Preparation

• Download the Disciplines Chart

Purpose

This activity asks students to decide what kinds of questions scholars from different disciplines might ask about an object or a significant event. The goal is to help students solidify their understanding of the different disciplines, but more important, to move your students toward thinking in an interdisciplinary fashion. Additionally, this pushes students to start thinking about how to construct researchable questions.

Process

In this activity, students are presented with another scenario and tasked with finding the best interdisciplinary research team to help understand what happened. In this case, students are going to examine one of the 10 largest impact craters on Earth. This time, instead of giving students a specific question to ask (such as, "What's the best research team to determine if humans could live on Mars?"), students are given a less structured scenario so they can start to determine the kinds of questions they would ask about it. Being able to ask good, researchable questions is a very difficult skill to master. Encouraging students to think about the different questions they might ask about a scenario takes time, but it's important. This is further complicated by not only having them think about the different questions, but requiring that they do it from the perspective of different disciplines. However, this process also gives students the opportunity to think about how different groups of people will approach the same problem.

Feel free to use the following scenario, or come up with your own. There are a lot of impact craters around the world and you might consider using the one that's geographically closest to you.

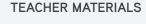
Tell your students that once again they need to put a research team together to try to figure out what happened when a huge asteroid hit the Earth (South Africa, to be specific) an estimated 2 billion years ago. This asteroid caused a massive crater in the Earth, now named the Vredefort Crater, or Vredefort Dome. It has an estimated radius of 118 miles, making it the world's largest known impact structure. It was even declared a UNESCO World Heritage site in 2005!

Students will be given nine discipline cards to construct their teams: **agriculture**, **astrophysics**, **anthropology**, **archaeology**, **biology**, **chemistry**, **cosmology**, **geology**, and **conservation science**. Have your students take a few minutes to review the cards so they are familiar enough to assume the perspective of the different disciplines as they work to construct their teams.

<u>Vredefort Dome, Free State, South Africa</u>, by Júlio Reis, public domain.

Next, have students get into groups. Encourage them to discuss what they want to know, that is, what questions would they ask, about this asteroid impact before they choose their teams. For example, if they want to find out why something hit the Earth at all, they might look to disciplines like cosmology and astrophysics, which are focused on space. On the other hand, if they want to understand the actual effect the event had on Earth, they might look to geology, conservation science, and agriculture.

Once students are done, have them share their teams and questions with the class.



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Preparation

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Purpose

This activity asks you to decide what kinds of questions scholars from different disciplines might ask about an object or a significant event. The goal is to help you solidify your understanding of the different disciplines, but more important, to help you start thinking in an interdisciplinary fashion. Additionally, this activity should help you work on an important skill: the ability to construct researchable questions.

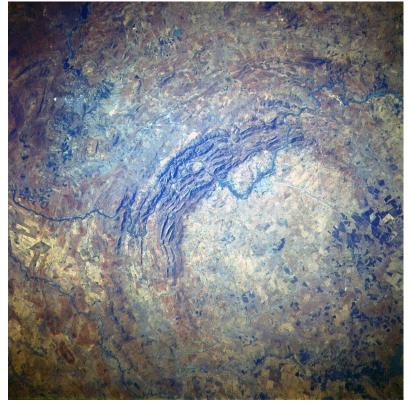
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You will be given nine discipline cards to help you construct your team: agriculture, astrophysics, anthropology, archaeology, biology, chemistry, cosmology, geology, and conservation science. Take a few minutes to review the cards and ask questions about any of them – you should be familiar enough to be able to assume the perspective of the different disciplines as you work to construct your team.

Once you're in your group—and before trying to form a team—discuss what you want to know about this asteroid impact. What you choose to ask about the event is directly related to who is doing the asking – so, make sure the topic of study and your disciplines are aligned!

Be prepared to share your team makeup and questions with your class!



Vredefort Dome, Free State, South Africa, by Júlio Reis, public domain.

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BIG HISTORY PROJECT / LESSON 3.2 ACTIVITY DISCIPLINES - WHAT DO YOU KNOW? WHAT DO YOU ASK? Name:

STUDENT MATERIALS

Date:

Directions: Your job is to assemble the best research team possible to most deeply understand an object or event (you must include at least three disciplines). Fill out this worksheet to construct your research team and plan their approach to better understanding the object or event.

Object or Event:

Discipline:	Discipline:	Discipline:
What would someone from this discipline know or want to know about this object or event?	What would someone from this discipline know or want to know about this object or event?	What would someone from this discipline know or want to know about this object or event?

What are the two most important scientific and historical questions your team would ask about the event or object? Make sure the questions include the interests of each discipline.

Why is this team the best for the job?

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Agriculture

I study farming and work to increase productivity and improve crop quality.

Questions

When and where did agriculture farming begin?

How did agriculture change human development?

How does the availability or lack of crops contribute to the growth or fall of a civilization?

How did agriculture increase collective learning?

Resources Domesticated animals Fertilizers/ Pesticides

Tractors/

data

Evidence Soil types/samples Weather forecasts/ history

> Crop development Plant germination

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Reapers, etc. Historical climate



Irrigation systems

environments? How have societies developed and changed from the past to the present?



Questions

When, where, and

how did humans

How do people

adapt to different

evolve?

Anthropology

I study human language. culture, and societies all around the world and throughout time.

Evidence Resources Observations Bones, fossils Primary and Human remains and secondary sources artifacts Artifacts; i.e. tools, First observations of living individuals foods, clothing, etc. and groups

Astrophysics

I study how the laws of

physics can be applied to the

natural world and space itself.

Written accounts of events and interpretations.

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Questions

What is driving human evolution? Why did it happen?

What role does technology play in evolution?

hunting have to do with it? Or larger social groups?

How can artifacts help us understand the past and our future?

Archaeology

I study ancient people and the world they lived in.

Resources

political,

Maps (physical,

topographic, etc.)

Primary sources

Excavation tools; i.e. hammers, chisels, brushes

How much does

Evidence

Artifacts from ancient settlements Bones and burial remains Soil deposits from previous settlement sites

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Astronomy

I study the universe, including stars, solar systems, galaxies.

Questions	Resources	Evidence	Questions	Resources	Evidence	Questions	Resources	Evidence
How long will it take for our sun to "die"? What is inside a black hole? How quickly is the universe expanding? Is our galaxy unique?	Telescope Camera Spectrogram Computer imaging	Space debris Doppler Effect Observational data from telescopes Computer monitoring and images from space craft	How did the universe begin? Is it evolving? Is there more than one dimension to the universe? What's the universe made of?	Mathematical models Telescopes Experiments Observational data Computer modeling Scientific method	Observations Proven mathematical equations Computer models	What are the causes and cures of diseases? How do genes mutate over time? How can we develop medications to cure diseases?	Electron microscopes Lasers Laboratory instruments Computer- generated modeling programs Scientific method	DNA, enzymes, and protein samples Examples of gene mutations
		BIG HISTORY PROJECT			BIG HISTORY PROJECT			BIG HISTORY PROJECT



Biochemistry

I study the molecules that

make up all living things.



Biology

I study living organisms: their structure, behavior and distribution.

Evidence

Samples of

organisms

Environmental

impact reports

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Soil samples

Questions

How do human brains work?

How does language impact us? How can we

remember what we hear?

How do we learn?

Resources Samples of living things Microscope Slides, test tubes. petri dishes Bunsen burner

Scientific method

Beakers



Questions

properties of an

What affects the

How, why and

where were

formed?

behavior of matter?

chemical elements

- - -

. . . .

element determine

How do the

its use?

Chemistry

I study what everything is made of (matter) and how it changes.

Evidence

Matter samples

Diagrams/models

Water/soil samples

Observations about

chemical reactions

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Resources
X-rays
Models
Microscopes
Spectroscopy/Mass spectrometer
Computer modeling
Scientific method

Economics

I study how society produces

and consume goods and the

impact of those decisions.



Questions

How do we survive through the Anthropocene?

What are ways that we can lessen the human impact on the environment?

How do we not exhaust nature?

What trade-offs to support both human and environmental needs?

Conservation Science

I study the integration of natural resources in both the physical and biological sciences.

Resources

Environmental impact reports Water quality testing supplies Maps (physical,

topographical,

political, etc.)

maps Statistics about refuse production and distribution

Evidence

Endangered species

numbers/reports

Population density

Weather patterns Water/ozone quality

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Cosmology

I study the origin and evolution of the universe from the earliest possible time to today.

Questions	Resources	Evidence	Questions	Resources	Evidence	Questions	Resource
What was there before the Big Bang? Are we alone in the universe? Why did the Big Bang happen? What is dark matter/dark energy?	Telescope Satellites Spectrographs Scientific method	Speed of light CMBR data Radio/infrared rays Satellite images	What should be produced? How should it be produced? For whom should it be produced? Who owns and controls the factors of production?	Law of supply and demand Mathematic models and projections Statistics Stock market data	Statistics about particular companies, nations, individuals GDP/GNP Stock Market reports	How can people be protected from natural hazards and climate change? How can humans work in concert with natural Earth systems? What will the world look like in the future? How can computers solve everyday problems?	Hand tools Computers Programming software Maps Simple mach Mathematics
		BIG HISTORY PROJECT			BIG HISTORY PROJECT		

Engineering

I study science and math to create solutions to real-world problems.

esources	Evidence
and tools	Models
omputers	Simulations
ogramming ftware	Computer-based testing
aps	Environmental and
mple machines	safety reports
athematics	technical data
	Design analysis

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Genealogy

I study families, tracing their lineages throughout history

Questions

Who are the members in the family?

What impact has this family had on history?

How does this family fit into the larger story of a group of people?

Evidence Resources Oral interviews DNA testing Computer modeling Historical records Internet databases Genetic analysis Primary sources Family trees (birth, marriage, Diaries and death records) Letters Emigration/ immigration/ naturalization records Photographs



Questions

work?

get here?

movement?

Earth?

How does the Earth

How did the Earth

What drives plate

What is inside the

What will happen

distant future?

on the Earth in the

Geology

Resources

Pick and axe

Ice/rock core

Brushes

samples

Electron

microscope

Spectrometers

I study the makeup of the Earth and its processes.

Evidence

Chemical analyses of rocks and minerals Soil/rock samples Maps Satellite images

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Questions

How do things change over time and what factors contribute to those changes?

What elements of an institution or a society persist despite change? What is the narrative of people who lived in the past?

Evidence

I study the past as it relates to

individuals and societies.

History

Resources

Primary and

Artifacts: i.e.

pottery, etc.

Interviews

Journals

Artifacts secondary sources (journals, letters, weaponry, clothing, etc.) Public/private records Visual materials

First-hand accounts

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Questions

How does food

impact human

development?

How has the

relationship

over time?

between humans

and food changed

How does food and

food production

play a role in

culture?

Nutrition

I study how food can be used to increase the health and well-being of patients.

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Resources	Evidence
Body mass index Neight/height measurements Food models	Experiments (controlled and trial) Observational studies
Recipes	Peer-reviewed journals
	Evidence-based systematic reviews
	Weight loss measurements
	Food journals



Questions

the rest of the

How do species

adapt to changes

in the ocean? How

do waves, storms,

tides, and currents

movement around

affect human

the globe?

Earth?

How do processes

in the ocean impact

Oceanography

I study marine life and ecosystems, health of the sea, and geologic processes.

Resources	Evidence	1
Nets	Salinity measures	I
Water sampling supplies	Animal sensors/"tags"	
Satellites	Computer generated	
Boats	current measures	
Moors/buoys	Seafloor mapping	
Sonar		
Computer tracking programs		
Seafloor sampling		



Paleontology

I study fossils to find links between extinct animals and plants and living relatives.

Questions	Resources	Evidence
How have animals	GPS	Fossils
and plants evolved?	Chisel	DNA
Are we experiencing	Rock Hammer	Biological remains
normal levels of	Brushes	Amber
extinction, or are we experiencing a	Tape measure	
mass extinction?	Plastic/paper bags	
How have mass	Walkie-talkie	
extinction events helped push evolution forward?	Markers	

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Physics

l study matter and energy and the interaction between them.

			1					nd feel.
Questions	Resources	Evidence	Questions	Resources	Evidence	Questions	Resources	Evidence
an we ever travel ack in time? Vhat is dark natter/dark nergy? Iow do stars roduce elements? Iow does gravity ffect the Earth?	Balances and mass sets Glassware Calculators Computer models Mathematics Scientific method	Particle colliders Observational data Mathematical models Satellite imagery Research reports	How do power imbalances create world tensions? Is war a permanent part of political life? What is justice and how is it carried out in a society? What is the link between power and justice? How does resource distribution impact power?	Public opinion survey Economics data Data analysis essays Election results	Historical documents Polling Academic research Expert opinions Social media Newspapers Laws/government documents	 What do people think or feel about a situation or event? How do our feelings impact our behavior? What do our reactions tell us about our feelings? 	Research on mental illnesses Personality/ behavioral testing Observational data Holistic/ prescription medicine	Observations Medical history Letters/journals Lab experiments Interviews Personality Tests Behavioral Tests
	Theology		+		BIG HISTORY PROJECT	+		BIG HISTORY PROJI
	l study religions	s, religious e current role of		l study			l study	
Juestions	Resources	Evidence	Questions	Resources	Evidence	Questions	Resources	Evidence
Questions Why do humans exist? What is a human being? What is the meaning of ife? What happens to a berson at death? How do we know what is right and wrong?	Resources Religious texts Artifacts; i.e. relics, scriptures, symbols, etc. Primary sources Interviews	Evidence Sacred books, (i.e. the Bible) Artifacts Sacred sites Observations of religious ceremonies	Questions	Resources	Evidence	Questions	Resources	Evidence

Political Science

I study how political systems

are created and change over

Psychology

I study the human brain and

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experience; how people