S-1

## BIG HISTORY PROJECT / LESSON 4.3 ACTIVITY DISCIPLINES - WHAT DO YOU KNOW? WHAT DO YOU ASK?

## Preparation

• Download the Disciplines Chart

## Purpose

In most fields, individuals are asked to work in teams. We are often taught that, "two heads are better than one." We see this idea carried over into multiple disciplines, including history. This activity asks you to investigate a historical event or object from the lens of multiple disciplines. Students develop their interdisciplinary thinking and reasoning skills as they work to create questions and investigate some of the greatest puzzles in the last 13.8 billion years.

## Process

Your teacher will assign the event or object that you'll think about when filling out the What Do You Know? What Do You Ask? Worksheet. This time, you can pick from any of the disciplines on the Disciplines Chart. Try to include some that you haven't used for past teams as part of this activity.

Your job is to think about how you would assemble a research team to most deeply understand the event. This worksheet will help walk you through that process. You will also have to explain why your team is the best team for this job. Make sure you pay close attention while your group works through this process – next time, you'll be constructing a team on your own!

Once you've completed the worksheet, be prepared to share your answers with the class. Then, think about why understanding this event as an interdisciplinary team is better than doing it from an individual perspective.



<u>An 1888 lithograph of the 1883 eruption of Krakatoa</u>, by Lithograph: Parker & Coward, Britain, public domain.

## BIG HISTORY PROJECT / LESSON 4.3 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?

1	1	1		1		1	1	1	 S-2



## 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

**BIG HISTORY PROJECT** 

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.

**BIG HISTORY PROJECT** 

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

BIG HISTORY PROJECT



## Astronomy

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

Questions 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?	<b>Resources</b> Telescope Camera Spectrogram Computer imaging	<b>Evidence</b> Space debris Doppler Effect Observational data from telescopes Computer monitoring and images from space craft	Questions How did the universe begin? Is it evolving? Is there more than one dimension to the universe? What's the universe made of?	Resources Mathematical models Telescopes Experiments Observational data Computer modeling Scientific method	<b>Evidence</b> Observations Proven mathematical equations Computer models	Questions What are the causes and cures of diseases? How do genes mutate over time? How can we develop medications to cure diseases?	Resources Electron microscopes Lasers Laboratory instruments Computer- generated modeling programs Scientific method	Evidence DNA, enzymes, and protein samples Examples of gene mutations
		BIG HISTORY PROJECT			BIG HISTORY PROJECT	I		<b>BIG HISTORY PROJE</b>



**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

**BIG HISTORY PROJECT** 

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

**BIG HISTORY PROJECT** 

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

BIG HISTORY PROJECT



# Cosmology

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

Questions	Resources	Evidence	Questions	Resources	Evidence	Questions	Resourc
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 Programmi software Maps Simple mad Mathematic
		BIG HISTORY PROJECT			BIG HISTORY PROJECT		

Engineering

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

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

**BIG HISTORY PROJECT** 



## 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

**BIG HISTORY PROJECT** 



#### 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

BIG HISTORY PROJECT

Questions

How does food

impact human

development?

How has the

relationship

over time?

between humans

and food changed

How does food and

food production

plav a role in

culture?

# Nutrition

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

**BIG HISTORY PROJECT** 

Resources	Evidence
Body mass index	Experiments (controlled and trial)
neasurements	Observational studies
ood models Recipes	Peer-reviewed iournals
	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	
Nets	Salinity measures	l
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	Tape measure	
mass extinction?	Plastic/paper bags	
How have mass	Walkie-talkie	
extinction events helped push evolution forward?	Markers	

BIG HISTORY PROJECT

**BIG HISTORY PROJECT** 

**BIG HISTORY PROJECT** 

S-5



# Physics

l study matter and energy and the interaction between them.

				time.			behave, think a	nd feel.
Questions Can we ever travel back in time? What is dark matter/dark energy? How do stars produce elements? How does gravity affect the Earth?	Resources Balances and mass sets Glassware Calculators Computer models Mathematics Scientific method	Evidence Particle colliders Observational data Mathematical models Satellite imagery Research reports	Questions 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?	Resources Public opinion survey Economics data Data analysis essays Election results	Evidence Historical documents Polling Academic research Expert opinions Social media Newspapers Laws/government documents	Questions 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?	Resources Research on mental illnesses Personality/ behavioral testing Observational data Holistic/ prescription medicine	<b>Evidence</b> Observations Medical history Letters/journals Lab experiments Interviews Personality Tests Behavioral Tests
	Theology I study religions history, and the religion in today	BIG HISTORY PROJECT		l study	BIG HISTORY PROJECT		l study	BIG HISTORY PROJECT
Questions Why do humans exist? What is a human being? What is the meaning of life? What happens to a person 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
		BIG HISTORY PROJECT			BIG HISTORY PROJECT			BIG HISTORY PROJECT

Political Science

I study how political systems

are created and change over

Psychology

I study the human brain and

S-6

experience; how people