

F CUSED FIELD TRIPS

Seventh Grade Teacher Guide

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What's inside This Guide

Teacher Information

This guide will provide a brief introduction to the student Investigation, as well as suggestions about what to do before, during, and after your visit to the Arizona Science Center.

Standards

How this *Investigation* aligns with Arizona State Science Standards.

The Student Investigation at Arizona Science Center

Strategies on how to do your *Investigation* at the Science Center.

Pre- and Post-Visit Activities

Pre-visit classroom activities will help prepare your students for their Focused Field Trip experience. Post-visit activities will help your students take their Science Center experience back to the classroom, and enhance their learning.

Teacher Information

Congratulations! You have chosen an innovative, inquiry-based learning experience that:

- begins and ends in your classroom;
- is a structured discovery process linked directly to classroom curriculum;
- will promote a deeper understanding of scientific principles;
- promotes team problem-solving skills; and
- is fun!

Before Your Visit

Read the *Investigation* workbook to become familiarized with the concepts that will be presented.

Divide your class into groups of five students.

Each group is a team and should work together to investigate the topic.

Do one or more Pre-Visit Activities.

These activities are directly related to the *Investigation* and will help your students focus on this topic and prepare them for their Arizona Science Center Focused Field Trip experience.

Prep your chaperones for the field trip to the Science Center.

Give them the *Investigation* booklet ahead of time. Chaperones are essential to the success of the *Investigation* – the more they know, the harder they will work to make your field trip a success.

Assign each team to a chaperone.

One chaperone for every five students is a must! Make copies of the next four pages of this guide to help your chaperones manage their group and make sure they read the “Tips for Chaperones” section in the *Investigation* booklet.

At the Science Center

Visit at least three of the *Investigation* exhibits.

You may wish to assign more than three; however, you will have time constraints imposed by lunchtime, IMAX and planetarium shows, and time spent waiting in line for popular exhibits.

Some of the activities in this *Investigation* may require assistance from one of our facilitators. Facilitators will be present in the galleries during your focused field trip and should be easy to spot in bright blue shirts. Not all the facilitated activities will be available at the same time, but a range of the activities in the *Investigation* will be available for every field trip.

Exhibits are also sometimes removed temporarily for repair or refurbishment and may be in use by other groups, so be prepared to be flexible. These activities can be performed in any order and groups may be rotated through various exhibits.

After Your Visit

Reinforce your visit with an experience from the Post-Visit page.

Chaperones

Teachers: *You will probably want to copy these suggestions for each chaperone. It is a good idea to distribute and review before you arrive at the Science Center.*

Chaperones

The following suggestions are designed to make your experience at the Arizona Science Center as enjoyable as possible:

- Learn the name of each student in your group. Make sure students in your group know your name.
- Make sure you know the times of any special demonstration, movie, and planetarium show, etc., your group is due to attend. Arrive at least 5 minutes early. (We do not allow groups to enter late if a movie or planetarium show has started.)
- Make sure your group stays close together at all times.
- Leave backpacks and large items on the bus or other transportation.
- If you are staying for lunch, make sure you know where your lunches are stored (or where the food court is if you are purchasing food), what time your group leader has arranged lunch, and where you are going to eat. The Center's lunchroom is now available by pre-reservation by calling 602-716-2028. Please work with our reservations associate to determine the best time for your group.
- If you are visiting on a focused field trip, read through the investigation materials. It is a good idea to do this before you arrive. Read each investigation out loud to you group before they begin. Finding the exhibits is part of the investigation, so be sure to check the maps located next to the elevators on each floor.
- You are responsible for the safety and behavior of students assigned to you. No running and no food, drink, candy, gum in the Arizona Science Center.
- You should encourage students to explore, investigate, and talk about their experiences during their visit.

Acompañantes

Maestros: Quizás ustedes desearán copiar estas sugerencias para cada chaperón/a. Es buena idea distribuirlas y considerarlas antes de llegar al centro Science Center.

Acompañantes: Las siguientes sugerencias han sido diseñadas para hacer su experiencia en el centro Arizona Science Center los más agradable posible:

- Apréndase el nombre de cada estudiante en su grupo. Asegúrese de que los estudiantes en su grupo sepan su nombre.
- Asegúrese de saber los horarios de cualquier demostración especial, película, presentación en el planetario, etc., a lo cual su grupo vaya a asistir. Lleguen por lo menos 5 minutos antes. (No permitimos que los grupos entren tarde si una película o presentación en el planetario ha comenzado.)
- Asegúrese de que su grupo se mantenga reunido en todo momento.
- Dejen las mochilas y los artículos grandes en el camión u otro tipo de transporte.
- Si se van a quedar a almorzar, asegúrese de saber dónde se almacenan sus almuerzos (o dónde está el área de comida si comprarán alimentos), a qué hora hizo arreglos el líder de su grupo para el almuerzo, y dónde van a comer.
- Si están visitando en un recorrido enfocado de campo, lea los materiales de investigación. Es buena idea hacer esto antes de llegar. Lea cada investigación en voz alta a su grupo antes de que comiencen. Encontrar las exhibiciones es parte de la investigación, así que asegúrese de recoger un mapa del Centro en el vestíbulo.
- Usted es responsable por la seguridad y el comportamiento de los estudiantes que se le han asignado. No se permite correr, ni alimentos, bebidas, dulces, chicles en el centro Arizona Science Center.
- Usted debe animar a los estudiantes para que exploren, investiguen y hablen sobre sus experiencias durante sus visitas.

Chaperone Information Card

Time of Planetarium Show: _____

Time of Movie: _____

Time of Demonstration: _____

Location of Demonstration:

My Students:

Lunch Time: _____

Departure Time: _____

Chaperone Information Card

Time of Planetarium Show: _____

Time of Movie: _____

Time of Demonstration: _____

Location of Demonstration:

My Students:

Lunch Time: _____

Departure Time: _____

Tarjeta de Información
para Chaperones

Hora de la Presentación del Planetario: _____

Hora de la Película: _____

Hora de la Demostración: _____

Lugar de la Demostración:

Mis Estudiantes:

Hora del Almuerzo: _____

Hora de Salida: _____

Tarjeta de Información
para Chaperones

Hora de la Presentación del Planetario: _____

Hora de la Película: _____

Hora de la Demostración: _____

Lugar de la Demostración:

Mis Estudiantes:

Hora del Almuerzo: _____

Hora de Salida: _____

Arizona State Science Standards Alignment

Seventh Grade Investigation

The activities in these Investigations address the following seventh grade science standards adopted by the Arizona Department of Education in 2004.

Strand 3: Science in Personal and Social Perspectives

Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

PO1. Analyze environmental risks (e.g., pollution, destruction of habitat) caused by human interaction with biological or geological systems.

PO2. Analyze environmental benefits of the following human interactions with biological or geological systems: reforestation, habitat restoration, construction of dams

Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

PO1. Propose viable methods of responding to an identified need or problem.

PO2. Compare solutions to best address an identified need or problem.

Strand 6: Earth and Space Science

Concept 1: Structure of the Earth

Describe the composition and interactions between the structure of the Earth and its atmosphere.

PO1. Classify rocks and minerals by the following observable properties: grain, color, texture, hardness

PO3. Explain the following processes involved in the formation of the Earth's structure: erosion, deposition, plate tectonics, and volcanism.

Concept 2: Earth's Processes and Systems

Understand the processes acting on the Earth and their interaction with the Earth Systems.

PO1. Explain the rock cycle.

PO2. Distinguish the components and characteristics of the rock cycle for the following types of rocks:

- igneous
- metamorphic
- sedimentary

PO3. Analyze the evidence that lithospheric plate movements occur.

PO4. Explain the lithospheric plate movement as a result of convection.

PO5. Relate plate boundary movements to their resulting landforms, including:

- mountains
- faults
- rift valleys
- trenches
- volcanoes

Concept 3: Earth in the Solar System

Understand the relationships of the Earth and other objects in the solar system.

PO4. Explain the seasons in the Northern and Southern Hemispheres in terms of the tilt of the Earth's axis relative to the Earth's revolution around the Sun.

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The Investigation

Please copy the *Investigations* responsibly by using recycled paper and copying back to back. For grades K-2, the *Investigation* has been written for use by teachers or chaperones. *Investigations* for grades 3 – 8 have been written for use by students.

We Suggest

Do a pre-visit activity or have a discussion to establish prior knowledge of your field trip's focus. This will help illustrate scientific principles related to the *Investigation* and will focus your group before their trip to the Science Center.

Give the *Investigation* workbooks to your chaperones a day or two before the field trip. The more they know, the better able they are to make your field trip a success.

When you return to the classroom, everyone can share what s/he experienced at the Science Center, along with group results. Since each group may have explored different exhibits, we suggest that the groups share their information and ideas about the exhibits they visited.

Pre-Visit Activities

A Focused Field Trip begins with classroom discussion of the topics you want to cover at the Arizona Science Center. Here is an introductory activity to get your seventh graders interested in plate tectonics.

Checking the Fit of the Continents

The earth's crust is divided into large rocky plates that support the continents. These plates are thought to move as a result of the pull of convection currents in the hot mantle rock below them and the push of lava welling up between them. A hypothesis called continental drift says that the earth's continents were once in contact with each other and have been moving apart over the eons as a result of these movements of the earth's crust.

Supplies

A world globe
Tracing paper
Pencils
Scissors

Activity

Working as a group, lay the tracing paper over the globe. Trace the outline of each continent. Carefully cut out the continents and see if you can fit them together like a jigsaw puzzle. Do your results help support the hypothesis of continental drift?

Post-Visit Activities

Now that you have investigated some topics at Arizona Science Center you can continue your exploration back in your classroom!

Erosion Control

Sometimes erosion and deposition are beneficial to humans, for example, the creation of farm land in the Phoenix valley or the deltas at the mouths of large rivers such as the Mississippi and the Nile. However, many times erosion causes soil to be carried away from areas where we would like it to stay. Monsoon winds blow farmland soil away during dust storms, and rains can erode sloping areas along freeways and in yards.

This exercise can be used as a whole-class experiment if care is taken that each group uses the same amount of water on their box.

Split the class into small groups and give each group a different substance to test for erosion control properties. Possible choices are: grass seed, cheese cloth or netting (pin it down with toothpicks), gravel, coarse sand, wood chips.

In this exercise you are going to investigate ways to slow down or prevent water-caused erosion.

Supplies

Potting soil
Plastic storage box (at least 8" x 12")
Erosion control substance supplied by your teacher
Sprinkling can
Small ruler
Measuring spoons

Activity

1. Set your box on a flat surface and put three to four inches of potting soil in the bottom. Make it level
2. Completely cover one half of the dirt (long way of the box) with your erosion control substance. Pat it down gently.
3. As a class, discuss which substance you think will prevent erosion the best. Make a hypothesis.

If any of your groups are using grass seed, all groups should water their boxes at the same time with the same amount of water. This will make your experiment a controlled experiment.

When the grass is well sprouted, test for erosion control properties.

4. Prop the narrow end of your box up on something so that the box is at about a 30° angle. (One side, top to bottom, should be plain dirt; the other side should be covered with your erosion control substance.)
5. Gently pour water across the tops of both strips. (Be sure each side gets the same amount of water; remember this is a controlled experiment.)

What happens? Which side erodes more?

6. Measure the depths of the furrows made in the soil on each side of your box, and also the amount of dirt washed to the bottom on each side. Record your data in the chart below.

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	Covered Side	Plain Dirt Side
Depth of Furrows		
Amount of Dirt		

When all of the groups have finished, compare your data.

Which substance worked best to control erosion?

Was your hypothesis correct?

If you were to do your experiment again, what would you do differently?