ScienceNews

IN HIGH SCHOOLS | EDUCATOR GUIDE

Easter Islanders

MADE TOOLS, NOT WAR

CARL LIPO, BINGHAMTON UNIV.

SOCIETY FOR SCIENCE & THE PUBLIC

SN EDUCATOR GUIDE

Easter Islanders
MADE TOOLS, NOT WAR

About the Guide

The *Science News* article "Easter Islanders made tools, not war" presents new evidence suggesting that sharpened stones made by the Rapa Nui civilization were not used for violence as previously thought.

"Easter Islanders made tools, not war" can be used across a wide range of curricula with a focus on **history**, **social studies** and **research**. Concepts and skills include chronological and spatial thinking; interpreting the past and evaluating others' interpretations; analyzing evidence; recognizing the complexity of historical causes and effects; and understanding the nature of the scientific endeavor. The activities, questions and discussions in this educator guide can also be used to support the following education standards:

Next Generation Science	Common Core
Earth and Human Activity: HS-ESS3-1	ELA Standards: Reading Informational Text (RI): 1, 2, 4
	ELA Standards: Writing (W): 1, 4, 7, 8, 9
	ELA Standards: Speaking and Listening (SL): 1, 4
	ELA Standards: Language (L): 1, 3, 5, 6
	ELA Standards: Reading for Literacy in History/Social Studies (RH): 1, 2, 3, 4, 5, 6, 7, 8, 9
	ELA Standards: Writing Literacy in History/Social Studies and Science and Technical Subjects (WHST): 7, 9

Prior to reading

Guide student reading by pointing out connections between this article and what students are learning in class. Here, find ideas for standard-aligned paths to follow while reading:

- Ask students if they've ever heard of Easter Island. Where is it located? (*In the southeastern Pacific Ocean.*) What is it famous for? *(The hundreds of statues, called moai, created by Polynesians who settled the island perhaps a thousand years ago.)* What do students know about the people who first lived there? *(They had a thriving society — they were able to create and position huge carved stone blocks, after all. No one knows why they created these statues. By the time Europeans arrived in the 18th century, the society had downsized dramatically. Some researchers believe it collapsed, but others think its members reorganized into smaller farming communities.)* Use Blackline Master 1 to orient students to the geography of Easter Island and its early civilization. A map can also be found here: https://commons.wikimedia.org/wiki/File:Easter_Island_map-en.svg. Brainstorm ideas about why this civilization might have disbanded.
- Ask students how researchers can study the past. What sources do they use? *(Students might talk about recordings, first- or second-hand accounts, oral tradition, written records and artifacts including art, architecture, tools and other specific objects.)* How do archaeologists determine if an object is human-made? How do they determine what an object is used for? What if there are no oral, pictorial or written accounts? *(Students might mention studying similar cultures and how those cultures use similar objects.)* Discuss how difficult it is to study the past, especially when there is limited evidence. This can lead to a discussion of the importance of examining new evidence as it emerges. Students might also consider the role of the researcher and how someone's personal background can influence how he or she sees the world and interprets clues. Use Blackline Master 2 to foster this conversation. Hand out the first page and then the second as the discussion progresses.

After reading: Comprehend

You can adapt and print these questions (Blackline Master 3) to check for comprehension and analysis before or after discussion:

1. **What is the main topic of the article?** *(Sharpened stone objects, known as mata'a and found on Easter Island, are now believed to be tools rather than weapons.)*
2. **Describe what researchers know definitively about mata'a.** *(Some mata'a are triangular but overall there is no standard shape; they are made of obsidian; they feature narrow stems and wide blades; some have scratches, polish and chipping; they rarely look like spearpoints.)*
3. **What does archaeologist Carl Lipo believe the mata'a were used for and why?** *(Because they have no standard shape or size and rarely have long, sharp tips, Lipo believes mata'a were used for planting and harvesting crops, stripping tree bark and cutting ritual designs into skin, possibly for tattoos.)*
4. **What new evidence did archaeologists rely on for their conclusions about the mata'a?** *(The archaeologists looked at shape and size measurements taken from photographs of 423 mata'a. They also performed statistical analyses on these data.)*

5. **Why does archaeologist Robin Torrence believe that Carl Lipo's conclusions are not definitive?** *(Robin Torrence says that although the mata'a don't look like spearpoints, they would still be very dangerous if used as axes or clubs in close-combat fighting.)*

After reading: Analyze

1. **Some researchers believe the Rapa Nui's civilization was largely destroyed after the "leveling of resource-rich palm forests." Why would trees have been important to a healthy society?**
(Answers will vary, but students should think about shelter, food resources and the role of trees in the ecosystem. Answers might include: Trees provide wood for building structures and boats. They provide habitat for organisms that can keep an ecosystem healthy and be a food resource themselves. Trees provide shade and protection from the weather. They provide fuel for cooking. They support nutrient cycling, soil formation and primary production. They regulate climate and flooding. They help prevent soil erosion. They might also have cultural benefits for art and spiritual ceremonies.)

2. **Based on information in the article, what can students infer about the society that lived on Rapa Nui?**
(*Answers will vary, but might include: The society survived in its full form until around the 18th century. It downsized or disbanded unknown reasons. Some researchers believe it collapsed, but there isn't a lot of solid evidence for how or why. The society remains largely mysterious. The society practiced agriculture and woodworking, and therefore had an established way of life and culture. In the past, researchers have thought the society might be violent but there are few signs of warfare. The society relied on the natural resources available, most likely wood. Overuse of these resources might have affected survival.)*

3. **What type of evidence might provide new clues to the role and degree of violence on Rapa Nui?**
(Researchers might find more mata'a of different shapes and sizes. They might find other types of tools that resemble weapons or new signs that the mata'a had in fact been attached to spears. Human skeletal remains with signs of violence (or not) might also offer clues.)

Discuss and Assess

After students read the article independently, return as a group to the concepts outlined prior to reading. Invite students to share their answers and observations from the article and lead a class discussion that further underscores your current curriculum. The discussion can serve as an informal assessment. Ideas for further reading discussion or writing prompts include:

- As new evidence comes in, scientists have to re-evaluate data and reconsider existing hypotheses. Ask your students to think of other cases in which new evidence has changed scientific consensus. What are some ideas, thought to be right based on existing evidence, that were later rejected? Examples might include the geocentric model of the universe, the idea that people are born as blank slates with no built-in mental content or the existence of a pervasive substance called the ether. These ideas reflected insights of their time but turned out to be wrong. Encourage your students to think about science as an accumulation and evaluation of data that is updated when new information is found.
- Writers make observations that help their readers see the world in new ways. Have students select an object in the classroom, examine that object and make a list of observations about it. Ask them to discuss with a partner or in groups what they are seeing, encouraging the use of descriptive and figurative language. Ask how their observations rely (or don't) on their personal experiences with the object. Have students write a story or poem based on their observations. They should not name their object in the work, but should find other ways to convey the nature of their object to their audience.
- The article mentions that the Rapa Nui civilization did not last in its previous form. It is not the only civilization that has collapsed or reorganized. Ask your students to brainstorm reasons why a society might collapse or reorganize. *(Warfare is highlighted in this story, but other reasons include invasion, disease, natural disaster, famine, overexploitation of resources, changes in the ecosystem due to the introduction of new species, deforestation, desertification. Changing climate and rising sea levels are particularly relevant today.)* In some cases a whole society might die out, but more likely people will be incorporated into a new society or will relocate to a new place. Discuss some examples that students might know of. *(Historical examples include the Maya civilization, the Anasazi people, the Roanoke Colony, the Khmer civilization in Cambodia. Current populations under pressure include the people of Seychelles, the Torres Strait Islands and the Maldives, as well as communities in Alaska.)* If you are connecting this lesson to NGS: Earth and Human Activity, emphasize the role that natural hazards, severe weather and a changing climate can have on survival and way of life.
- When people move in haste, buildings are abandoned and objects are left behind. Have students think about what objects might be left behind if they and their neighbors had to leave their homes quickly. Over time (100 versus 1,000 versus 100,000 years), what would remain? *(Students might talk about things made of wood, metal, plastic, rock. They might talk about personal items, but also homes, office buildings, churches, sewer systems and soccer fields.)* Ask students to imagine that they are members of a future society that knows nothing about the past. What could they determine about 21st century societies based only on the artifacts left behind?

- The researchers in the article used a statistical analysis to look for similarities in the tools found at Easter Island. Discuss the concept of "statistical evidence." Why might researchers perform statistical analyses? What are the researchers looking for by running these types of tests? Ask your students what types of statistical analyses they know about (*mean*, *median*, *mode*, *range*, *standard deviation*, *ANOVA*, *for example*). Do they know how to identify an outlier in the data and conduct outlier analysis? If you'd like students to practice their statistical analyses, Blackline Master 4 offers a dataset to work with. Students can run separate analyses and discuss their results, or they can perform a more thorough analysis of the data independently. What can be said about individual objects in this collection? What about the collection as a whole? What cannot be determined by looking at the data? How is looking at the data different from looking at the objects themselves?

Extend

Offer students other ways to explore the content of the article as it relates to your curriculum, such as:

YOU'RE THE ARCHAEOLOGIST

Purpose: Students sometimes believe that researchers have all the answers, but often that isn't the case. In this exercise, students will make observations about an object to try to determine how it might have been used and what it might say about the society that used it. This will help students understand what it is like to be an archaeologist who is coming up with hypotheses based on limited information.

Notes: This exercise can be conducted with actual objects or images of objects such as those provided in Blackline Master 5. It's important that the objects are unfamiliar to the students studying them. (*Answer key for Blackline Master 5: 1. birthing forceps, 2. cherry pitter, 3. egg separator, 4. meat grinder, 5. sextant, 6. pasta maker.*)

Preparation: Acquire the objects you plan to use or duplicate the images provided in Blackline Master 5. Each team of two to four students should be assigned at least one object to examine.

Ideas for actual objects:

- Medical equipment (antique or current)
- Engine repair tools
- Personal hygiene or appearance enhancement tools
- Kitchen tools (antique or gourmet)

Directions:

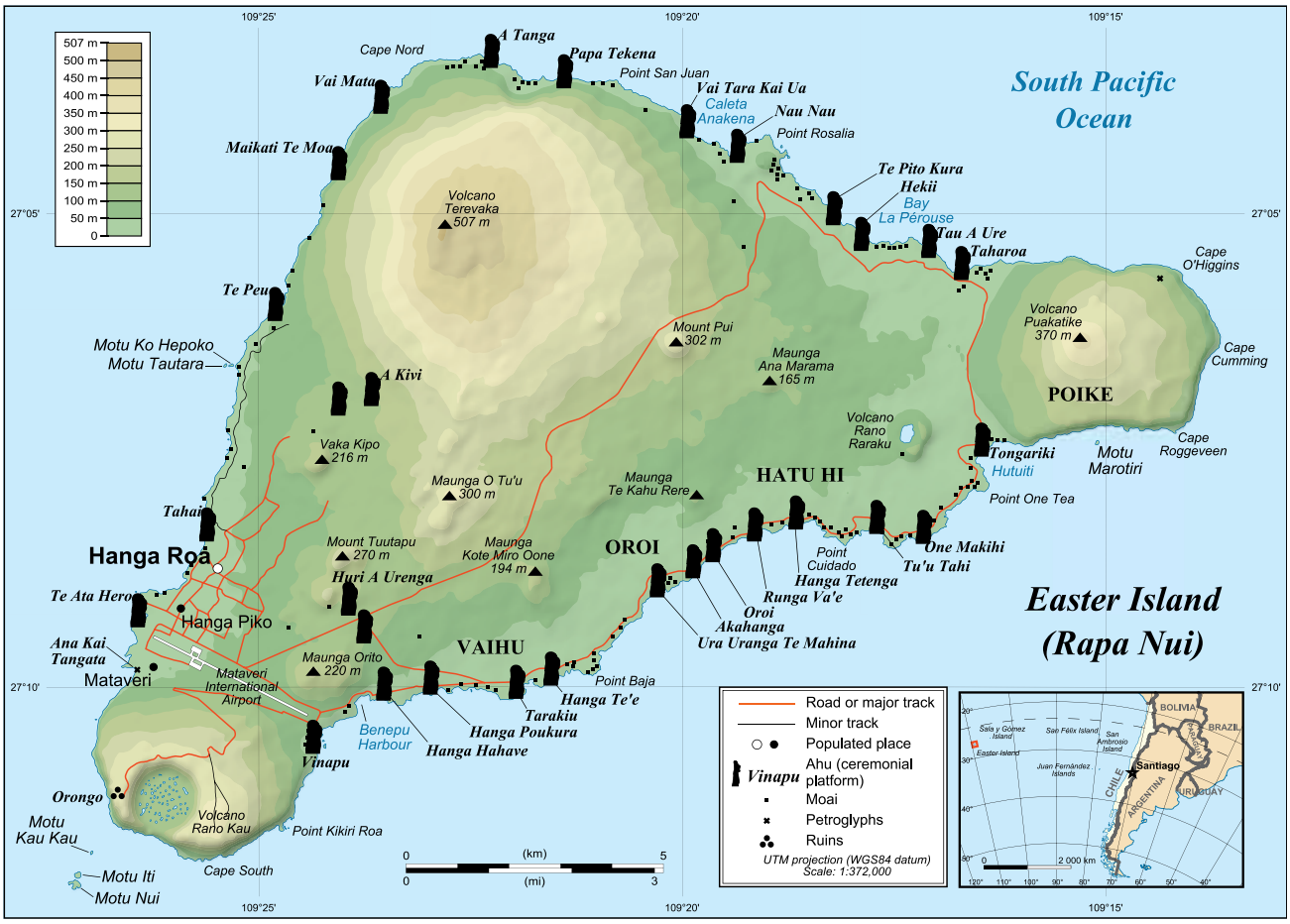
1. Ask students what kinds of evidence an archaeologist needs to gather about a found object in order to determine its purpose and relevance?
2. Tell students they are going to view found objects. Their task, like the task of archaeologists, is to identify each object and its purpose.
3. Assign each group of students an object (or image of an object) to examine.
4. Ask students to observe, measure and record as many details as they can about their object in the time provided.
5. Based on those observations, ask students to draw conclusions about their object's purpose and how it works.
6. You can repeat this exercise with more objects, having teams track their ideas about each object on separate pieces of paper.
7. Once students have finished examining all their objects, position each object (or a picture of each object) around the room and have students place their "findings" next to their objects.
8. Invite students to do a "gallery walk," visiting three objects that they did not themselves research. They should examine and compare the findings of different groups.
9. In what ways were the students' conclusions similar and different? Were some objects easier to evaluate? If so, why?
10. Discuss how students could find out more about a specific object.
11. You may decide to give students the "right" answers — or not. After all, real archaeologists don't have an answer sheet!

SN IN HIGH SCHOOLS

Easter Islanders
MADE TOOLS, NOT WAR

Getting to know Easter Island

Directions:
Examine the map of Easter Island. Use the questions that follow to orient yourself to this part of the world.



ERIC GABA/WIKIMEDIA COMMONS (CC BY-SA 2.5)

1. Where is Easter Island located?

2. What can you tell about the island's geography based on the map?

3. What types of information does this map provide about the island's past civilization?

4. What questions do you have based on the information provided?

5. What do you want to know that isn't on the map?

6. Why do you think people are fascinated by Easter Island?

SN IN HIGH SCHOOLS

Easter Islanders
MADE TOOLS, NOT WAR

Analyzing an unknown object

Imagine you are walking on the island of Yap in the Pacific and you see the stone below in someone's front yard:

SCOT NELSON/FLICKR (CC BY-NC-SA 2.0)

1. Have you ever seen a stone like this? Or something else shaped similarly?

2. Why do you think the stone is shaped this way?

3. What do you think this stone is? What could it be used for, or what does it represent?

4. How did it get here?

5. What questions do you have about this find?

Easter Islanders
MADE TOOLS, NOT WAR

Analyzing an unknown object (continued)

While investigating this object, you learn that this type of stone is not found naturally on the island. Instead, it is traced to a larger rock from an island over 300 kilometers away.

6. How does this new information change your thinking about the stone and what it represents?

7. What new questions do you have?

8. What type of information might help you determine the stone's purpose?

SN IN HIGH SCHOOLS

Easter Islanders
MADE TOOLS, NOT WAR

Comprehend

After reading the article "Easter Islanders made tools, not war," answer these questions:

1. **What is the main topic of the article?**

2. **Describe what researchers know definitively about mata'a.**

3. **What does archaeologist Carl Lipo believe the mata'a were used for and why?**

4. **What new evidence did archaeologists rely on for their conclusions about the mata'a?**

5. **Why does archaeologist Robin Torrence believe that Carl Lipo's conclusions are not definitive?**

Analyze

1. **Some researchers believe the Rapa Nui's civilization was largely destroyed after the "leveling of resource-rich palm forests." Why would trees have been important to a healthy society?**

2. **Based on information in the article, what can students infer about the society that lived on Rapa Nui?**

3. **What type of evidence might provide new clues to the role and degree of violence on Rapa Nui?**

SN IN HIGH SCHOOLS

Easter Islanders
MADE TOOLS, NOT WAR

Storytelling with data

Ten artifacts have been selected from a large collection of Stone Age spearheads. Each was measured and weighed. It's your job to analyze these artifacts based on the data provided in the table below.

Artifact	Length (mm)	Width (mm)	Thickness (mm)	Mass (g)
1	49	20	3	7.8
2	61	45	5	12.6
3	59	25	8	12.4
4	88	33	6	19.3
5	58	43	6	10.2
6	53	29	8	10.6
7	77	36	7	17.8
8	78	38	7	17.6
9	63	44	4	11.1
10	58	25	5	10.8

The Stone Age spearheads pictured below were found at the La Brea Tar Pits.

PHOTO BY STACY SINCLAIR

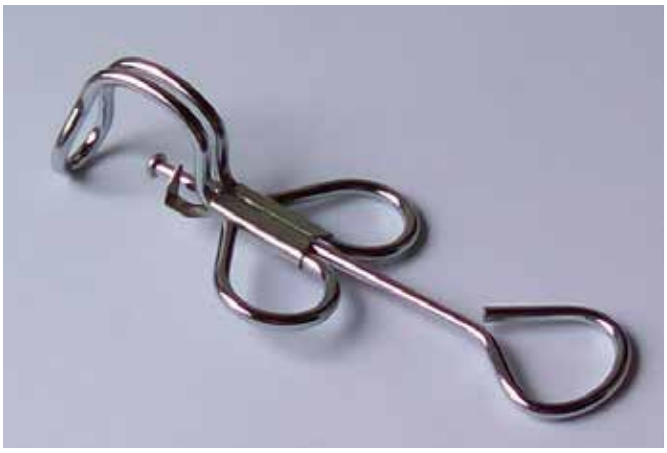
SN IN HIGH SCHOOLS

Easter Islanders
MADE TOOLS, NOT WAR

You're the archaeologist

1.

2.



3.

4.

5.

6.