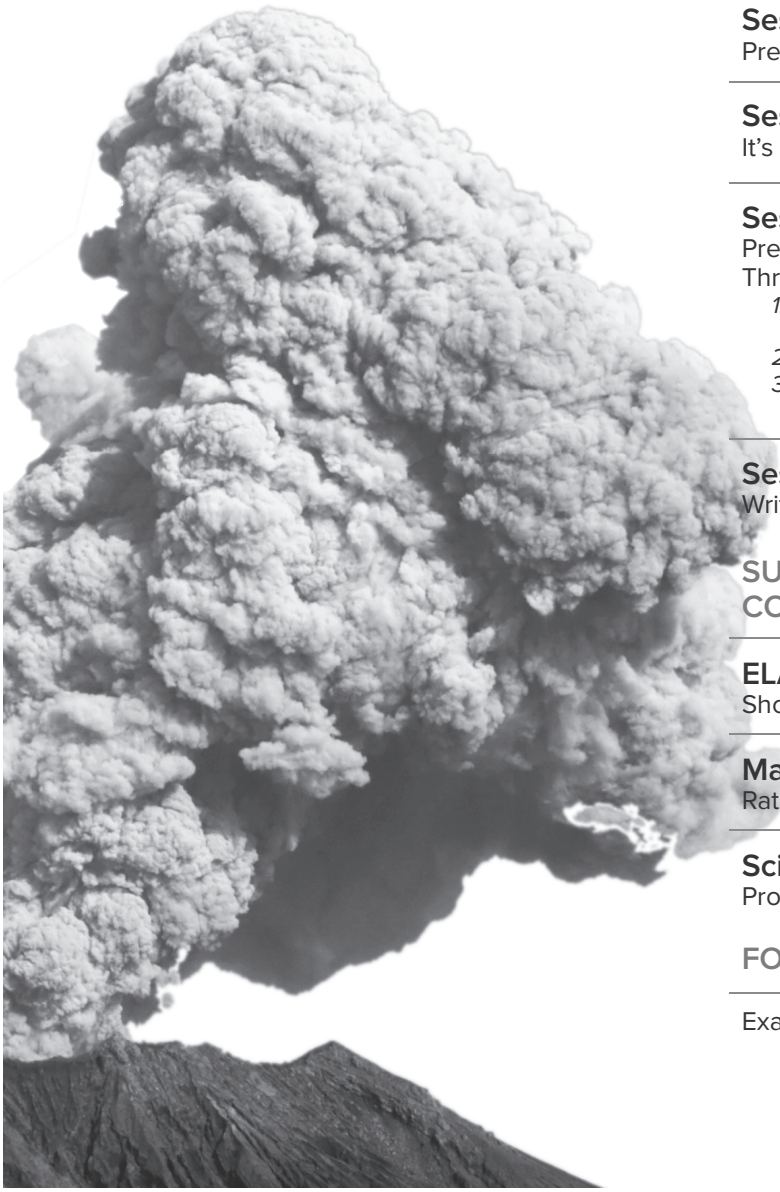
social studies generation

POMPEII: AN IRRESPONSIBLE DECISION OR UNEXPECTED DISASTER?



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Reader's Theater

Shaken by Studying Pompeii

Setting: Four friends meet in the cafeteria. They have just come from their social studies class where today's lesson focused on the volcanic explosion in Pompeii, which is located in today's Italy.

Max, Natalia, Brittany, and Andre sit down at their usual lunch table.

Natalia: Andre, are you ok? You're so quiet!

Andre: I just can't shake the bad feeling I had in class this morning when we read about all the people who died after Mount Vesuvius erupted. It's so creepy. Almost everyone in the town—killed instantly by a volcanic explosion.

Natalia knew what he meant. She had an image from a photograph stuck in her head of a family that was found when the city was excavated, or dug up. They were buried in layers of volcanic ash just as they were running away and preserved in that terrible moment.

Natalia: Max, you missed class…again. We're talking about Mount Vesuvius, a volcano near the city of Pompeii which erupted about 2,000 years ago. When the hot ash fell, everyone in its path was burned or suffocated and then buried in ash. It's horrible to think about all those people who were killed while they were trying to flee the city.

Max: Well, it was their own stupid fault for living near a volcano. It's just like people moving to California in the middle of a drought and then complaining about forest fires. People living near Vesuvius were **irresponsible**, just like Californians.

Andre: Back then, people probably didn't even know it was a volcano. This was 79 CE, not yesterday. I don't even think they had science back then. People used to think bad things happened because a god was angry or something. They didn't have warnings announced on TV, you know.

*Natalia wanted to side with her friend Andre but she wasn't sure that his statement about people in the past not knowing any science could be **verified**. When she watched the history channel on TV, she learned that many ancient civilizations knew a great deal about science. So, she decided to make a different argument based on what she had read in the social studies textbook.*

Natalia: People had good reasons for living in Pompeii. It was an important commercial center, with beautiful houses and lots of rich inhabitants. It was close to the beach. The land was **fertile**, so they had lots to eat. It was also one of the most beautiful places in the area. I don't think it was so stupid for people to live there.

Max: So they wanted the good, and they had to take the bad with it. Do you feel bad for people who suffer after buying houses in earthquake zones? Or in places where hurricanes regularly hit?

Brittany: You know, Max, not everyone gets to choose where they live. Sometimes people are **compelled** to go places they don't want to. If you have a family, you need to go where you have a job. It's the same today. And, oh yeah, what about the slaves in Pompeii? They didn't have any rights at all and they sure didn't get to choose where they lived.

*Max agreed that slaves should be **exempted** from his argument that people in Pompeii deserved no sympathy. But he wasn't so sure about everyone else.*

Map of Italy

The city of Pompeii was an ancient Roman city that was buried by burning ash after a volcanic explosion in 79 CE. The city remained undiscovered until 1748. Since then, archeologists have been excavating the city, and the artifacts they have found give us **verification** of what life was like for some during the Roman Empire.

This week, you'll learn about the beginning of the Roman Empire, which lasted for over 1,000 years. Much of what made the Roman Empire so successful had to do with geography. One question we will discuss this week is: Was living near Mt. Vesuvius an **irresponsible** decision or were the people of Pompeii victims of an unexpected disaster? Think about **compelling**, or convincing, arguments for living in certain places. Does it ever make sense to live in a dangerous place? Even next to a volcano?

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Identifying Different Perspectives

"Spacebook" Status Updates

Write a Spacebook status update for each of the characters in the Reader's Theater. Each update should express what the character thinks about why the people of Pompeii may have chosen to live next to a volcano.

spacebook

Max
Studies at Amazing Scholars Middle School
From Big City, U.S.A.
Interests: Video games, reminding people that you get what you deserve

What are you thinking about?

The people of Pompeii totally had it coming! They wanted the beautiful, **fertile** land next to the volcano—they died when it erupted! They made their choice and faced the consequences. If you think there's no point in feeling sorry for them, like my post and show the softies they're outnumbered.

Natalia
Studies at Amazing Scholars Middle School
From Big City, U.S.A.
Interests: Dancing, standing up for ancient people's practical choices

What are you thinking about?

Brittany
Studies at Amazing Scholars Middle School
From Big City, U.S.A.
Interests: Singing, defending slaves from their masters' silly decisions

What are you thinking about?

Andre
Studies at Amazing Scholars Middle School
From Big City, U.S.A.
Interests: Funny movies, sympathizing with ancient people affected by disasters

What are you thinking about?

Thinking Through Reasons

Taking Sides?

If the Reader's Theater characters had a Spacebook debate, there would be two sides, or claims. The two claims are defined in the boxes on the right. Each character would have to support either Claim 1 or Claim 2. Then, each would provide reasons to support his or her claim in the comments box. Finally, characters would post what they think about the other characters' reasons. Fill out the blanks below to get a sense of how the debate would go between the two sides.

☐ **Claim 1:** The people of Pompeii were being **irresponsible** when they decided to live next to Mt. Vesuvius.

☐ **Claim 2:** The people of Pompeii were not being **irresponsible** when they decided to live next to Mt. Vesuvius.

spacebook

MAX: I definitely think the people of Pompeii were being **irresponsible** when they decided to live next to Mt. Vesuvius because they knew the risks of living next to a volcano, and they still decided to stay there. They wanted the good, and they had to take the bad with it! Just like people who want to live in California—they have to accept the risk of earthquakes!

Andre

COMMENTS:

Max, my man! I think _____

because _____

_____ .

NATALIA: I think _____ because _____

_____

_____

_____ .

Max

COMMENTS:

What's up, Natalia! I think _____

because _____

_____ .

BRITTANY: I support claim _____ because _____

_____

_____

_____ .

Natalia

COMMENTS:

Hey, Brittany! I think _____

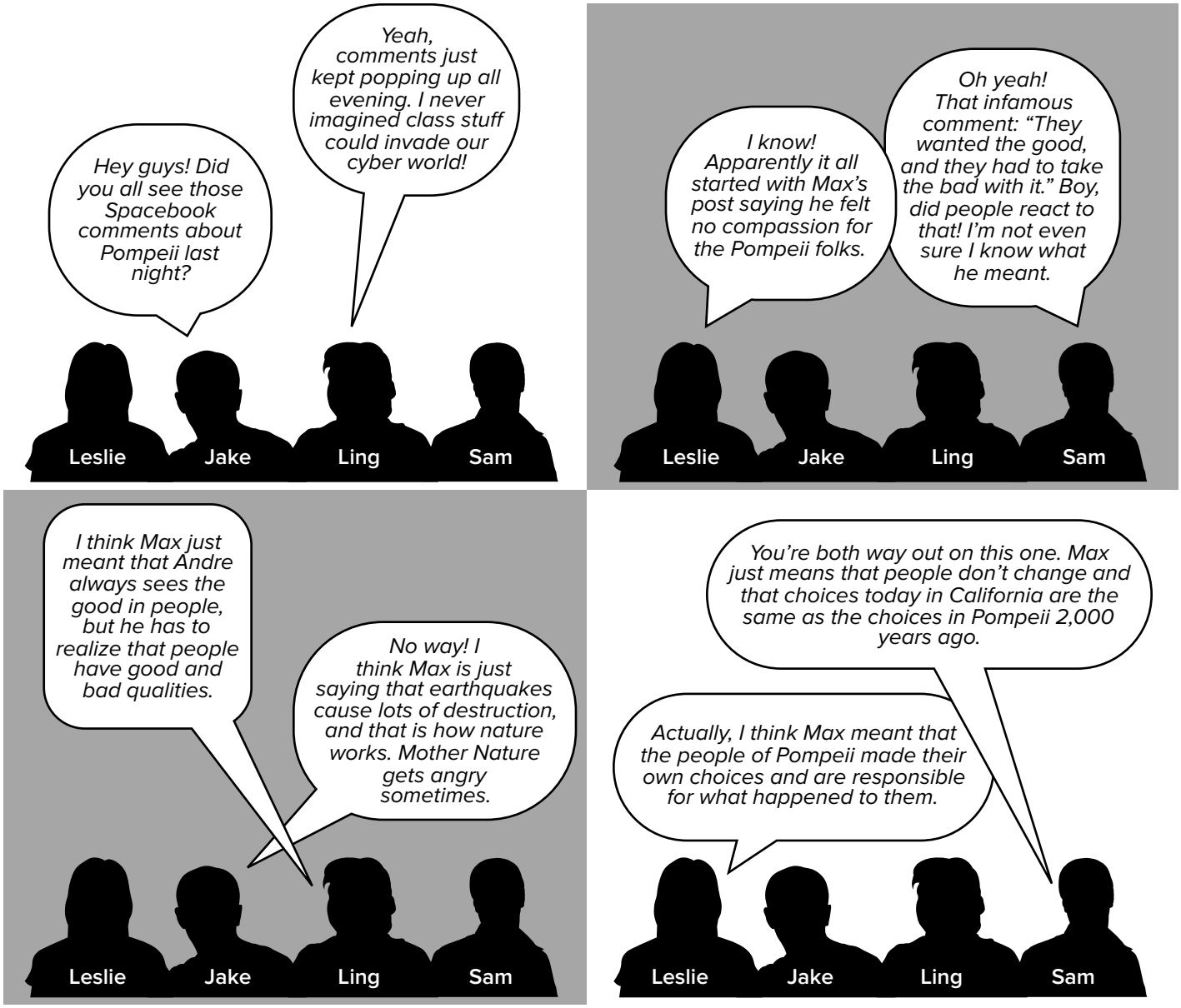
because _____

_____ .

Reflecting on Other Perspectives

Continuing the Conversation

The Spacebook debate triggered a larger conversation among other schoolmates. During morning break, a few students brought up the Spacebook comments that they read the night before. Read their conversation and think about how each person interpreted Max's comments.



Who understands what Max meant?
Based on what you read above, rate each student's statement by marking 1, 2, 3, or 4.

	1 This totally misses Max's point!	**2** This is not really what Max meant.	**3** This is partly what Max meant.	**4** This is exactly what Max meant.
Ling's statement:	☐	☐	☐	☐
Jake's statement:	☐	☐	☐	☐
Sam's statement:	☐	☐	☐	☐
Leslie's statement:	☐	☐	☐	☐

TURN AND TALK: Explain to a partner why you gave the ratings you did. Be sure to provide evidence!

Preparing for the Debate

Two Different Claims

You will be working with your group to prepare for a debate on the weekly topic question.

Was it **irresponsible** of the people of Pompeii to live next to Mt. Vesuvius?

- ☐ **Claim 1:** The people of Pompeii were being **irresponsible** when they decided to live next to Mt. Vesuvius.
- ☐ **Claim 2:** The people of Pompeii were not being **irresponsible** when they decided to live next to Mt. Vesuvius.

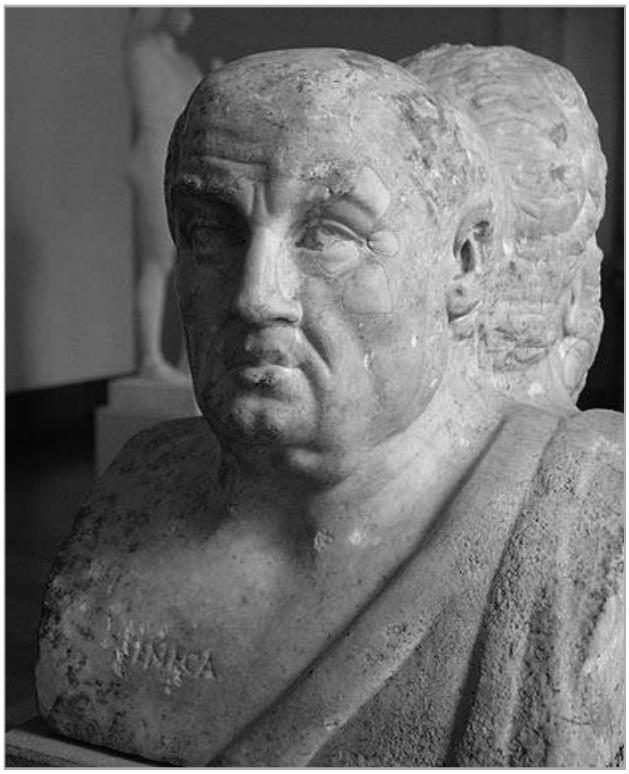
Go back to the Spacebook debate on page 4 and review the claim each character supports and why. Your group will be defending one of the two main claims.

During the debate, your group will try to convince the class that yours is the best claim. You can use these sources to find evidence to support your group's claim:

1. Reader's Theater
2. Pompeii Fact Sheet (next page)

Underline the evidence you find and write short notes in the margins to show how the evidence supports your claim. Also, remember to use as many of this week's focus words as possible in your notes as practice for the debate!

Many of the facts listed on the next page are based on the writings of Roman philosopher Seneca.



Seneca, part of a double-herm (Antikensammlung Berlin) by Calidius

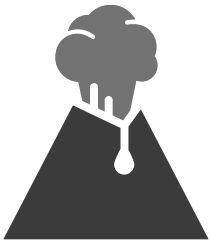
Preparing for the Debate

Pompeii Fact Sheet

Earthquakes in Pompeii

- ☐ There were many earthquakes near Pompeii.
- ☐ Seneca, a famous and educated Roman, wrote about the scientific causes of earthquakes. He wrote about a big earthquake that happened in 62 CE, 17 years before Mt. Vesuvius erupted. This earthquake caused major damage to the city of Pompeii.
- ☐ After the earthquake in 62 CE, people in Pompeii did not leave the city. Instead, many people decided to stay and rebuild their homes. They were working hard to improve the city when Mt. Vesuvius erupted.
- ☐ Earthquakes can be a sign that a nearby volcano will erupt.

The Eruption of Mt. Vesuvius



- ☐ Thousands of people from Pompeii were killed by the eruption of Mt. Vesuvius.
- ☐ The eruption of Mt. Vesuvius lasted for 24 hours. The people who left Pompeii as soon as the eruption started survived.
- ☐ During the eruption of Mt. Vesuvius, people thought it was safer to stay in Pompeii and take shelter rather than try to escape. They thought the eruption would pass, and they would be safe.
- ☐ There were a few early signs that the volcano would erupt. Smoke was coming out of the volcano days before the eruption. There were also earth tremors for a few weeks before Mt. Vesuvius erupted.
- ☐ Historians say the people of Pompeii did not know Mt. Vesuvius was a volcano, so they were not prepared for it to erupt.
- ☐ Some historians believe scientists living in Pompeii ignored the warning signs that the volcano was going to erupt.

Pompeii's Economy

- ☐ The economy of Pompeii was very good. The port of Puteoli, near Pompeii, was one of the largest trading sites in the area.
- ☐ The land near Mt. Vesuvius was very **fertile** and produced many important crops.
- ☐ After the 62 CE earthquake, many Pompeii residents decided to stay because the economy was doing well.
- ☐ There were thousands of slaves in Pompeii who helped the city's economy, but they did not have the right to buy property.

Roman Beliefs

- ☐ According to ancient Roman religion, gods and other creatures had supernatural powers that could control nature.
- ☐ Roman gods were believed to be fickle creatures who often ended up using their powers to fight one another. Romans believed that natural disasters like volcano eruptions and earthquakes were often caused by fighting between gods.
- ☐ Seneca's writings about earthquakes do not make any connections between earthquakes and volcanoes.

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Preparing for the Debate

Your Group's Position

Your teacher will assign you to be on one of four debate teams. To prepare for the debate, your group must fill in this opening statement outline. Write three or four pieces of evidence that could be used to support your team's claim. Make sure that you also explain how each piece of evidence supports the claim. Finally, remember to use this week's focus words!

My group will be defending:

- ☐ **Claim 1:** The people of Pompeii were being **irresponsible** when they decided to live next to Mt. Vesuvius.
- ☐ **Claim 2:** The people of Pompeii were not being **irresponsible** when they decided to live next to Mt. Vesuvius.

My group supports:

- ☐ **Max's** argument
- ☐ **Andre's** argument
- ☐ **Natalia's** argument
- ☐ **Brittany's** argument

Opening Statement
Use the Reader's Theater and Pompeii Fact Sheet to provide evidence of how your group's claim is the best. Prepare your group's opening statement:

Our group claims that _____

_____ .

Our first piece of evidence is: _____ .

This piece of evidence shows that the people of Pompeii ☐ *were* ☐ *were not* being **irresponsible** because

_____

_____ .

Our second piece of evidence is: _____ .

This piece of evidence shows that the people of Pompeii ☐ *were* ☐ *were not* being **irresponsible** because

_____

_____ .

Our third piece of evidence is: _____ .

This piece of evidence shows that the people of Pompeii ☐ *were* ☐ *were not* being **irresponsible** because

_____

_____ .

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It's Debate Time!

Three Rounds

The debate question is:

Was it **irresponsible** of the people of Pompeii to live next to Mt. Vesuvius?

Today's debate will be divided into three rounds:

Round 1:

Opening Statements. One person from each group will present the opening statement with the group's claim, their supporting evidence, and how this evidence supports the claim.

Round 2:

Clarify, Challenge, and Respond. One person from each group will ask clarifying questions or challenge another group's claim or supporting evidence. The challenged group will be given time to regroup and prepare a response.

Round 3:

Debrief. Each student will write down his or her observations about the debate and about each group's performance according the "What makes a good debate?" criteria.

Round 1: Opening Statements

Listen to your classmates' opening statements and take notes so you can challenge them in round 2. You may use the chart below to take notes.

Why the claim of the opposing team is wrong or unsupported	Problems with the other team's evidence	Problems with the connection of the other team's evidence to its claim

After your classmates finish presenting, meet with your group and review the notes you took in response to the other team's opening statement. Use this time to prepare another statement that will challenge the other group's claim and evidence. Choose one team member to challenge the other team in the next round.

Round 2: Clarify, Challenge, and Respond

Listen as the other team challenges your claim and take notes about the points that they bring up. After, you will have a chance to plan how you will respond with support for your claim.

How did the other team challenge your claim and evidence?	How will you respond to their challenges or questions?

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It's Debate Time!

Round 3: Debrief

During the debrief, you will evaluate the debate. Use the criteria in the box to help you analyze this week's debate.

What makes a good debate?

- *Groups presented evidence that clearly supported their claims.*
- *Groups challenged each other's claims and/or supporting evidence.*
- *Groups asked clarifying questions.*
- *Groups responded to challenges with good supporting evidence.*
- *Students who presented spoke loudly and clearly.*
- *Students listened quietly and attentively when others spoke.*
- *Information presented in the debate was correct.*
- *Different students from each group participated.*
- *Students used this week's focus words correctly.*

Group Members	Focus Words Used	Strengths (What this group did well)	Suggestions for Improvement
Max's Group Members:	☐ argue ☐ irresponsible ☐ verify ☐ compelling ☐ exempt ☐ fertile		
Natalia's Group Members:	☐ argue ☐ irresponsible ☐ verify ☐ compelling ☐ exempt ☐ fertile		
Brittany's Group Members:	☐ argue ☐ irresponsible ☐ verify ☐ compelling ☐ exempt ☐ fertile		
Andre's Group Members:	☐ argue ☐ irresponsible ☐ verify ☐ compelling ☐ exempt ☐ fertile		

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Preparing for Writing

Three Readings

This week's writing question brings the issue of Pompeii to a contemporary setting. The following short readings tell the stories of people who live in dangerous locations today (pages 13–15). Choose one of the stories and think about where these people live and why they have decided to live or stay there. As you read, think about the people of Pompeii.

Consider this week's writing question:

Are people **irresponsible** for living in dangerous places?

After reading, you will be asked to explain the story you read to your partners and discuss the issues faced by the people at each location. Then you will write about one of the stories. Use the guiding questions and the space below to take good notes that will help you share and write.

Title: _____ Reading #_____	
What's the problem in this community, country, or region? Are any of these **compelling** reasons why people should leave?	Why does the author want to stay in this place?
Do you think people living in this place are being **irresponsible**? Explain your answer. Use evidence from the reading to support your claim.	Would it be easy or hard for people to leave and settle in a new place? Why?

Preparing for Writing

Analyzing and Discussing the Readings

Share

Find two classmates who read the other readings. One at a time, explain what you read to each other, taking notes in the chart below. After each reading is explained, discuss your opinions on whether or not the people living in that area were being **irresponsible**.

	Partner Name _____ **Reading #_____**	**Partner Name _____** **Reading #_____**
What's the problem with this place?		
Why do people decide to stay?		
Do you think the reasons to stay are compelling? Why or why not?		
Do you think people living here are being **irresponsible**? Why or why not?		

Synthesize

Think about all of the readings that you read or discussed. Do you see any common patterns about why people decide to live in places that are potentially dangerous or harmful?

_____

_____

_____

_____

_____

READING #1

Haitian Girl Writes to Her Aunt After the Earthquake

January 30, 2010

Dear Tantin Marie,

I'm writing to you because our phone lines are down. They tell us that we won't have phone service again for many months. I must let you know that Evens and I are okay. We are living in a temporary shelter outside of Port-au-Prince. It is rough. There is little clean water, and the roads in and out of the city have been destroyed. Evens and I were so lucky to get a ride in a jeep to this camp. As we drove through the city, all we saw were miles and miles of houses and shacks that had collapsed. It breaks my heart to think about what has happened to our people! Even though our house was built in a nice suburb near the beach, it still collapsed.

We never imagined an earthquake striking our island. We were so unprepared. The government is so weak. We must now rely on the help of international aid workers. This damage could have been prevented if our country were wealthy like America. You told me once that your buildings are made to handle most earthquakes. Here, most people live in shacks and poorly built buildings. All have crumbled.

Please do not ask me to come to California. Even though we have the money to travel, Evens and I could never leave Haiti. It is our home. I've learned that many people around the world have given money to help with the relief effort. I know this is true because food has been dropped into this shelter from a helicopter every few days. This makes me so happy. I want my country to one day be strong and capable too.

Bless you,
Your Niece,
Jeanne

Mini-Glossary

temporary – for a short time; not permanent

collapse – to fall down; to cave in

international aid – support (like food, money, workers) from other countries

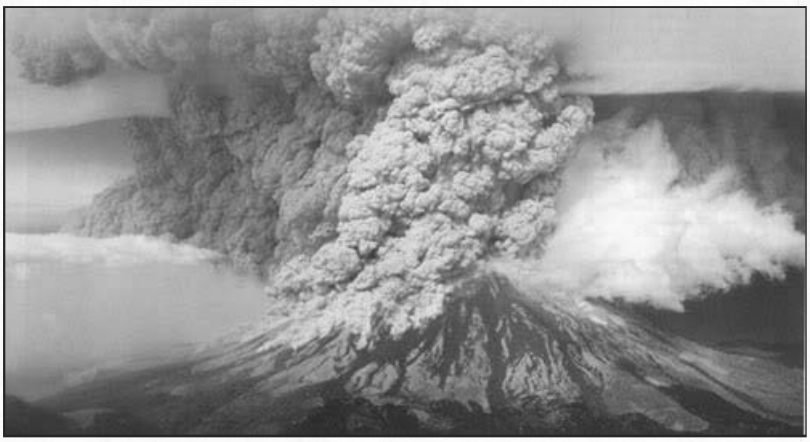
capable – having the skill or power to do what is needed

READING #2

Report on Mount St. Helens in Washington State

27 January 2004
Washington State

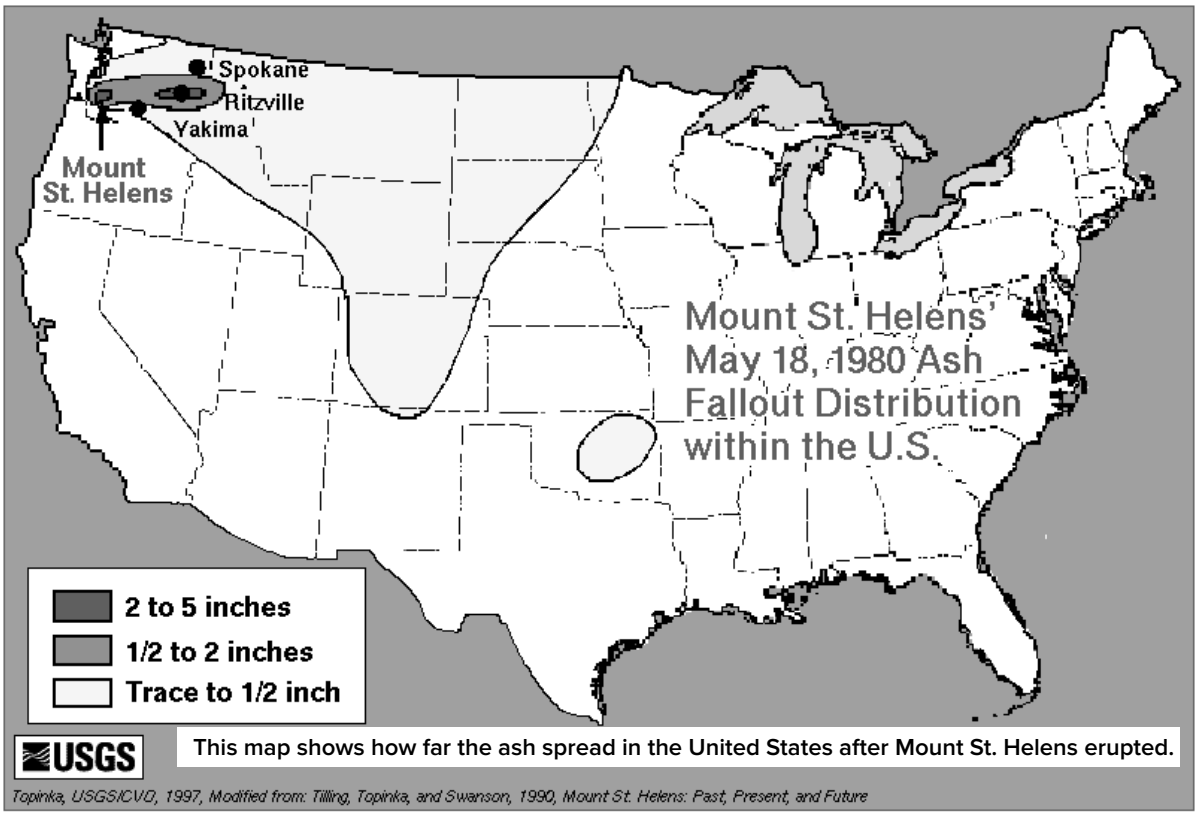
Mount St. Helens is starting a new period of eruption. Scientists are unable to predict precisely, but they think it may last for some years. The volcano last erupted in the 1980s, destroying homes, bridges, highways, and railroad lines, and killing 57 people. One of the people killed was an 83-year-old man who ignored the order to evacuate. Another person killed was a 30-year-old volcanologist.



Mount St. Helens erupted in 1980

Mount St. Helens is about 60 miles from Yakima, WA, a town of 70,000 people. On May 18, 1980 in Yakima, the sky started getting dark mid-morning. By noon, the city was as dark as night. Ash falling from the volcano completely obscured the sun. Three inches of ash fell on everything in Yakima. It got into motors and machinery, disrupted the water treatment plant, blew through cracks into houses and schools, and made driving a car impossible.

Even the city manager of Yakima had no warning the ash was coming, and no plan for what to do. We might ask why, in 1980, with lots of evidence about how destructive volcanoes can be, people would go on living so close to them.



This map shows how far the ash spread in the United States after Mount St. Helens erupted.

Mini- Glossary

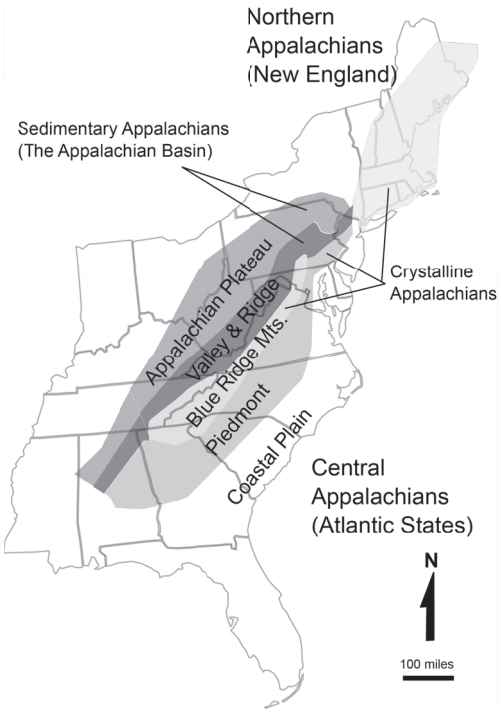
predict – to tell in advance
evacuate – to leave
volcanologist – a person who studies volcanoes
obscure – to make dark; to darken
disrupt – to destroy
destructive – likely to cause damage

READING #3

Young Woman Describes Problems of Living Near Coal Mines

14:30 PM

My name is Colleen, and I live in a little-known part of America called Appalachia. Appalachia is a beautiful place with many mountains. My daddy works as a coal miner in the big mountain by our home in West Virginia. Coal mining is a dangerous job. Sometimes the mines collapse and the men get trapped inside. The air is so dirty that it makes my daddy cough all night, but that's the only job in my neck of the woods so my daddy does it to feed us.



Sometimes I hate the mines because they do so much bad stuff in my community. People have to drink water, right? We need it to live. But around here the water is contaminated. It comes out of the well a brown-red color, with little bits of sediment like sand and dirt in it. Plus it usually smells like rotten eggs. The water is so gross that it actually rotted my little brother's teeth out. When it's really bad, we can't even take a bath because the water can give you a rash.

Workers have to blast into the mountains to excavate the coal. You wouldn't believe how loud it is. Last year when they were blasting, a huge boulder actually flew off the mountain and crashed into my friend Jeremy's living room. Nobody got hurt, but that was only luck.

Whenever it rains, we have to look out for floods. The mining companies have stripped away the trees, so there's nothing to stop the water. It comes rushing down the mountainside like river rapids. It's so fast and strong that I've seen it pick up cars and carry them away. Can you imagine seeing a car floating down a river?

The worst part is the toxic waste. When the companies separate the coal from the other rocks, they use all types of nasty, dangerous chemicals in the process. They store this stuff in big green lakes called "sludge impoundments." One time, the sludge got loose. It killed a lot of people, destroyed houses, and killed all the fish in the river. My school is below one of these impoundments. If the dam that keeps the sludge back ever broke, we would only have five minutes to evacuate before the sludge would be 15 feet high inside the school.

I love my home. I love the mountains and our life, but I hate the coal mines. Whenever I say that to my daddy, he says, "Those mines put food on the table. What would we do without them?" So I guess we either have to starve, or we have to make the best of it right here.

Mini-Glossary

contaminated – affected by poison or pollution

sediment – matter that settles to the bottom of a liquid

process – series of actions or steps

Writing

Make a Case

Throughout the unit you have learned about the people of Pompeii and how they lived next to Mt. Vesuvius, a volcano that erupted and caused great devastation. You have also read or discussed modern day examples of people living in dangerous places. What do you think?

Are people **irresponsible** for living in dangerous places?

Write an essay to explain your answer. Make sure your response includes the items in the box:

- ☐ Details about one of the readings (It does not need to be the one you read. It can be your partner's reading.)
  - ▶ The problem with living in this place and why the author wants to stay
  - ▶ Evidence from the text that supports the author's claim of why he or she wants to stay
- ☐ Your opinion or claim: Do you think people in this location are **irresponsible** for living there?
  - ▶ Clear statement of your opinion or claim
  - ▶ Evidence from the text that supports your opinion or claim
- ☐ This week's focus words (to make your argument stronger)

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Writing

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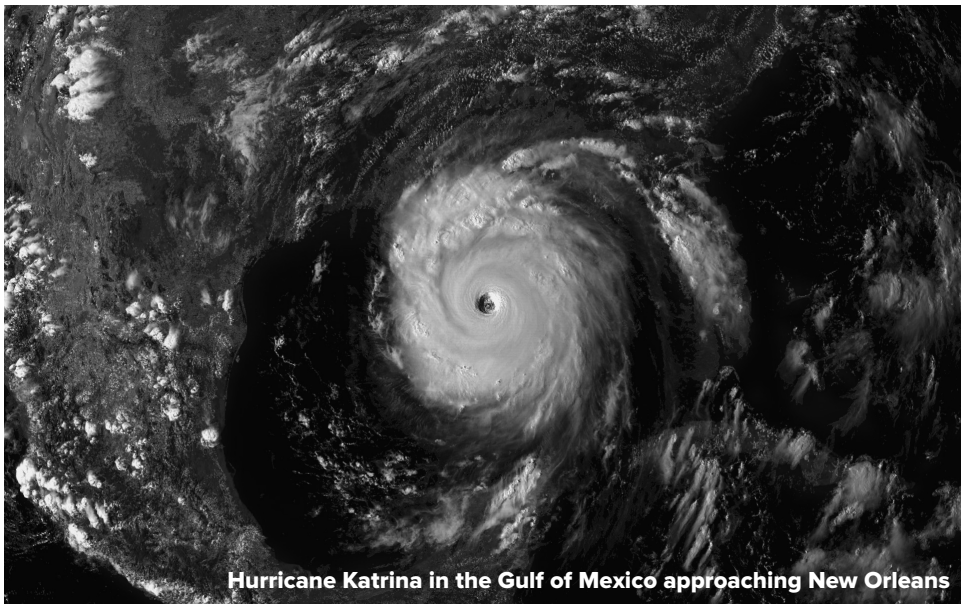
Should people live in New Orleans?

"I love New Orleans physically. I love the trees and the balmy air and the beautiful days. I have a beautiful house here." -Anne Rice

"So while an incredible amount of progress has been made, on this fifth anniversary, I wanted to come here and tell the people of this city directly: My administration is going to stand with you—and fight alongside you—until the job is done. Until New Orleans is all the way back, all the way." -Barack Obama

New Orleans, Louisiana, is one of the most well-known cities in the world. It is famous for its great parties and great food. Also, New Orleans is **fertile** ground for new music, and it is known as the birthplace of jazz. The city is located in the southeastern part of Louisiana on the banks of the Mississippi River.

In 2005, one of the biggest hurricanes in U.S. history—Hurricane Katrina—was headed for New Orleans. The mayor ordered everyone to leave the city; no one was **exempt**. However, many people were unable to leave the city. Some did not have enough money to pay their way. Some had nowhere to go. Others felt **compelled** to stay in the city because it was the home that they loved. Unfortunately, many people stayed as Katrina flooded the city, and almost 1,600 people died. In addition, many of the buildings and homes were destroyed, particularly in a section of the city called the 9th Ward.



Hurricane Katrina in the Gulf of Mexico approaching New Orleans

After this disaster, some people **argued** that we shouldn't rebuild New Orleans. They said that New Orleans would probably get destroyed again by a hurricane. Their evidence was that the city is below sea level, and hurricanes often hit that part of the country. In addition, the people **argued** that parts of New Orleans were dangerous. There was a lot of crime, and the schools were bad. They **argued** that people should not be allowed to live in such a dangerous area, and that the government should not have to pay to rebuild the city.

On the other hand, there were people who strongly supported rebuilding New Orleans. They **argued** that New Orleans was their home, and they wanted to go back. Also, they believed New Orleans was one of the most interesting cities in the world before the storm hit, and that its unique culture made it worth rebuilding. These people claimed that the government could protect the city better this time by building stronger, higher walls, or levees, to keep the water out of the city during big storms like hurricanes. Finally, some **argued** that people who opposed rebuilding didn't care about New Orleans because many poor people and African-American people lived there before the storm. If this had happened to a city with a lot of rich white people, they believed there would have been support for quickly rebuilding it.

Ultimately, the people of New Orleans decided to rebuild their city, though many **argue** that the government has not done enough to help them. As evidence of this, 100,000 people still have not been able to return to their home. What do you think? Did they make the right decision to rebuild? Or should they have abandoned New Orleans because the danger is too great that it will get destroyed again? How could you **verify** whether or not the people made the right decision to rebuild?

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Rates and Ratios

Pompeii Statistics

Option 1:

Before the eruption of Mt. Vesuvius, Pompeii experienced lots of disasters. A big earthquake hit near Pompeii in 62 CE—just 17 years before the volcanic eruption that ultimately destroyed the city. After the earthquake, some of the people living there began to **argue** about whether or not they should leave. The majority of residents felt **compelled** to stay because they loved their city and had worked hard to rebuild it.

The ratio of people who moved out of Pompeii to people who stayed after the earthquake in 62 CE was 1:6. If 500 people moved out, how many people stayed?

Option 2:

Archeologists found evidence to **verify** that Mt. Vesuvius erupted for 24 hours. If the ash fell at 15 cm/hour, how deep was the ash when the volcano stopped erupting?

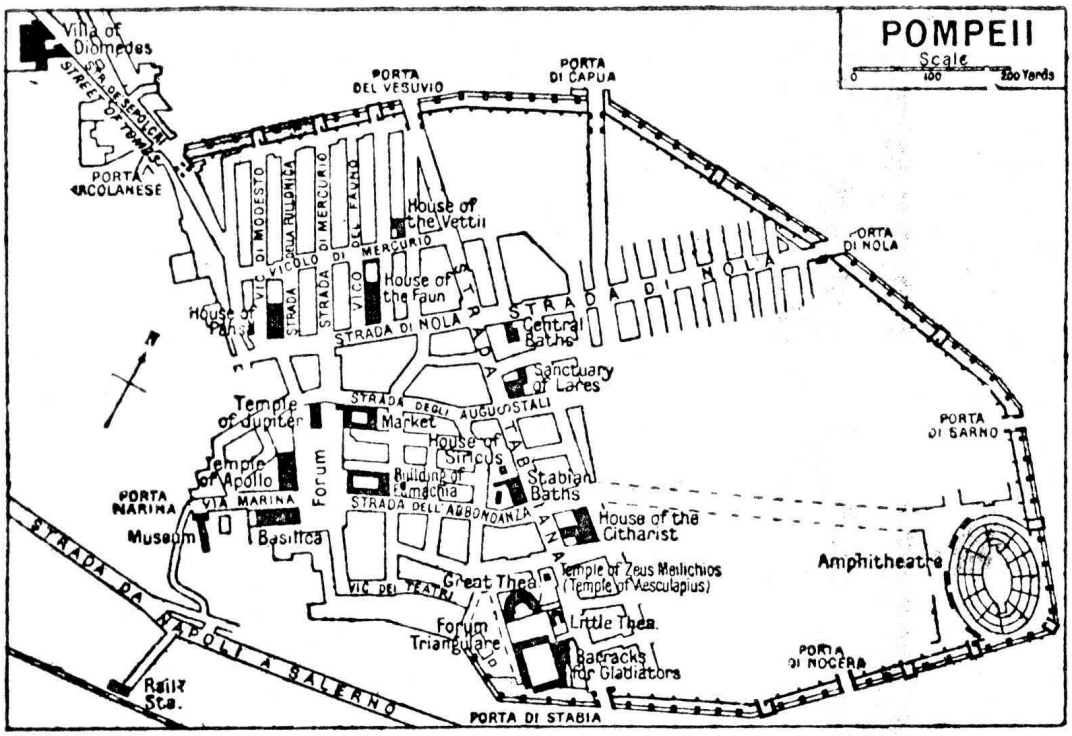
a) 36 meters

b) 360 meters

c) 3.60 meters

d) 3,600 meters

DISCUSSION: Although the ash destroyed everything, it also helped preserve the city. If you were an archeologist excavating Pompeii, what kinds of objects would you expect to find? Why?



Properties of Volcanos

Lava and Eruptions

Types of Lava

Would you like to see a volcano erupt? Depending on the type of volcano, it might not be **irresponsible** for you to watch the eruption while standing only a few feet from the vent. For other eruptions, you might have to observe from far away at a distance of several hundred miles. How do scientists know how volcanoes will erupt?

Volcanologists, or scientists that study volcanos, **argue** that volcanic activity is very difficult to predict, but they know that one important factor in volcano eruption is the type of lava inside a volcano. Lava is a mixture of melted rock and gas. Different types of lava play a strong role in determining how a volcano will look and erupt. This lesson will focus on four types of lava and the eruptions that they create.

Two characteristics describe lava: gas content and viscosity.

Gas content: This refers to how much gas is dissolved in the melted rock. The gases in lava are mainly water vapor and carbon dioxide. How does gas affect eruption? Think of a bottle of soda. If you shake an unopened bottle of soda and then open it, it will spray everywhere with lots of force. No one standing close will be **exempt** from being hit with a spray of soda. This is because there is a lot of gas in the soda itself which is now compressed into a bottle. So what about an old bottle of soda that was left open? If you shake the bottle and then open it, not much will happen. That is because there is very little, if any, gas left in the soda.

Viscosity: This refers to how thick and sticky a liquid is. Some high-viscosity (very viscous) liquids you might know are honey and molasses. They are thick and sticky, and not very runny. Since it runs slowly, viscous lava does not flow far before cooling down after a volcano eruption. Over time, layers of cooled lava build up near the opening of a volcano. On the other hand, other liquids, such as water and milk, have a low viscosity. They are runny and not particularly sticky. Low-viscous lava runs quickly, spreading out farther around a volcano while it is hot.

Make a prediction:

With a partner, match each type of lava with the eruption that it would produce. The eruptions are illustrated below.

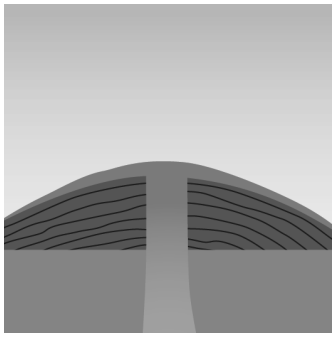
Type 1: Low gas, low viscosity

Type 2: Low gas, high viscosity

Type 3: High gas, low viscosity

Type 4: High gas, high viscosity

- ☐ Type 1
- ☐ Type 2
- ☐ Type 3
- ☐ Type 4



- ☐ Type 1
- ☐ Type 2
- ☐ Type 3
- ☐ Type 4

- ☐ Type 1
- ☐ Type 2
- ☐ Type 3
- ☐ Type 4

- ☐ Type 1
- ☐ Type 2
- ☐ Type 3
- ☐ Type 4

Compare your responses to the predictions of another pair of students, and listen as your teacher reviews the answers.

Discuss these questions with your partner. Your teacher will listen to your ideas and confirm the answers.

- ▶ Which type of lava will produce the least dangerous eruption?
- ▶ Which type of lava will produce the most dangerous eruption?
- ▶ Which type of lava will produce the most visually **compelling** eruption?

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Examining the Focus Words Closely

SoGen Unit 6.6

FOCUS WORD OR *RELATED FORM	DEFINITION	SAMPLE SENTENCES	TURN AND TALK
argue *(verb)*	to give reasons for or against something	Max **argued** that the people of Pompeii deserved no sympathy because they chose to live by a volcano.	Do you ever **argue** with your parents? If so, what do you normally **argue** about?
irresponsible *(adjective)*	not showing good judgment; not responsible	It's so **irresponsible** to live in a place that's dangerous!	Can you think of a time when you were **irresponsible**? What did you do?
verify *(verb)*	to make sure of the truth of something	Natalia thought Andre should **verify** his statement that the people of Pompeii didn't know that they were living next to a volcano.	How could you **verify** whether it will rain today?
***verification** *(noun)*	proof; evidence that something is true or real	The artifacts they found give us **verification** of what life was like during the Roman Empire.	How do your parents receive **verification** that you are doing well in class?
compelling *(adjective)*	very strong or convincing; irresistable	What would be a **compelling** argument for living somewhere?	Can you think of a **compelling** reason for schools to give laptops or tablets to all students?
***compel** *(verb)*	to force someone to do something by a person, rule, or situation; to draw someone to something	The students wondered what **compelled** the people of Pompeii to live near a volcano.	Which situation would most **compel** you to act or help: someone being bullied, or someone struggling to carry many grocery bags? Why?
exempt *(adjective)*	not having to do something or obey a rule	Max agreed that slaves should be **exempt** from his argument that people in Pompeii were irresponsible.	Can you think of a time when you were **exempt** from homework or a household chore? What was it? Why were you **exempt**?
***exempt** *(verb)*	to officially tell someone that they don't have to obey a rule, policy, or law	The teacher **exempted** some students from participating in gym class because they were sick.	Why might a teacher **exempt** a student from taking a test?
fertile *(adjective)*	able to grow or produce a lot (of crops, offspring, ideas, etc.)	The land near Mt. Vesuvius was very **fertile** and produced many important crops. Kanye West has a **fertile** mind for rhymes.	Do you know of any places that are **fertile**? What do they look like?

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