LESSON 3:
RING OF FIRE

GRADE LEVEL 3-5

VOLCANOES EDUCATOR GUIDE

An SK Films Release

DIGITAL CROSSING FILMS

Volcanoes Educator Guide

LESSON 3:
RING OF FIRE

GRADE LEVEL 3-5
(1) 15 MINUTE PREP LESSON
(2) 45 MINUTE LESSONS

LESSON OVERVIEW:

In this lesson, students will investigate recent claims regarding volcanic activity on the Ring of Fire. Students will begin by mapping locations and intensities of recent volcanic eruptions. Afterwards, students will graph the number of volcanic eruptions over time and draw conclusions on the claims that the Ring of Fire is increasing in intensity.

SCIENCE STANDARDS:

- Analyze and interpret data from maps to describe patterns of Earth's features.

MATH STANDARDS:

- Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.

SCIENCE AND ENGINEERING PRACTICES:

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

FROM THE FILM:

Volcanoes follows the work of volcanologists and photographers as they explore active volcanoes on our planet and visit the infamous Ring of Fire. What exactly is the Ring of Fire? How does its activity shape our world? In this lesson, students will investigate recent claims about the volcanic activity of the Ring of Fire.

MATERIALS:

- Crayons or colored pencils

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TO DO:

BEFORE VIEWING THE FILM:

1. Tell students that soon, they are going to watch the film, ***Volcanoes***. This film follows photographers and scientists as they get up close to some of the worlds active volcano sites. Give each student a sticky note. Have students put their name on the top of the sticky note. Tell students that you are going to ask four questions and they will form a hypothesis (educated guess) for what the answer might be. They should record their guesses on their sticky note.

Questions:

"How many active volcanoes do you think there are on the planet right now?"

"How many active volcanoes do you think are in the United States right now?"

"How do you think volcanoes affect us even if we don't live by them? Do they?"

"What would happen if more volcanoes started erupting on Earth?"

2. Have students place their sticky note on an anchor chart for you to revisit after watching the film.

DAY 1:

1. Have students collect their stick notes and return to their desk. As a warm up, review the answers to the four questions:

"How many active volcanoes do you think there are on the planet right now?" 1,500!

"How many active volcanoes do you think are in the United States right now?" 169!

"How do you think volcanoes affect us even if we don't live by them? Do they?" Volcanic activity produces rich soil and mining minerals that are useful in many different areas of our lives.

"What would happen if more volcanoes started erupting on earth?"

Many volcanoes produce an ash cloud during eruption. This ash cloud will block out sunlight and cool down Earth's temperatures. In Earth's past, when many volcanoes erupted at once, the ash and gas blocked out enough sunlight to drop temperatures, leading to the "Little Ice Age".

2. Remind students that the film mentioned that most of the active volcanoes on planet Earth lie on the Ring of Fire. First, we are going to explore where this ring of fire is located on Earth. Ask students: *do they think the United States is on the Ring of Fire? Why or why not?*

3. Give students the "Ring of Fire" activity page(s). This activity gives students the longitude and latitude of 20 of the major recent eruptions. Demonstrate how to use the longitude and latitude to place a dot on the map for the location of that volcano. Give students 20 minutes to complete the map.

4. Afterwards, have students describe the pattern they see on the map. *Can they shade in the ring of fire area in red? Is any part of the United States on the Ring of Fire?*

5. Finally, have students conclude, do they personally know anyone who might be affected by the Ring of Fire? *Does anyone they know live on or near it?*

DAY 2:

1. Display an image of the Ring of Fire on the globe for students to see. Have them compare it to their results from the "Ring of Fire" activity page(s). *What is the same? What is different about where they shaded?*

2. Tell students that recently, the Ring of Fire has been in the news. Here, you have the option to show a news clip of the Ring of Fire activity being discussed or read a short news article aloud for students. Some suggested videos and news links are:

https://www.youtube.com/watch?v=CoPPkUEN-dY (a CNN clip), https://www.youtube.com/watch?v=jpqUu0PLkmM (CBS news clip)

https://phys.org/news/2018-01-volcanos-earthquakes.html (a phys.org article)

LESSON 3: **RING OF FIRE**

DAY 2 CONTINUED:

Please note: When selecting articles, there are frequently running rumors that the activity in the Pacific ring is intensifying (a false claim). Many articles provide incorrect claims and some border on entirely false stories. This lesson is intended to teach skepticism when reading or watching the news and students will evaluate the claims made in these articles and find them to be false. It is your choice as an instructor as to whether you want to use a more moderate or extreme article as the anchor text for this lesson.

3. Remind students that it is important to be critical when reading or watching the news. All claims must be analyzed and double-checked before you accept them as true. Today, you are going to evaluate whether the claims that the Ring of Fire is "roaring to life" is true.

Is it really more dangerous to live on the Ring of Fire at the moment?

Can we expect more and stronger volcanoes and earthquakes?

4. In the "Volcanic Activity" activity page(s), students are given the number of volcano eruptions in the Ring of Fire for the past 60 years. Students should create a bar graph for the data set. Afterwards, students will answer comparative math questions to help them understand if geologic activity is truly happening around the Pacific.

5. Lead a whole-class debrief.

Are the news claims that the Ring of Fire is increasing in activity valid?

Why or why not?

What does this make students think about information they may learn by reading or watching the news?

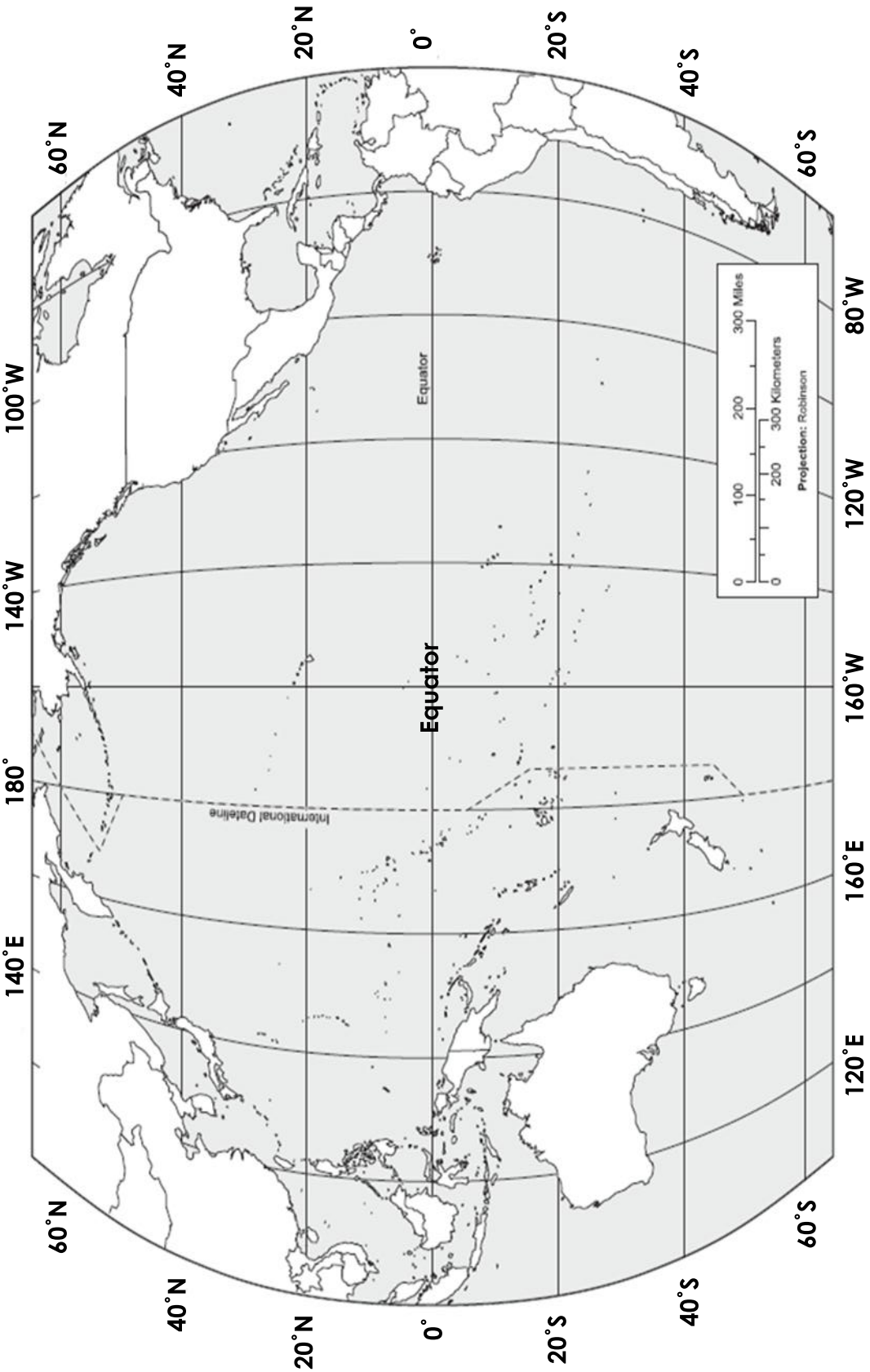
What advice would they give people when reading or watching the news?

The Ring of Fire encircles much of the Pacific Ocean.

Ring of Fire

Directions: The table below lists all of the major volcanic eruption locations. Use the longitude and latitude to place a star on the map for that volcano.

Name:	Latitude:	Longitude:
Abu	34	131
Acamarachi	-23	-67
Acatenango	14	-90
Adams	46	-121
Adams Seamount	-25	-129
Adatara	37	140
Agrigan	18	145
Agua	14	-90
Aguilera	-50	-73
Agung	-8	115
Ahyi	20	145
Akademia Nauk	53	159
Akagi	36	139
Akan	43	144
Akhtang	55	158
Akita-Komaga-take	39	140
Akita-Yake-yama	39	140
Akuseki-jima	29	129
Akutan	54	-165
Alaid	50	155


60˚N
40˚N
20˚N
0˚
20˚S
40˚S
60˚S
100˚W
140˚W
180˚
140˚E
120˚E
160˚E
160˚W
120˚W
80˚W
Equator
International Dateline
0
100
200
0
200
300 Kilometers
300 Miles
Projection: Robinson

Ring of Fire

Conclusions:

What pattern do you see in volcano location?

Shade in the area you believe to be the "Ring of Fire". Why do you believe they call it the "Ring of Fire"?

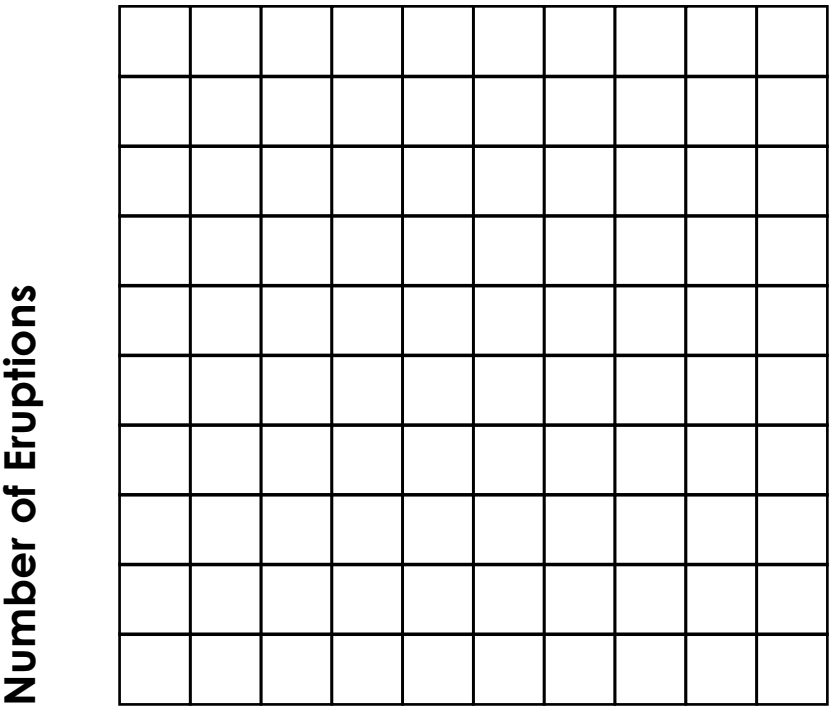
Volcanic Activity

Directions:

In the table below, the number of volcanic eruptions in the Ring of Fire is listed by decade. Use the information to create a bar graph.
Answer the questions. Are there really more eruptions happening now?

Decade:	Number of Major Volcanic Eruptions:
1950	70
1960	85
1970	90
1980	80
1990	80
2000	75

Create a bar graph of volcanic eruptions.



Volcanic Activity

Analyze:

1. What decade had the most volcanic eruptions? _____ .

2. What decade had the least volcanic eruptions? _____ .

3. How many volcanoes erupted in the most recent decade? _____ .

4. Is this more or less than previous decades? _____ .

Conclude:

Many news articles claim that there is an increase in activity in the Ring of Fire. Think like a scientist. Look at the data. Do you think the Ring of Fire is increasing in activity? Why or why not?

_____

_____

_____

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