GOT SCIENCE? GUIDE

Grades 9-12

Science City is more than just a place to have fun. Science is lurking in unsuspecting places. Use this guide to help you discover where!

Please note: Exhibits are sometimes removed temporarily for repair or refurbishment, or may be in use by other groups, so be prepared to be flexible.

Teachers: *Standards for KS and Strands for MO listed on these pages next to the exhibits are intended for guides to understanding or reinforcing concepts addressed by these suggested standards. Follow-up in your classroom about the students' experiences will further enhance the hands-on learning experienced at Science City.*

****The following exhibits are listed in alphabetical order. This is not a recommended flow for exploring the science center. Reference a science center map for assistance.***

Dino Lab

NGSS: HS-LS2, HS-LS4
MO Science Strands: 4.1, 4.3, 7.1
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

Guide

The DINO Lab is about paleontology. Observe the activity in the lab to see step-by-step processes performed to preserve the fossils.

- If fossils are being prepared during your visit, what process did you observe?

Use the informational guides surrounding the DinoLab to answer the following.

- What is the definition of "dinosaurs"?
- When did dinosaurs live (Period Name)?
- About how many years ago?
- Where are dinosaur fossils found?
- Did dinosaurs lay eggs?
- What types of foods do animals that are carnivorous eat?
- What types of foods do animals that are herbivorous eat?
- What types of foods do animals that are omnivorous eat?
- Describe the process in which most dinosaur fossils have been formed?
  (Hint: Chart in Prehistoric Dig area).

Giant Lever

NGSS: HS-PS2
MO Science Strands 2.2F
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

Guide

Before performing a tug-of-war, observe the difference in point of attachment for each rope on the Giant Lever. *NOTE: One rope is attached two feet above the fulcrum, the other is attached six feet above the fulcrum--or the point at which the lever pivots.*

- Predict which rope will have a mechanical advantage.
- Justify your answer.

Activity: Gather two teams of two or more people.

- **Trial 1:** Attempt to make the teams evenly matched in strength. Perform a tug-of-war, and then switch sides.
- **Trial 2:** Group your smallest/weakest members against the largest/strongest members. Perform a tug-of-war, and then switch sides.
- What conclusions would you draw?

FACT **The lever is one type of simple machine.**

Name other simple machines.

Challenge: Name an application of each simple machine.

Light Alley

MO Science Strands: 7.1

Guide

Shadow Wall: Make your shadow "stick" to the light green wall.
(If available, experiment with celll phone "flashlight" to create an image on Shadow Wall.)

- How does your shadow "stick" to the wall?

- What other things have you seen that use phosphorescent "glow-in-the-dark" technology?

MISTER E. HOTEL

MO Science Strands: 7.1
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

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FACT **There is an optical illusion (a trick on your brain) in every room.**

Before proceeding to the Mr. E Hotel:

Red Light Sign: Find the tiny sign near the corner of the railing outside of the Astronaut Training Center and follow directions.

- What two symbols appeared when you followed the directions?

Faces in the Rotunda: As you approach the lobby of the Mr. E Hotel, look up and notice the portraits surrounding the inside of the rotunda (lobby).

- As you move and stare at the faces, where do they appear to be staring?

Room #18: Try our new bed. Lie on the bed and follow the instructions as posted.

- Why do you think your vision is affected by the configuration of the room?
- How long does the effect last?

Haunted Washroom: Enter the washroom located behind the black curtain. Take time to adjust to the lighting.

- What do you see?
- What differences do you see when people are wearing different color clothes?

Faces/Vases: Stare at the white rotating vase—then concentrate on the black space around the vase.

- Do you see faces or vases?
- When you see the faces, what do they appear to be doing?

Nature Center

HS-LS1, HS-LS2
MO Science Strands: 3.1A, 3.1D, 4.1C, 8.3B
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

THINK! Tapping on the glass or cages frightens the animals. Please be kind to our animals and use quiet voices. Ask a Science City staff member for more information about the animals.

Guide

Observe one of our Veiled Chameleons.

- By looking at their hands as a clue, what do you suppose their natural habitat would be?

FACT **The chameleon's diet in the wild is insects.**

- What do you notice about the movement of the chameleon's eyes and how might that be related to their steady diet of insects

Ask an educator in the Nature Center to explain what causes the Chameleon to change color.

- Can you think of ways humans might mimic the chameleon's ability to change color in order to stay comfortable in its surroundings?

Check out our animals in our Night Gallery.

- How might the human population's lifestyle and habits effect nocturnal animals' natural homes

Look at all the residents of the Nature Center.

- Are they unicellular organisms or multicellular organisms?
- Do you think it is possible for our Nature Center to include both types of organisms?
- Why/Why not?
- What type of exhibit could be added to include unicellular organisms?

Looking at the Spiny-tail lizard, you will notice water missing from her habitat.

- What can you deduce about the origin of this lizard?
- How do you think she acquires water?

SCIENCE ON A SPHERE *(Teacher guidance recommended)*

Various depending on the content
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

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Visit the kiosk inside the Science on a Sphere exhibit area. There are a variety of choices that address various Kansas and Missouri education standards. Select a dataset that best fits the grade level curriculum for your group. Take a seat and observe the many facets demonstrated with this technology.

- What dataset did you watch?
- Record one interesting thing that you learned.
- What other topic would you like to learn about at Science on a Sphere at another visit?

SKY BIKE

NGSS: HS-PS2
MO Science Strands: 2.2 (Grades 9-11), 7.1
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

GUIDE

Ride the bike across the cable (if you meet the height/weight requirements).

- Why do you not fall off the cable?
- What scientific principles does the sky bike demonstrate?
- If the counterweight is 200 lbs., what design changes is necessary for a person weighing more than 200 pounds to safely ride the sky bike?

Water Maze

MO Science Strands: 2.2A, B, D(9th-11th),
4.1C, D(9th-11th), 7.1, 8.1
CCS ELA Connections: CCSS.ELA-LITERACY.W.9-10.4, 11-12.4

Guide

Water is fun to play in, no matter our age. Experiment here with Newton's laws of motions!

First, remove all small and large plexi-barriers from the Water Table. You now see the standard flow of the water.

- How well does a rubber duck travel down the water?
- Is there contact force acting on the duck that is possibly slowing it down?
- What force is that?
- How can you use the plexi-barriers to alter the flow and remove the contact force?

Using the barriers again, can you make the water go against its standard flow and the non-contact force of gravity? (Can you make the water flow "up hill"?)

- In the world of nature, how would re-routing water or making it flow against its standard flow help or hinder an environment and/or ecosystem?
- For what reason would rivers or streams need to be altered or rerouted?