

June 21, 2013—January 5, 2014

Explorations

EDUCATOR GUIDE

MAYA

HIDDEN WORLDS REVEALED



FOR FIELD TRIP INFORMATION: www.smm.org/maya/educators





IN THIS GUIDE

Exhibition Overview	4
Exhibition Floor Plan	8
About this Topic	9
Connecting with the Classroom	11
At the Museum	13
Teacher Key Pages	29
After Your Visit	33
Resources for Teachers and Students	35
Minnesota Academic Standards	36

Encounter the richness of Maya culture by examining centuries-old authentic artifacts, traditions, and world view. Experience immersive life-size recreations of Classic Maya architecture, and explore the hidden worlds of the Maya past and present.

Your students will have the opportunity to:

- **Engage in hands-on explorations** of building arches, deciphering hieroglyphs, drilling techniques, translating a Maya calendar, and more.
- **Understand** that contemporary Maya people maintain many cultural practices and beliefs that link them to their ancestors.
- **Take part in the process of discovery** to learn how archeologists use science, technology, and contemporary Maya voices to interpret the past.
- **Find evidence** that shows the relationship between writing, mathematics, astronomy, architecture, urban planning, and the sophisticated world view of the Maya.

Objects from the collections of the National Institute of Culture and History, Belize; Harvard University's Peabody Museum of Archaeology and Ethnology; the University of Pennsylvania Museum of Archaeology and Anthropology; the Science Museum of Minnesota; the Denver Museum of Nature and Science; and the San Diego Museum of Man.

Exhibition Partners: Science Museum of Minnesota
Denver Museum of Nature and Science
Museum of Science, Boston

Premier Partners



Sponsored by



Field Trip Information

Maya Exhibition and Omnitheater, plus access to all of our interactive galleries:

\$16 per student

\$11 for schools with over 50% Free & Reduced Lunch

For further information, field trip guidelines:

www.smm.org/maya/educators

Plan your trip today with one of our field trip specialists for best availability. Visit

www.smm.org/fieldtrips or call (651) 221-9444.

Educator Discount

Teachers with ID can receive a discount to preview the exhibition. Call (651) 221-9444 for information.



A Maya warrior, with black body paint and dressed in jaguar robes and headdress, adorns a ceramic plate that is over 1200 years old.

Collection of DMNS.

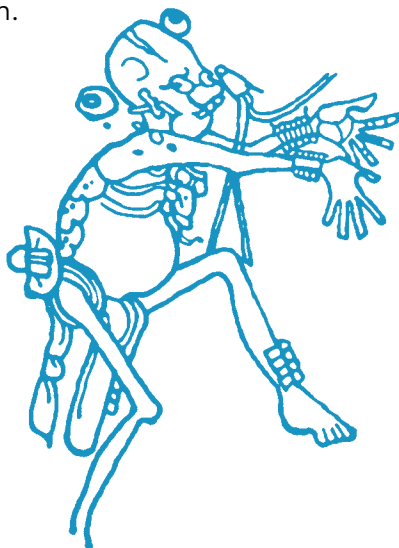


BEFORE YOU VISIT

- Do some preparation activities before your visit. Use suggestions in this guide and the resource list for more ideas.
- Review this guide for connections to your curriculum. Choose the activities that meet your needs best. Jigsaw groups to provide fewer questions for each student, but still cover topics you need.
- Add your own page(s). Bring journals or composition notebooks if you use these in classroom work. Bring sturdy cardboard to write on if you plan to use single pages during your field trip.
- Share expectations, plans, and schedules for the visit with students and chaperones. Give chaperones copies of any activities students will do.
- Encourage students to spend time in each section to go beyond simply answering questions.

DURING YOUR VISIT

- Ask students to add their own questions and observations that arise during their exhibit explorations.
- Flash photography is NOT allowed in the exhibition. Photographs without a flash are permitted and encouraged.
- Students must be with their chaperones to enter the exhibition, and should stay with the chaperones throughout.
- Divide your class into small groups to work together in the exhibition.



Mystery of the Maya Omnitheater Film

Don't miss these complementary Science Museum programs

Omnitheater film: *Mystery of the Maya*

Deep within the jungles of Mexico, Belize, and Guatemala and extending onto the limestone shelf of the Yucatán peninsula, lie the fabled temples and palaces of the Maya. While Europe was in the midst of the Dark Ages, these innovative people charted the heavens, mastered mathematics and calendrics, and created the first true writing system of the Americas.

With newly updated narration, *Mystery of the Maya* features depictions of techniques archeologists use to document and better understand the cultural legacy of the Maya as well as re-enactments of Maya activities that give glimpses into daily and religious life.

www.smm.org/maya/omnitheater

Lectures and workshops

The museum is in partnership with the Maya Society of Minnesota to present public programs in conjunction with *Maya: Hidden Worlds Revealed*. Monthly lectures and workshops feature leading Mayanists who have been consultants on development of the exhibition.

www.smm.org/maya/lectures



EXHIBITION OVERVIEW

To the Maya, both the past and present, the ceiba is a sacred tree. Its trunk is of this world—that of the living—while its roots plunge into the depths of the underworld and its lofty branches reach into the heavens above. In many Maya cities and villages, the giant ceiba stood as a symbol of a universal connection between the earth, the heavens, and *Xibalba*—the underworld. In *Maya: Hidden Worlds Revealed*, the construct of the three worlds, symbolized by the ceiba tree, helps show interconnections, growth, death, and rebirth.

A floor plan is shown on page 8.

INTRO THEATER

Maya narratives have repeated themes of death and rebirth. The brief introductory video provides an analogy between the story of the death and resurrection of the Maya Maize God and the abandonment and gradual rediscovery of Maya cities, monuments, writing, and life ways of kings and nobility of the time period over 11 centuries ago.

It also briefly introduces the methods Mayanists have used to explore the Maya world of the past: archaeological investigations, ethnographic analogies, and the complicated decipherment of Maya script.



Learn how scholars have begun to unlock secrets of life long ago in Maya lands and read inscriptions carved hundreds of years ago. New techniques allow archaeologists to study sites that were previously inaccessible, adding greatly to our knowledge of daily life among the Maya. Scientists begin to understand Maya culture by excavating cities and house mounds, interpreting objects recovered, deciphering glyphs, and learning from Maya people living today.

- An activity will let you see the gorgeous cities of the ancient Maya, introduced to the rest of the world by early explorers to this region.
- Use an interactive time line of glyph decipherment and learn why scholars and Maya people alike are excited about our ability to read the glyphs.
- Try your hand at some Maya mathematics.
- Examine two massive replica stelae—once unreadable, but now a wellspring of information about Maya rulers and their relationships.





Maya hieroglyphs carved into stone stelae, only recently deciphered, tell of great and powerful dynasties. Get a sense of how to read a stela and how Maya rulers placed themselves at the center of the cosmos as living “world trees.”

- A name glyph generator allows you to title yourself, Maya style.



A video, set against a star field and city scape, describes how and why the Maya charted the 365 day solar cycle, predicted solar and lunar eclipses, and precisely tracked the complex orbit of Venus. Astronomical phenomena are closely associated with seasonal changes

that inform important agricultural practices for planting maize. Knowledge of the skies could ensure a good harvest—and power.

- Artifacts and replicas illustrate the interaction of astronomy and human responses.
- A calendar translator shows you how the Maya calendar cycles intersect, allows you to correlate important dates in our time to the cycles of Maya time, and lets you print out a personalized stela.



The Maya were excellent urban planners, organizing their cities according to practical needs, environmental constraints, and religious beliefs. Architects, artists, and laborers—who had no wheels or metal tools—incorporated the Maya world view and social hierarchy into city plans and buildings. And the Maya modified

every inch of their landscape. Explore city size, layout, population, and specific features—such as roadways, agricultural terraces, and reservoirs—that served the tens of thousands who lived in the shadows of these cities. A life-size frieze that once surrounded the top of El Castillo pyramid at Xunantunich, in Belize, is bathed in what archaeologists believe may have been the original colors.

- See construction techniques, learn how a tumpline is used, and build a Maya arch.
- Explore a floor “map” of the city of Caracol, in Belize, and compare it to a 3-D model of the city’s center.
- Examine the Maya ball game—believed to be one of the first team sports in human history. Watch a video of the ball game as it’s played today, learn how archaeologists think it was played, and pick up a ball game ball—it’s heavy!
- Try your hand at pollen identification to learn how scientists use lake sediments and cave decorations to understand land use and climate changes throughout the centuries.





During the 3rd -10th centuries, cities were densely populated, in some cases supporting many more people than the same areas do today. Individual households were the engine of the economy. Their residents worked together to produce and process food, raise children, and properly honor their ancestors. But many households also produced goods such as textiles, tools, jewelry, or pottery for market.

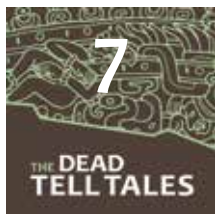
- Try your hand at creating a weaving pattern with blocks.
- Explore a model of an ancient Maya neighborhood, and see a house recreated from archaeological and ethnographic evidence.
- See examples of traditions still practiced by Maya people today.



Hidden beneath the land of the living lay the underworld: *Xibalba*. Caves were physical portals to the underworld and prayers and sacrifices were offered inside. But *Xibalba* was a place of creation as well as death. It was the birthplace of the sun and moon, and life sprang from its depths. As priests ventured underground, they drew nearer to the gods and their prayers took greatest effect.

Artifacts recovered from these caves give a glimpse into rituals that helped priests and kings transcend the earthly world and speak with the gods of the underworld.

- Experience Actun Tunichil Muknal through a re-creation of this ritually important cave.
- Learn to decipher stone carvings from the Chiapas region in Mexico.



Explorations of Maya burials tell us about the structure of Maya society, their world view, and even their diet and lifestyle.

- Witness a recreated tomb and see the spectacular objects that accompanied elites on their journey through underworld.
- A touch table allows you to digitally explore a royal burial. Learn how objects from a burial hint at political relationships between far-flung places.
- Examine photographs of human skeletons and find out what the histories written in our bones tell archaeologists about us.





More than a thousand years ago, Maya artists painted the walls of three small rooms in Bonampak with scenes of war, celebration, and life at court. Today, the murals of Bonampak provide an unparalleled view of elite life and warfare in ancient Maya society.

- Step into a recreated mural space to explore courtly life in the late 8th century.
- View images made with an infrared camera to see details of the murals invisible to the naked eye.
- Match objects with their counterparts in the murals. Use the pictures and artifacts to examine themes of elite privilege, ceremony, responsibility, connection, and competition.
- Take a photograph of yourself and see how you'd look wearing the costumes of various court figures.
- Assemble a bow drill and imagine using one to create dental inlays.



Today's Maya are heirs to a culture whose elements have survived thousands of years of transformation, adapting to environmental change, political turmoil, and conquest. Many still speak the languages of their ancestors, wear traditional dress, and keep their sacred calendar.

- In short videos, modern Maya people describe those connections and the meaning they attach to their Maya identity. Through the efforts of scientists and the Maya themselves, a lost history is being recovered.



The floor plan illustrates the layout of the 'Maya Roots Run Deep' exhibit. The path begins at the **ENTRANCE**, leading into the **INTRO THEATER**. From there, the path winds through nine numbered rooms, each with a corresponding title box: **1. HUMAN BEING (TODAY CHIEF)**, **2. HISTORIES STONE**, **3. WATCHING THE SKIES**, **4. MASTER BUILDERS**, **5. MAKING LIVING**, **6. DEATH REBIRTH**, **7. DEAD TELL TALES**, **8. STORY PICTURES**, and **9. MAYA ROOTS RUN DEEP**. The path concludes at the **EXIT**. The plan also shows various artifacts, furniture, and architectural details like walls, doors, and windows.



ABOUT THIS TOPIC

The term *Maya* comes from the Yucatec Mayan word that describes the language spoken by indigenous people of the Yucatán Peninsula, México. Western scholars have ascribed this term to all Maya people. Ancient Maya culture is characterized by monumental architecture; by symbols, images, and hieroglyphic writing; and by complex mathematical and astronomical systems.

(Living Maya Time, website: <http://maya.nmai.si.edu/the-maya/maya-people>)

The Maya were never a single empire, but lived in various densely-populated cities and surrounding regions that shared many aspects of culture throughout this region. As a whole, the Maya people created the longest lasting civilization of the New World. Their culture endured through changes, wars, and disasters until it was suppressed by the Spanish conquest in the 16th and 17th centuries. However, the Maya survived and today there are millions of Maya living in Mexico, Belize, Guatemala, El Salvador, and Honduras.

Vocabulary

Review of these terms would be helpful before your visit to *Maya: Hidden Worlds Revealed*. See *Connecting with the Classroom* section (page 11) for suggestions.

Artifact, Archaeologist, Excavate

Artifacts are objects made, used, or changed by humans. Archaeologists excavate (reveal, record, retrieve) and study artifacts from the past.



Ceiba (*Ceiba pentandra*) also known as the silk cotton or kapok tree.

Trees of the Ceiba genus can grow up to 50m tall, with swollen trunks and large buttresses. As the sacred world trees of the Maya, Ceibas represent the intertwined celestial, earthly underworlds.



Classic Period of Maya Culture 250–900 AD

Much of *Maya: Hidden Worlds Revealed* focuses on this time period of Maya culture. But research indicates that distinctive signs of Maya culture first start appearing around 1800 BC.

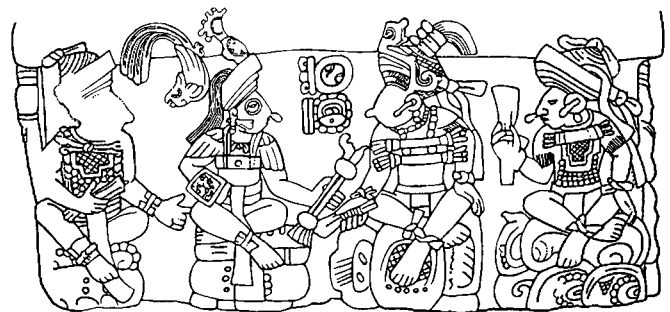
Corbel Vault

Typical Maya architectural features included the corbel vault. The corbel vault has no keystone, as European arches do, making the Maya vault appear more like a narrow triangle than an archway.



Elite

Small group of people who control the major share of wealth and/or political power.





Glyph

Symbolic figure or character, also called a hieroglyphic. All Maya glyphs are formed from various combinations of nearly 800 signs in the forms of humans, animals, supernatural creatures, objects, and abstract designs. These signs can express meaning, denote sound values, or be pictorial (the picture is the word), and are used to write words, phrases, and sentences.

Glyphs appear as very intricate squares laid out in a grid like pattern. Each square is a glyph block that actually contains one to five glyphs, often forming a word or even a phrase. You will see glyphs on many objects throughout the exhibition.

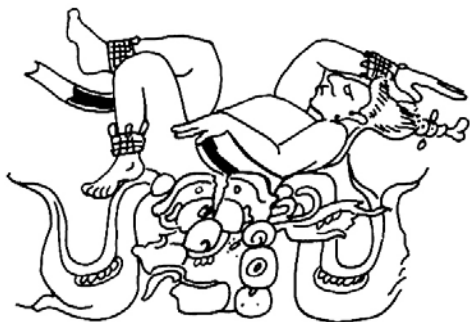
Huipil (*we-peel*)

Traditional garment made of a piece of rectangular cloth folded and usually stitched down the sides, worn as a blouse. Huipils have been made and worn in this region for centuries. Huipils are still worn by the Maya today.



Maize (Corn, *Zea mays*)

A staple food of Maya, past and present, with a major role in all aspects of Maya life. The Maize God story introduces you and your students to *Maya: Hidden Worlds Revealed* in the introductory theater. Many images or partial symbols of the Maize God occur on artifacts you will see in the exhibition.



Maize God emerging from a flower.

Scribe

Scribes prepared art and text for public displays glorifying the ruler's triumphs. Most Maya could not read and write during Classic times, so scribes had a very important role in Maya society to reinforce the power and authority of Maya rulers. They were from the noble class, sometimes from the royal family of the city.



Maya inkwell in the exhibition.

Stela (plural: *stelae*)

Freestanding stone pillars, often of limestone, with figures carved in relief and hieroglyphic text.

<http://deyoung.famsf.org/files/collectionicons/index1.html>

This interactive website helps students understand several aspects of Maya art and culture (symbols, glyphs, mathematics, materials) through investigation of a stela in the DeYoung Museum's collections. Upper elementary and above.



Tumpline

A strap attached at both ends to a load, and placed over the top of the head, just back from the hairline, so the weight of the load pulls straight down in alignment with the spine. The bearer then leans forward, allowing the back to help support the load. The Maya used this device (and still do today) to carry loads as heavy as their own body weight. Since much of the terrain in the region is uneven, narrow, or rocky, this was more efficient than using wheels or beasts of burden. The Maya did not use either during Classic times.



CONNECTING WITH THE CLASSROOM

Field trips are most effective when integrated with your curriculum. Below are activities that can be used as an introduction to topics included in *Maya: Hidden Worlds Revealed* exhibition. Many can also be used after your trip or as ongoing topic explorations.

BEFORE YOUR VISIT

All Grades

Review the activities to do at the museum to review any vocabulary that will be new to students. A suggested list of vocabulary is below. (See pages 9 and 10 for definitions) Add others that may be new to your students.

Archaeologist

Artifact

Ceiba

Corbel Vault

Elite

Excavate

Glyph

Huipil

Maize

Scribe

Stela (plural: stelae)

Tumpline

- Ask students to find the meaning of each word and make a drawing to help them remember the meaning of each word. Discuss each as a class.
- Locate the Maya region on a world map.
- Use images from the websites listed in the Resource section (page 35) to discuss what students will be seeing when they visit the exhibition.
- Gather class questions about the topic. What do students want to know? What do they think they will see and experience? What do they know or think about the Maya? Use their questions as a basis for your field trip guiding questions, or choose from the At the Museum pages (13-27).

- Review the floor plan (page 8) of the exhibition with your students before your field trip. You can also provide floor plan copies to chaperones or individual students.
- Review schedule for the day with students, and share behavior expectations.

Grades K-2

There are no student pages for students in K-2. Please use the Chaperone Page for suggestions for chaperones to use in discussing the exhibits and activities with students. Chaperones can also provide paper and pencils for drawing in the exhibition. Drawing is a great tool for students in an exhibition to focus attention, support observation skills, and provide a change of pace for young students. Drawings can also be used for many post-trip follow up activities.

Grades 3-5

Preparing for the visit:

- Identify questions, activities, and experiences students are expected to complete during the visit. There is a lot to see and do.
- Use the At the Museum questions (pages 13-16) as guiding questions for students during your visit to the exhibition. Questions should be used at the museum just for note-taking and documentation to allow students to more fully experience the exhibits and activities. We recommend that students complete their answers after they return to school or as a homework assignment.
- Consider dividing into smaller groups with different questions for each group, then sharing answers after returning to school. Using all of the questions on each page may be overwhelming for some students.
- Maya Math (page 26) is also a page for students to use. Use all or several of the questions on the Maya mathematical notation system. This page can be used for any grade.
- Ask students to bring a journal, notebook, or folder to provide a writing surface as they take notes for their responses.



Grades 6-8

Preparing for the visit:

- Identify questions, activities, and experiences students are expected to complete during the visit.
- Use the At the Museum questions (pages 17-21) as guiding questions for students during your visit to the exhibition. Questions should be used at the museum for note-taking and documentation, to allow students to experience the exhibits and activities. We recommend that students complete their answers after they return to school, or as a homework assignment.
- Consider dividing into smaller groups with different questions for each group, then sharing answers after returning to school. Using all of the questions on each page may be overwhelming for some students.
- Ask students to bring a journal, notebook, or folder to provide a writing surface as they take notes for their responses. Copy the question pages (17-21) to use all of the questions, or ask students to answer specific questions.
- Maya Math (page 26) is also a page for students to use. Use all or several of the questions on the Maya mathematical notation system. This page can be used for any grade.
- Review questions to consider throughout the whole exhibition. Share post-visit plans about summaries for these questions:
 - o Describe "Maya Lands," the places where the Maya lived in the past and live today. Record details about what the land looks like.
 - o In this exhibition, you will find many places to try out activities. Keep a list of your favorites and your results.
 - o Tradition: then and now. Find examples of things that people used in Classic Maya times and still have or do now.

Grades 9-12

Preparing for the visit:

- Identify questions, activities, and experiences students are expected to complete during the visit.
- Use the At the Museum questions (pages 22-27) as guiding questions for students during your visit to the exhibition. Questions should be used at the museum for note-taking and documentation, to allow students to experience the exhibits and activities. We recommend that students complete their answers after they return to school, or as a homework assignment.
- Ask students to bring a journal, notebook, or folder to provide a writing surface as they take notes for their responses. Copy the question pages (22-27) to use all of the questions, or ask students to answer specific questions.
- Divide students into small groups or pairs and ask each group to develop a question to investigate about Maya culture, past or present. As students go through *Maya: Hidden Worlds Revealed*, each section can help them with background information, ways to refine or revise their questions, and sources that provide evidence in developing answers or hypotheses. Question pages can be used to guide students to resources that will help them in working on their own question.
- Tradition: then and now. Ask students to find examples of things that people used in Classic Maya times and still have or do now. There are examples of contemporary Maya life for comparison, or they can compare Classic Maya life to their own lives today.
- Maya Math (page 26) is also a page for students to use. Use all or several of the questions on the Maya mathematical notation system. This page can be used for any grade.

MAYA INVESTIGATIONS Grades 3–5

Find the title sign for each space in the Maya exhibition.

- On these pages, read the questions for that space.
- Take notes to answer the questions.
- Use the notes to write a complete answer to the question after you return to school.



Unlocking the Maya Past

Use your pencil to shade in the map at right where most of the Maya towns and cities were.



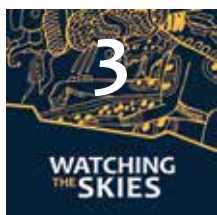
Histories in Stone

Look at the stone stelae or other stone sculptures. How many images of people can you find?



Draw a picture of one of them.

Draw a picture of yourself in the same style.



Watching the Skies

The Maya observed the movement of objects in the sky. Which ones were important to them?



Master Builders

Caracol was a city in what is now the country of Belize.

Which of these gives you the most information about Caracol? Look at the exhibits in this section, then choose one. Explain why you chose the one you did.

- ☐ Map of the region _____
- ☐ Floor map *LiDAR* _____
- ☐ Small model of the "downtown" _____

What did the builders of Caracol need to build and use this city?

How did they change the land?

Write some ideas here: _____

Try out one of these activities: Use a tumpline OR Build a corbel arch

Draw a picture of your choice (tumpline or corbel arch). Write a caption for your drawing.

What was this used for in the past? _____

What could you use this for in your life today? _____



Making a Living

Imagine that you were living in this city/region about 1000 years ago. Look around—find examples that show what your life might have been like. Add the examples to your notes in the questions below.

What kind of job would you do? Choose one—most Maya people may have had several of these jobs at the same time.

Choose one: ☐ farmer ☐ weaver ☐ shell artist ☐ scribe ☐ king ☐ ball player

Draw or describe your house:

What food would you eat? Find examples.

If you were doing activities on your own or with other members of your family, where would you go? What would you do?



Death and Rebirth and The Dead Tell Tales

Archaeologists study objects to learn about the past. Find artifacts in this section that help you learn more. Complete this chart with your notes. (Hint: Unless there is one object mentioned, you can choose from many possibilities!)

Object	Location	Interesting fact or idea or observation
Torch holder	CAVE, Belize	
	CAVE in:	This shows an animal from the region, it is a:
Shells	BURIAL, Belize	

Add to chart above: Find an object you like, tell where it is from, and list an interesting fact, idea, or observation.

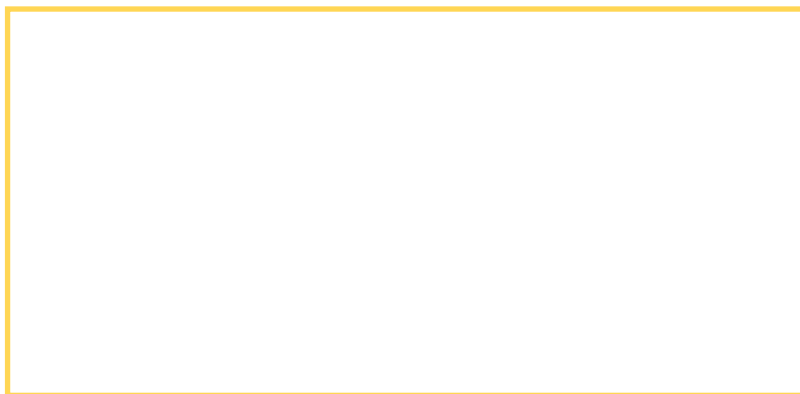


A Story in Pictures

Look at all of the pictures that artists painted 1300 years ago (about 800 AD). Find one item in a picture that tells you about life in that time and place.

What is the item you chose? _____

Draw it here:



What does that item tell you about life in that time and place?

Is there an *object* in this section that is similar to the *item in the picture*? YES NO



Maya Roots Run Deep

Think of photos or exhibits you saw that show something about Maya life *today*. It could be in this section or somewhere else in the exhibition.

What is the same as in the past? _____

What is different? _____

MAYA INVESTIGATIONS – Middle School

Find the title sign for each space in the *Maya* exhibition.

- On these pages, read the questions for that space.
- Take notes to answer the questions.
- Use the notes to write a complete answer to the question after you return to school.



Unlocking the Maya Past

There are many ways to learn about the “hidden worlds” of the Maya.

Describe a fascinating discovery by archaeologists in this region. _____

What did they discover? Be sure to add details. _____

What helps YOU understand this discovery? Check any that you used. You may learn more by seeing things in other sections.

- ☐ map
- ☐ artifact
- ☐ video
- ☐ written description
- ☐ model
- ☐ activity

Describe “Maya Lands”

Record details about what the land looks like as you find evidence. Include details about water, cities, forests, type of terrain, and other things you find in photos, maps, artifacts, models, or video.



Histories in Stone

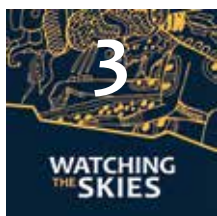
Find a story shown in a stone carving, artifact or painting. There are many possibilities. Look at the object and read the information to help answer the questions.

Who is the main character? _____

Where did he live? _____

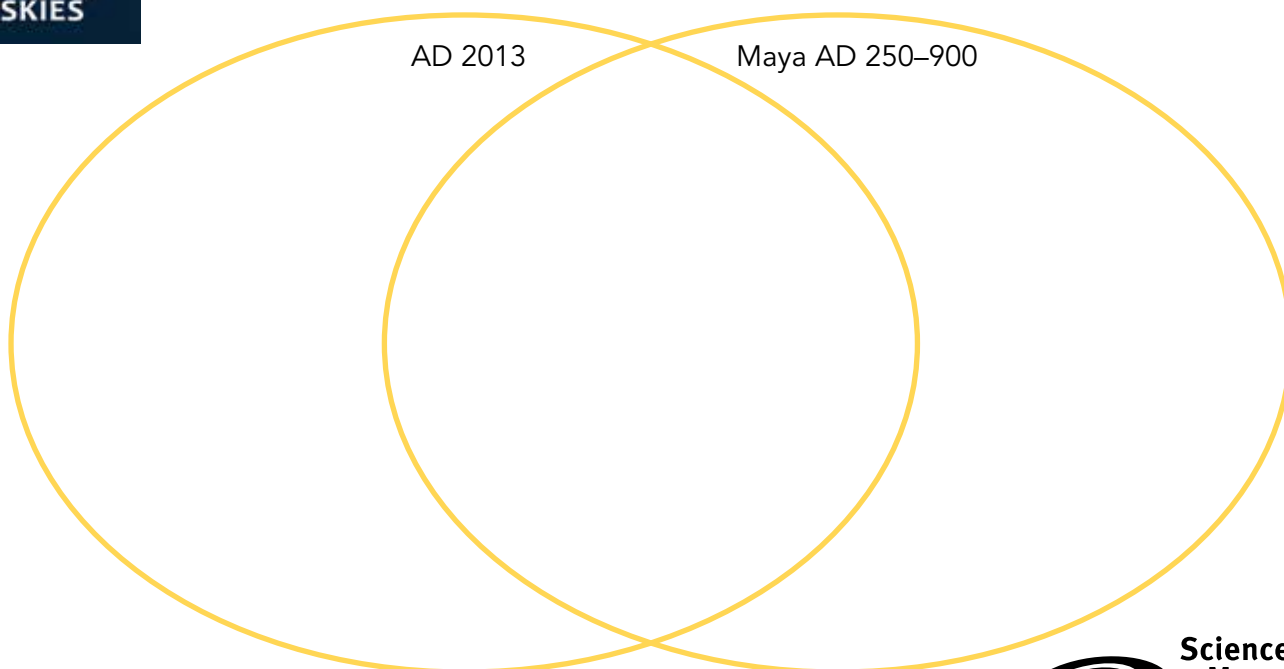
When did he live? _____

Sketch a glyph from that object. What do you think that glyph might mean?



Watching the Skies

The Maya observed the movement of objects in the sky. Compare their experiences 1000 years ago to ours today. What is different and what is the same? Use the Venn diagram make notes.





Master Builders and Making a Living

Make notes to describe a city in the Maya region. When you get back to school, you will use your notes to write a travel blog.

Where is the city located? _____

Add details so that someone reading your blog would like to visit the place you describe! Here are some ideas, you can use these or use your own detail ideas.

- | | |
|------------------------------------|---|
| • What is in the city? | • Who lives here? |
| • What do the buildings look like? | • What does the land look like? |
| • Are there different buildings? | • What kinds of food do people eat? |
| • Are there neighborhoods? | • What do people do for work? For fun? |
| • How big is the city? | • What would you do if you visited this city? |
| • What materials are used? | |

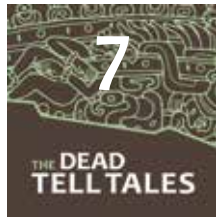
Try out **one** of these activities: Use a Tumpline OR Build a Corbel Arch

Describe how it works.

What was this used for in the past?

What could you use this for in your life today?

How would you change it to make it better for your purpose?



Death and Rebirth/The Dead Tell Tales/A Story in Pictures

Archeologists use objects to learn more about the past. Find artifacts in these sections that help you understand Maya life. Complete this chart with your notes.

(Hint: Unless there is one object mentioned, you can choose from many possibilities!)

Object	Location	Interesting fact or idea or observation
Torch holder	CAVE, Belize	
	CAVE in:	Animal images are symbols of Maya beliefs. This one shows:
Shells	BURIAL, Belize	
	BONAMPAK, Mexico	This artifact shows that elite people used jewelry to show status.

Sketch and describe a favorite object from this section.

(Use words that describe color, shape, texture, use of space, pattern, repetition, size.)



Maya Roots Run Deep

Describe one or two observations from the exhibition that provide evidence that:

- Maya people today have contact with people from other places and other cultures.

- Maya people today still value tradition.

MAYA INVESTIGATIONS (High School)

Find the title sign for each space in the *Maya* exhibition.

- On these pages, read the questions for that space.
- Take notes to answer the questions.
- Use the notes to write a complete answer to the question after you return to school.



Unlocking the Maya Past

There are many ways to learn about the “hidden worlds” of the Maya.

What scientific technologies and methods have been used to understand life 1200 years ago?

Keep track of other methods as you continue throughout the rest of the exhibition and list them here:

<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>



Histories in Stone

Find a story shown in a stone carving, artifact, or painting. There are many possibilities.

What is the name of this artifact?

What is the story?

Sketch one of the glyphs on this object.

What kind of information does this glyph provide?

Write your own label for the object, adding the parts that you think are the most important.

Are cities in the Maya region more like cities in the Roman Empire or Greek city-states?

Explain your choice: _____



Watching the Skies and Master Builders

In these two sections, consider this quote:

"Maya architects and planners combined their engineering skills with their religious understanding of the world. They organized their cities to reflect social values and reinforce political and religious power."

Find 3 examples that provide evidence for this statement.

Example	Evidence for which part of the quote?
1. _____	_____
2. _____	_____
3. _____	_____



Making a Living

How did the Maya use their environment?
Find an example for each of the categories.

Example	What part of the environment was used?
Food _____	_____
Clothing _____	_____
Shelter _____	_____
Other _____	_____



Object	Where was this object used	Interesting fact or idea or observation



A Story in Pictures

Bonampak, occupied from 600–800 AD, was an important Maya city in what is now Chiapas, Mexico. Look at the reconstructed room, as well as the artifacts and activities.

Make sketches and/or notes that would help you tell a story of the elite class during Classic Maya times.



Maya Roots Run Deep

Describe one or two observations from the exhibition that provide evidence that:































- Maya people today have contact with people from other places and other cultures.

- Maya people today still value tradition.

MAYA MATHEMATICS All Grades

As you explore *Maya: Hidden Worlds Revealed*, practice your understanding of Maya math. Write the numbers as Maya glyphs, unless the question mentions another way to answer.

Maya Math Key

0 	1 	2 	3 	4 
5 	6 	7 	8 	9 
10 	11 	12 	13 	14 
15 	16 	17 	18 	19 
20 	21 	22 	23 	24 
25 	26 	27 	28 	29 



Unlocking the Maya Past and Histories in Stone

Find a Maya number in any of the exhibits in this area.

Write the Maya number:

How would you write this number today? _____

Look at the stone stelae or other stone sculptures. How many king pictures can you find? _____



Watching the Skies

Look for Maya numbers in this section. What is the name of the artifact on which you found an example of Maya numbers?



Master Builders

Build a corbel arch. How many blocks did you use?

Ask a friend. How many did they use?



Making a Living

If you were a ballplayer, you would need to lift a ball that weighed pounds. Pick up the ball. Use Maya numbers for your answers.

How far do you think you could throw this ball?

feet



A Story in Pictures

Try the bow drill. How many pieces make up a bow drill?

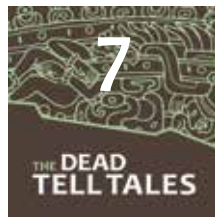
Draw a picture of the drill and label the parts.

A bow drill would be used to drill teeth for inlays. How many teeth in this section have these inlays?

CHAPERONE PAGE

- Encourage students to look closely at the exhibits, try the activities, and share their discoveries and ideas with the rest of the group.
- Enjoy the exhibits with your group! Share your own discoveries, questions, and “I wonder...”
- Allow time for student exploration. The suggestions below encourage exploration in the exhibition. Check with the teacher for their expectations.
- Teachers may have provided students with guiding questions or question sheets to use. Check with the teacher for your own copy.
- Please stay with your group throughout the exhibition.
- If you have questions, please ask any of the staff in the exhibition.

Look for the section intro signs to help with orientation:



Here are some questions to share with your group. Develop your own exploration questions too!

- Archaeologists have many ways to learn about the past. Find examples of different ways they have learned about the ancient Maya.
- How does Maya writing look different from our writing? How is it the same?
- In any area, ask students to find an interesting object to describe to the rest of the group. Can the others identify the object from their description? Take turns sharing descriptions throughout the exhibition.
- Find examples of traditions contemporary Maya keep that are similar to ancient traditions.
- Try one or many of the activities. Ask students to compare what they learned from this activity with the rest of the group.
- Read labels in Spanish and English. What words are similar in both labels?

AFTER YOUR VISIT Grades 3–5

Discuss student answers using suggestions below.

Students can also use notes from the field trip to write more complete answers, incorporating their observations and reflections.



Unlocking the Maya Past

Use your pencil to shade in the map at right where most of the Maya towns and cities were.

Use a map of Maya towns and cities to mark and label several cities. (One source is: <http://mayagis.smv.org>)



Histories in Stone

Look at the stone stelae or other stone sculptures. How many images of people can you find?

Draw a picture of one of them. Draw a picture of yourself in the same style.

Discuss what features of Maya style they used for drawing—compare to the pictures they saw in the reconstructed room at Bonampak (A Story in Pictures).



Watching the Skies

The Maya observed the movement of objects in the sky. Which ones were important to them?

Sun, Moon, Venus, Mars, stars. What objects in the sky are important to you? For us all? Why? e.g. sun is source of energy for life, sun & moon movements organize the calendar we use today (the Maya also designed their calendar on the movement of important celestial objects). How do we use our calendar? Do you remember how the Maya use their calendar?



Master Builders

Caracol was a city in what is now the country of Belize. *Add Caracol to your outline map.*

Which of these gives you the most information about Caracol? Look at the exhibits in this section, then choose one. Explain why you chose the one you did.

☐ Map of the region _____

☐ Floor map *LiDAR* _____

☐ Small model of the "downtown" *Caracol elevation model* _____

Discuss student choices. What details does each type of model, map, or aerial photo show? How are the pros or cons of each?

What did the builders of Caracol need to build and use this city?

How did they change the land?

Write some ideas here: _____

Natural resources: stones, wood

Tools: tumplines, cutting tools, etc.

Human resources: workers

Compare student answers to ideas about what it takes to build a city today. (Same categories, different technologies)

Grade 4 How does a city change the land it is built on? What changes do you think the Maya people noticed over the years as the city got bigger?

Grade 5 Compare the monuments of the Maya to ones students know (e.g. Capitol, public monuments in Washington DC, etc.). How do they look different? Why do you think they built them differently?

Did the Maya use any natural resources to build the city? Which ones? Ask students to choose one natural resource and find out how the Maya used it to build homes, large buildings, stelae, monuments.

Resources: websites, books, look at the material the artifacts are made from

Try out one of these activities: Using a tumpline OR Building a corbel arch

Draw a picture of your choice (tumpline or corbel arch). Write a caption for your drawing.

What was this used for in the past?

What could you use this for in your life today?

Ask students to write a paragraph explaining their chosen activity, what it was used for in the past, and their idea of how they would use it. Illustrate the paragraph with their drawing, and add labels to the drawing to explain main features of the tumpline or corbel arch.



Making a Living

Imagine that you were living in this city/region about 1000 years ago. Look around—find examples that show what your life might have been like. Add the examples to your notes in the questions below.

Discuss choices. What examples did they find to spark their ideas?

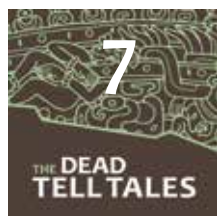
What kind of job would you do? Choose one—most Maya people may have had several of these jobs at the same time.

Choose one: ☐ farmer ☐ weaver ☐ shell artist ☐ scribe ☐ king ☐ ballplayer

Draw or describe your house:

What food would you eat? Find examples.

If you were doing activities on your own or with other members of your family, where would you go?
What would you do?



Death and Rebirth and The Dead Tell Tales

Archaeologists study objects to learn about the past. Find artifacts in this section that help you learn more. Complete this chart with your notes. (Hint: Unless there is one object mentioned, you can choose from many possibilities!)

Object	Location	Interesting fact or idea or observation
Torch holder	CAVE, Belize	<i>varies (shows that people entered cave and needed light)</i>
Artifact with animal shown	CAVE in <i>name of country</i>	This shows an animal from the region, it is a <i>varies</i>
Shells	BURIAL, Belize	<i>varies</i>

Discuss: What objects from the student's life would tell future archaeologists the most about their life? What information could those future archaeologists understand from the objects the students chose?

Add to chart above: Find an object you like, tell where it is from, and add an interesting fact, idea, or observation.



A Story in Pictures

Look at all of the pictures that artists painted 1300 years ago (about 800 AD). Find one item in a picture that tells you about life in that time and place.

What is the item you chose? _____

Discuss

What does that item tell you about life in that time and place?

Is there an object in this section that is similar to the item in the picture? YES NO

Ask pairs or groups of 3-4 students to write a narrative (archeological interpretation) of life in Bonampak in about the year 800, then compare the versions. What evidence would help support your interpretation?



Maya Roots Run Deep

Think of photos or exhibits you saw that show something about Maya life today. It could be in this section or somewhere else in the exhibition.

What is the same as in the past?

What is different?

Discuss: What traditions does your family have? Did your grandparents have the same tradition? Has it changed since they were your age? If so, why do you think it changed?

What did you notice in the exhibits that was different for the Maya today compared to long ago? Why do you think those things changed?

AFTER YOUR VISIT Grades 6–8

Ask students to write complete responses to the At The Museum questions, based on their notes. Review their answers as appropriate. Discuss in class to share insights, reactions, and perceptions.

Additional follow-up discussions and extensions for exhibition reflection.

- If you could create an additional display or room for *Maya: Hidden Worlds Revealed*, what would it be? Why would you choose this focus? What would it include?
- Select one of the interactive activities. Describe what you did. Record 3 things about the Maya you learned as a result of the activity. List student choices, along with things they learned. In a class discussion, determine if there are things they learned that are common to everyone. Are some things unique to a student and their own personal experience?
- Make a Venn diagram to compare a Maya public building with a public building in the U.S. What features would make the buildings last centuries? What features would disintegrate?
- Write a travel blog description of one Maya city. Where is it located? Why do you think this was a good place for this city? Use the details you gathered at the museum so that someone reading your blog would like to visit the place you describe!

An example is shown below:

On the banks of the Mississippi River are two of America's great cities: Minneapolis and St. Paul, Minnesota. We caught a ride a paddle boat down the Mississippi River, and saw the 5-story Science Museum of Minnesota, reflecting the sunlight off its limestone and brick building. We hopped off the boat in Minneapolis, and walked through the riverside park to the ruins of the flour mills that used to grind wheat into flour and made Minneapolis the flour capital of the US. The ruins are made of gray stone blocks.

- Describe the role of caves in the life of the Maya. Research caves in Minnesota. Where are they located? This area is called "karst" topography. Are they similar to the caves in the Maya region?
- Discuss: What is the most interesting thing you have learned about the Maya culture?
- Think–Pair–Share: As an archeologist working to understand more, what question would you pursue next? What parts of the exhibit would be most valuable for you to revisit?

AFTER YOUR VISIT Grades 9–12

Ask students to write complete responses to the At The Museum questions, based on their notes. Review their answers as appropriate. Discuss in class to share insights, reactions, and perceptions.

Additional follow-up discussions and extensions for exhibition reflection.

- What technologies or techniques that archaeologists use in the Maya region were new to students?
Mentioned in the exhibition: epigraphy, rubbings, analogies with contemporary people, LiDAR (Light Detection And Ranging), lake cores and pollen analysis, chemical analysis of speleothem, infrared light
 - How did the Maya use their environment?
Review student answers. Discuss: how would this use of the environment have impact on the environment? How does this compare with current life? Did students find any evidence in the exhibition that indicates major changes in the type of environment throughout time? (There is an exhibit that shows a lake core of sediment and examples of pollen that show changes).
- Ask students to summarize their observations of the exhibition in response to the following categories:
- Social organization: class structure and differences between class expectations and traditions
 - Political organization: was the structure similar to any political situations in the world today?
 - Relationship of religious beliefs to other parts of life
 - Artistic expression
 - Changes over time in the Maya region
- Think-Pair-Share: As an archeologist working to understand more, what question would you pursue next? What parts of the exhibit would be most valuable for you to revisit?
 - If you could create an additional display or room for *Maya: Hidden Worlds Revealed*, what would it be? Why would you choose this focus? What would it include?
 - Discuss: What is the most interesting thing you have learned about the Maya culture?



RESOURCES for Teachers and Students

Science Museum of Minnesota: *Maya: Hidden Worlds Revealed*

Background on the exhibition and associated programs, interview with exhibition archaeology curator, Dr. Ed Fleming, and images from exhibition development.

www.smm.org/maya

Caracol, a Maya city in Belize

www.caracol.org

Arlen and Diane Chase are archaeologists who have been working at Maya sites for over 30 years. Some of their research is highlighted in sections of the *Maya: Hidden Worlds Revealed* exhibition. Their website includes the main city of their research, Caracol, and includes current photos, videos and field reports, as well as this overview for young people.

Archaeology for Kids

www.caracol.org/kids/what_is_archaeology.php

Living Maya Time: Sun, Corn, and the Calendar

Includes sections about Maya people, past and present, locations of cities and population centers, worldview, the importance of corn, the Maya mathematical and calendar system, as well as further resources for educators. Developed by National Museum of the American Indian, Smithsonian Institution.

maya.nmai.si.edu

Very complete glossary of terms

maya.nmai.si.edu/sites/default/files/resources/site-glossary-en.pdf

Seeing Maya culture through examining a stela

This interactive website helps students understand several aspects of Maya art and culture (symbols, glyphs, mathematics, materials) through investigation of a stela in the DeYoung Museum's collections. Upper elementary and above.

deyoung.famsf.org/files/collectionicons/index1.html

Maya Glyphs

Maya glyph workbook

www.famsi.org/research/pitts/MayaGlyphsBook1Sect1.pdf

Background information about the Maya glyphs (as well as other scripts)

www.ancientscripts.com/maya.html

Maya Scribes

www.sfgate.com/news/article/Politics-of-the-ancient-Maya-rested-on-the-2896686.php



Minnesota Academic Standards

The Science Museum of Minnesota provides a field trip destination that allows teachers and students to reinforce Minnesota Academic Standards. Use of the materials in this guide in combination with a field trip to *Maya: Hidden Worlds Revealed* will help you link learning experiences to the following content standards.

Grades 3-5

SOCIAL STUDIES

Grade 3

3.2.4.5.1 Explain that producing any good or service requires resources; describe the resources needed to produce a specific good or service; explain why it is not possible to produce an unlimited amount of a good or service.

3.3.1.1.2 Create and interpret simple maps of places around the world, local to global; incorporate the "TODALS" map basics, as well as points, lines and colored areas to display spatial information

3.4.1.2.1 Examine historical records, maps and artifacts to answer basic questions about times and events in history, both ancient and more recent.

3.4.1.2.3 Compare and contrast various ways that different cultures have expressed concepts of time and space.

3.4.2.3.1 Explain how an invention of the past changed life at that time, including positive, negative and unintended outcomes.

3.4.3.8.1 Identify methods of communication used by peoples living in ancient times in three different regions of the world. (Classical Traditions, Belief Systems and Giant Empires: 2000 BCE-600 CE)

Grade 4

4.3.4.9.1 Explain how humans adapt to and/or modify the physical environment and how they are in turn affected by these adaptations and modifications.

Grade 5

5.4.4.15.1 Describe complex urban societies that existed in Mesoamerica and North America before 1500. (Before European Contact)

SCIENCE

Grade 3

3.1.1.2.3 Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed

3.1.1.2.4 Construct reasonable explanations based on evidence collected from observations or experiments.

3.1.3.2.1 Understand that everybody can use evidence to learn about the natural world, identify patterns in nature, and develop tools.

3.1.3.2.2 Recognize that the practice of science and/or engineering involves many different kinds of work and engages men and women of all ages and backgrounds.

Grade 4

4.1.2.2.1 Identify and investigate a design solution and describe how it was used to solve an everyday problem.

Grade 5

5.1.3.2.1 Describe how science and engineering influence and are influenced by local traditions and beliefs.

ART

Grades 4-5

4.1.1.5.2 Describe how the principles of visual art such as repetition, pattern, emphasis, contrast and balance are used in the creation, presentation or response to visual artworks.

4.1.3.5.1 Describe the personal, social, cultural, or historical contexts that influence the creation of visual artworks including the contributions of Minnesota American Indian tribes and communities.

ENGLISH LANGUAGE ARTS

Grade 3

3.1.2.2 Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.

3.2.7.7 Use information gained from illustrations (e.g. maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when why, and how key events occur).

3.6.8.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

3.8.7.7 7 Locate and use information in print, non-print, and digital resources, and identify reasons for choosing information used.

Grade 4

4.1.9.9 Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures, including American Indian.

4.6.8.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

4.8.7.7 7 Locate and use information in print, non-print, and digital resources, and identify reasons for choosing information used.



Grade 5

5.2.6.6 Analyze multiple accounts by various cultures of the same event or topic, noting important similarities and differences in the point of view they represent.

5.6.8.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

5.8.7.7 Locate and use information in print, non-print, and digital resources, and identify reasons for choosing information used.

Grades 6-8

SOCIAL STUDIES

Grade 8

8.3.1.1.1 Obtain and analyze geographic information from a variety of print and electronic sources to investigate places or answer specific geographic questions; provide rationale for its use.

8.4.3.14.8 Describe how groups are reviving and maintaining their traditional cultures, identities and distinctiveness in the context of increasing globalization.

SCIENCE

Grade 6

6.1.2.1.3 Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.

6.1.2.1.4 Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.

Grade 7

7.1.1.1.2 Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required.

Grade 8

8.1.3.2.1 Describe examples of important contributions to the advancement of science, engineering and technology made by individuals representing different groups and cultures at different times in history.

8.1.3.3.2 Understand that scientific knowledge is always changing as new technologies and information enhance observations and analysis of data.

ART (Grades 6-8)

6.1.3.5.1 Compare and contrast the connections among visual artworks, their purposes, and their personal, social, cultural and historical contexts, including the contributions of Minnesota American Indian tribes and communities.

6.1.3.5.2 Analyze the meanings and functions of visual art.

English Language Arts (these are for grades 6-8)

6.7.1.1; 7.7.1.1; 8.7.1.1 Write arguments to support claims with clear reasons and relevant evidence.

ENGLISH LANGUAGE ARTS DOMAIN-SPECIFIC Grades 6-8 (Social Studies & Science)

READING/SOCIAL STUDIES

6.12.1.1 Cite specific textual, visual or physical evidence to support analysis of primary and secondary sources.

6.12.4.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

6.12.7.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, maps) with other information in print and digital texts.

6.12.8.8 Distinguish among fact, opinion, and reasoned judgment in a text.

READING/SCIENCE

6.13.4.4 Determine the meaning of symbols, equations, graphical representations, tabular representations, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

6.13.8.8 Distinguish among claims, evidence, reasoning, facts, and reasoned judgment based on research findings, and speculation in a text.

WRITING FOR SOCIAL STUDIES & SCIENCE

6.14.7.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

6.14.8.8 Gather relevant information from multiple data, print, physical (e.g., artifacts, objects, images), and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.



Grades 9-12

SOCIAL STUDIES

9.3.2.3.1 Make inferences and draw conclusions about the physical and human characteristics of places based on a comparison of maps and other geographic representations and geospatial technologies.

9.3.4.9.1 Analyze the interconnectedness of the environment and human activities (including the use of technology), and the impact of one upon the other.

9.4.1.2.1 Pose questions about topics in history; suggest possible answers and write a thesis; locate and organize primary and secondary sources; analyze them for credibility and bias; corroborate information across the sources; use sources to support or refute the thesis; and present supported findings.

9.4.1.2.2 Evaluate alternative interpretations of historical events; use historical evidence to support or refute those interpretations.

9.4.4.15.1 Compare and contrast selected examples of diverse societies that existed in North America prior to contact with Europeans; analyze their life ways, social organizations, political institutions, and the effect of their religious beliefs on environmental adaptations. (Before European Contact)

9.4.4.15.2 Describe change over time in selected indigenous nations, including migration, trade and conflict. (Before European Contact)

SCIENCE

9.1.1.1.2 Understand that scientists conduct investigations for a variety of reasons, including: to discover new aspects of the natural world, to explain observed phenomena, to test the conclusions of prior investigations, or to test the predictions of current theories.

9.1.1.1.6 Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.

9.1.3.2.1 Provide examples of how diverse cultures, including natives from all of the Americas, have contributed scientific and mathematical ideas and technological inventions.

9.1.3.2.2 Analyze possible careers in science and engineering in terms of education requirements, working practices and rewards.

9.1.3.3.3 Describe how scientific investigations and engineering processes require multi-disciplinary contributions and efforts.

9.1.3.4.1 Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics, and new technologies.

9.4.4.1.2 Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.

9.4.4.1.3 Describe contributions from diverse cultures, including Minnesota American Indian tribes and communities, to the understanding of interactions among humans and living systems.

ENGLISH LANGUAGE ARTS

9.7.7.7; 11.7.7.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

11.12.7.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, spatially, aurally, physically as well as in words) in order

9.14.7.7; 11.14.7.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize ideas from multiple sources on the subject, demonstrating understanding of the subject under investigation.

9.14.8.8; 11.14.8.8 Gather relevant information from multiple authoritative data, print, physical (e.g., artifacts, objects, images), and digital sources using advanced searches effectively; assess the usefulness of each source in answering the research question;

ART

9.1.3.5.1 Analyze how visual artworks influence and are influenced by personal, social, cultural or historical contexts, including the contributions of Minnesota American Indian tribes and communities.