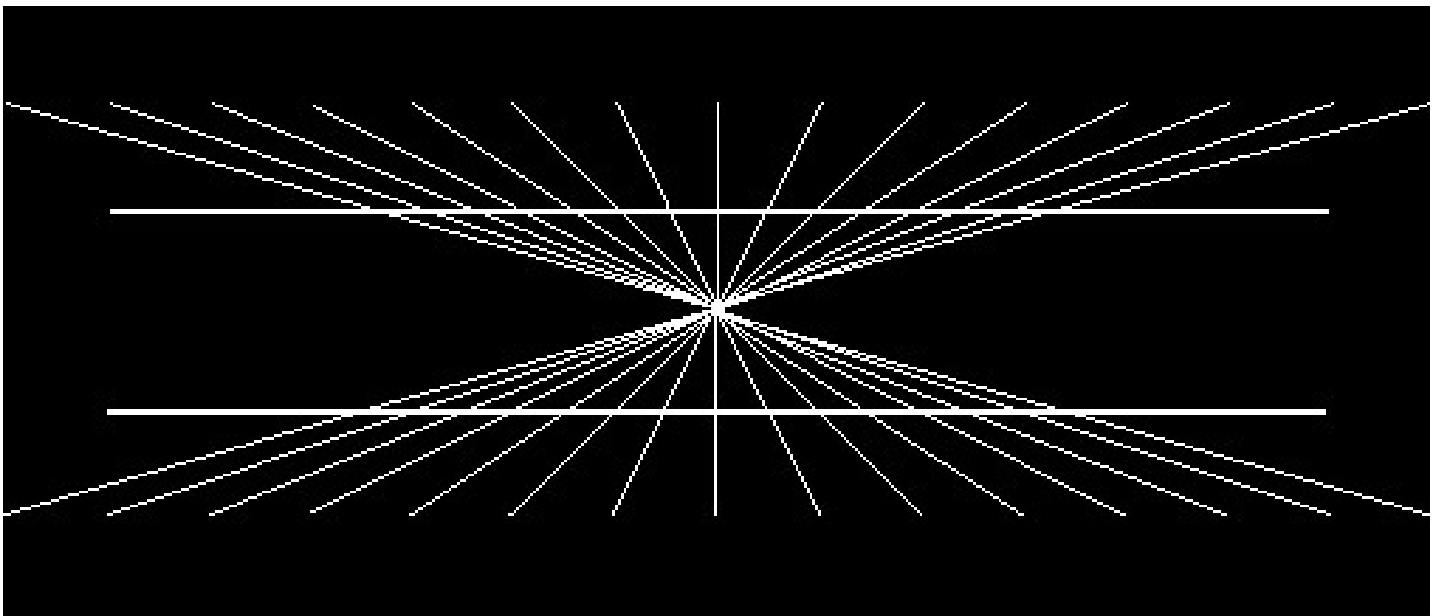
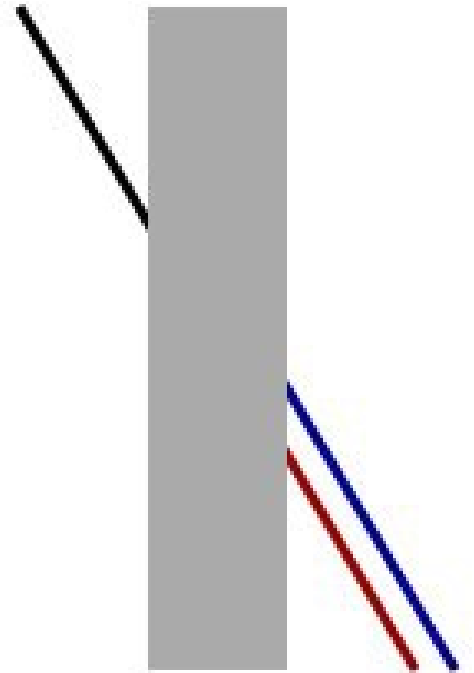
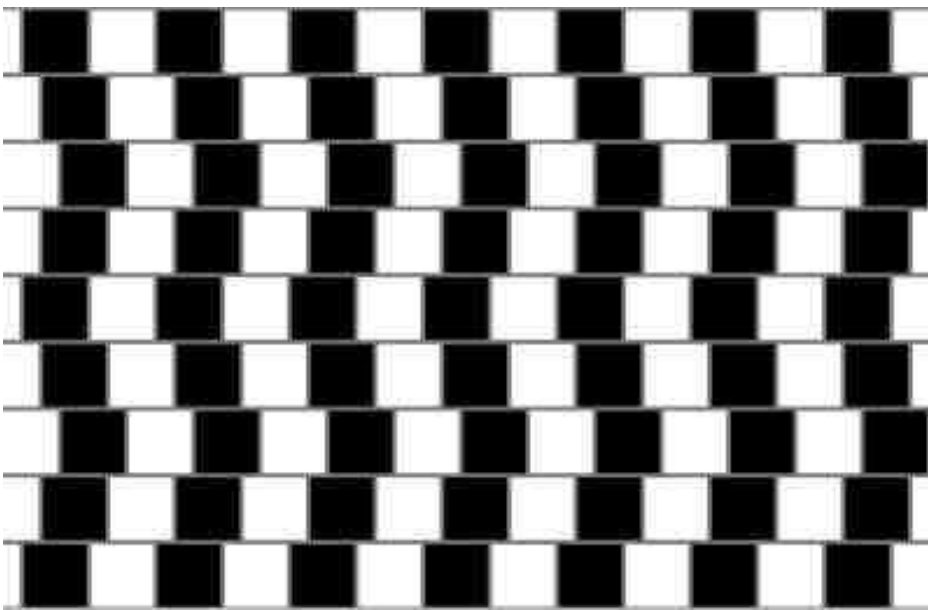
Standards Implemented: Grades 3-5.W.2 or W.1, SC03-S3C1-02

Approximate time: 30 - 45 minutes

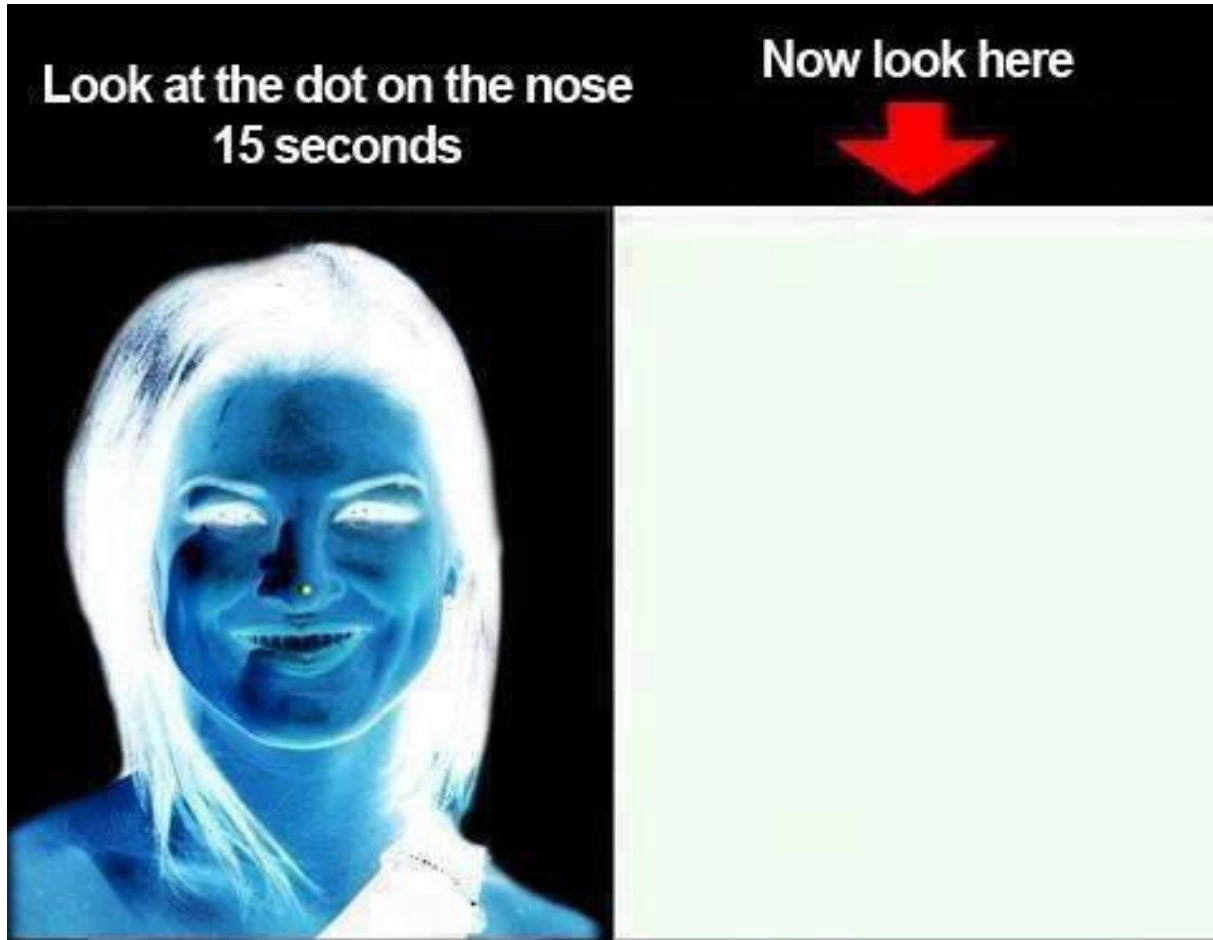
Materials Needed: Pencils, paper

OPTICAL ILLUSIONS

Use a ruler to check which lines are straight on these optical illusions. On the tall rectangle, use a ruler and check to see which lines actually connect behind the rectangle.



NEGATIVE PHOTO ILLUSIONS



What is happening?

What you are experiencing is known as a negative afterimage. This happens when the photoreceptors, primarily the cone cells, in your eyes become overstimulated and fatigued causing them to lose sensitivity. In normal everyday life, you don't notice this because tiny movements of your eyes keep the cone cells located at the back of your eyes from becoming overstimulated. If, however, you look at a large image, the tiny movements in your eyes aren't enough to reduce overstimulation. As a result, you experience what is known as a negative afterimage. As you shift your eyes to the white side of the image, the overstimulated cells continue to send out only a weak signal, so the affected colors remain muted. However, the surrounding photoreceptors are still fresh and so they send out strong signals that are the same as if we were looking at the opposite colors. The brain then interprets these signals as the opposite colors, essentially creating a full-color image from a negative photo.

(This explanation is from <https://www.verywellmind.com/the-negative-photo-illusion-4111086>)



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PERSISTENCE OF VISION ACTIVITIES

Tube Experiment

Your eye and brain can hold on to an image for about 1/30 of a second which can make a series of images form a complete continuous image. Try this experiment to see how persistence of vision works.

Materials:

- A cardboard mailing tube about 3 inches in diameter and 2 to 3 feet long with a cap over one end.
- An X-acto knife (for an adult to use!)

Directions:

1. An adult can use the knife to cut a slit in the cap of the cardboard tube. The slit should be about an inch long and 1/8 of an inch wide. If your tube does not have a cap, you can also cut the slit in black paper and then tape the paper over one end of the tube.
2. Holding the tube so that the slit is vertical, cup your hand over the other end and look with one eye through the tube. Close your other eye.
3. Observe what you can see when you hold the tube still vs when you sweep the tube from side to side. Experiment what happens when you increase the speed of the tube.

Flip Book Activity

The building blocks of animation technology come from persistence of vision. Try this quick activity to create a moving picture.

Materials:

- A small stack of post-it notes or squares of paper stapled on one end
- A pencil or drawing materials

Directions:

1. Draw a simple picture (smiley face, stick figure, etc) on the first page of the papers or post-its.
2. On the next page draw the same character/image but make a small change that shows movement.
3. On each following page change the picture a little bit each time.
4. When all the pages have been drawn on, use your thumb to flip the pages quickly and see what happens to the image!



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HEAT ABSORPTION EXPERIMENT

What absorbs more heat? When you're out in the sun on a hot summer's day it pays to wear some light colored clothes, but why is that? Experiment with light, color, heat and some water to find out.

Materials:

- 2 identical drinking glasses or jars
- Water
- Thermometer
- 2 elastic bands or clear tape
- White paper
- Black paper

Instructions:

1. Wrap the white paper around one of the glasses using an elastic band or tape to hold it on.
2. Do the same with the black paper and the other glass.
3. Fill the glasses with the exact same amount of water. Take the water temperature before going outside.
4. Leave the glasses out in the sun for a couple of hours before returning to measure the temperature of the water in each. Compare the temperature to the original temperature.

What's happening?

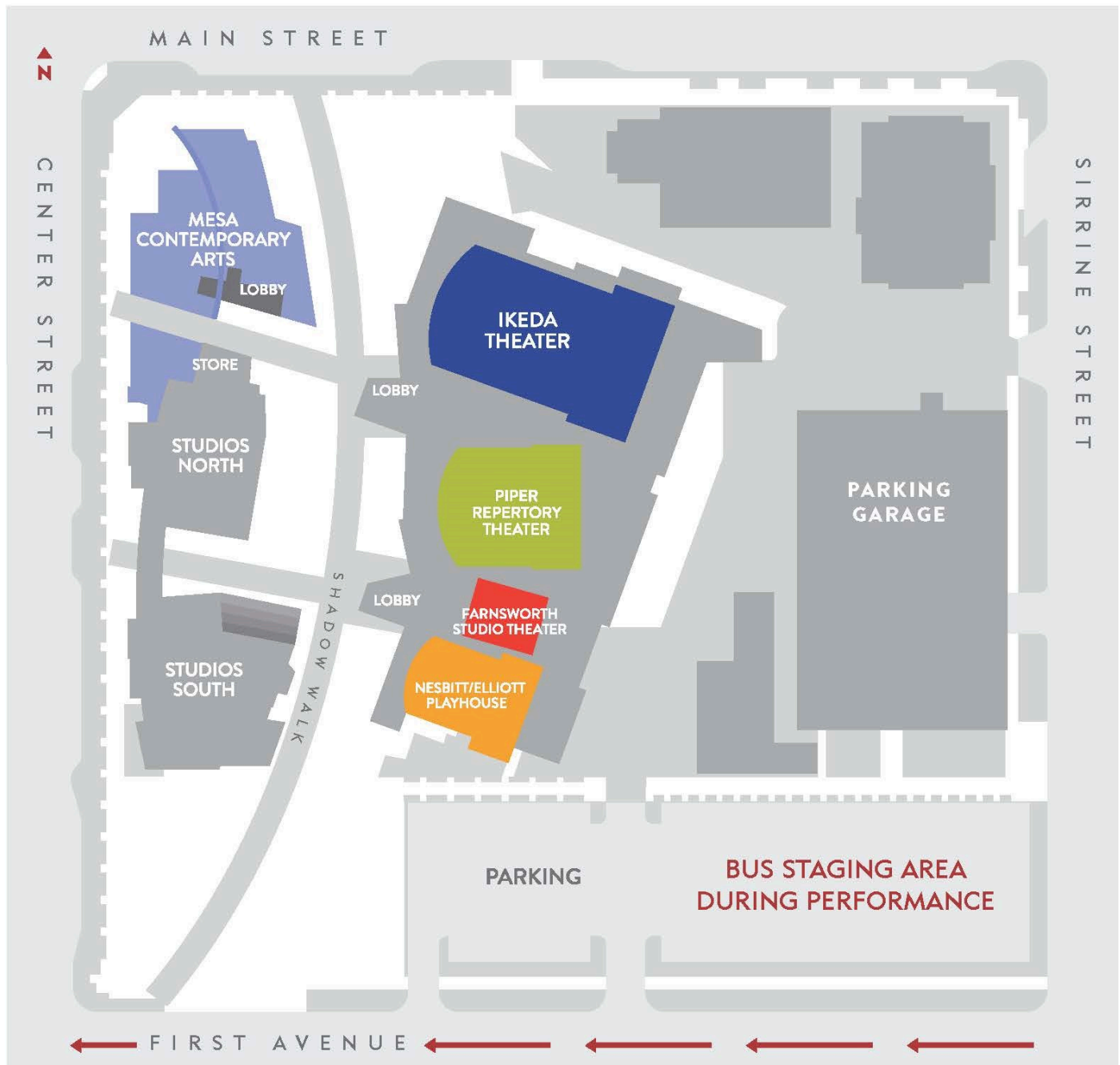
Dark surfaces such as the black paper absorb more light and heat than the lighter ones such as the white paper. After measuring the temperatures of the water, the glass with the black paper around it should be hotter than the other. Lighter surfaces reflect more light, that's why people wear lighter colored clothes in the summer. It keeps them cooler.

From LUMA study guide materials.

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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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