Sherri's Choice: Scene 1

Justin and Sherri are celebrating their 2-month anniversary and decided to go on a trip during the summer preferably somewhere with lots on sun and sand. Justin thinks the Indonesian coast would be great. Sherri wants to go to Hawaii and isn't thrilled about going to the land of tsunamis.

Justin [*excitedly*]: Sherri, check this out.

Justin is holding out a shiny brochure he just received in the mail for cheap vacations to Indonesia.

Sherri: What is it?

Justin: Look! They're offering a great trip to Indonesia flight and hotel for 5 days and 6 nights for only $350 per person.

Sherri: What? Indonesia?! You do know that they had a Tsunami that killed thousands of people. Why would I pay to get drowned? That brochure is just a trap for broke college students! Why can't we go to Hawaii?

Justin looks at Sherri in disbelief - he couldn't believe her reaction.

Justin: Tsunami? That was years ago and look at this price! Hawaii is going to cost a fortune!

Sherri: [*rolling her eyes*] Okay if you can prove to me that a Tsunami is not going happen during our vacation and there is no health risk, I'll think about it.

Justin: All right, give me two days and I'll prove that Indonesia is safe and better than going to Hawaii.

Role	Expectation	Performance
Indonesian Tourist Board	Advertise for hotel/resort vacations on the Indonesian coastline	Brochure reassuring tourists to visit Indonesian coastline and the low risk of Tsunamis occurring
Hawaii Travel Association	Promote Hawaiian vacations and low risk of Tsunami	Commercial promoting a vacation package to college students
Scientists	Gather information to predict Tsunamis and provide early notification to vulnerable locations	Create a power point on causes /effects of Tsunamis and areas most likely to experience them during the summer.
Justin	Persuade Sherri that the vacation to Indonesia will be a better choice than a Hawaiian vacation	Skit illustrating Justin's argument to visit Indonesia and not Hawaiian islands. Provide information on Tsunamis in skit.
Journalist	Provide an unbiased view on vacationing in Indonesia or Hawaii the benefits and dangers	Newspaper article that describes possible scenarios associated with vacationing in tectonically active destinations.
Engineer	Convince Hotel investor that Hawaii and Indonesian coastline is too tectonically active to pursue resort development	Create a 3D model of either Hawaiian or Indonesian coastline and the underlying plates.

Adapted from Torp & Sage (1998). p62.

Box chart

Facts **I read that….**	**Questions/Learning Issues** **I wonder/want to ask or I need to look up/learn more….**
Hypothesis **I think….If (FACT), then…**	**Action plan** **How will I get my information**

Learning issues worksheet

1) Learning Issue: ____

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Information I found about this learning issue: _______________________________________

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I found this information at: ____

If you found the information on a website, you must also complete a website evaluation form and include it with this worksheet.

2) Learning Issue: ____

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Information I found about this learning issue: _______________________________________

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I found this information at: ____

If you found the information on a website, you must also complete a website evaluation form and include it with this worksheet.

Learning issues worksheet

3) Learning Issue: ____

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Information I found about this learning issue: ______________________________________

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I found this information at: ____

If you found the information on a website, you must also complete a website evaluation form and include it with this worksheet.

4) Learning Issue: ____

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Information I found about this learning issue: ______________________________________

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I found this information at: ____

If you found the information on a website, you must also complete a website evaluation form and include it with this worksheet.

Name: ______________________________

Web address you are evaluating:

http://____

Name/Title of the site: ____

Accuracy/Authority	**Yes**	**No**
Do you know who wrote the page? Do they provide a real name?		
Is there a way to contact the author, not webmaster? (email or mailing address)		
Is the person qualified to write this document? Do you know their qualifications/ education/ expertise/ credentials?		
Do you know what institution publishes this document and is that institution valid? (.edu, .gov, .org, .net)		

Objectivity	**Yes**	**No**
Do you know the goals/ objectives of the website and are those met?		
Is the information detailed enough?		
Does it provide information for and against? Or provide alternative explanations?		
Is this an advertisement for a product?		

Currency	**Yes**	**No**
Do you know when this document was created?		
Do you know when the document was last updated? Is this recent (in last 5 years)		
Are the links up-to-date?		

Do you feel that this is a credible website to use for your research? Yes ☐ No ☐

Information about website evaluation

Not all websites are created equal. Some are accurate and provide facts while others are based on the opinion of the person writing the webpage or may be entirely untrue. If the webpage is not accurate, you may not want to use this information for your project. There are some ways for you to judge the accuracy of the websites that you visit. You will be completing a website evaluation that will help you with this. Below is the evaluation you will complete along with additional information (*) about each point.

Accuracy/Authority	**Yes**	**No**
Do you know who wrote the page? Do they provide a real name? **better if there is a real person with their real name posted*		
Is there a way to contact the author, not webmaster? (email or mailing address) **want to be able to contact the author in case you think the information is inaccurate or you have a question, better if a contact is given*		
Is the person qualified to write this document? Do you know their		

qualifications/ education/ expertise/ credentials? **want to make sure the person is qualified to write about the information they provide, better site if the author is properly qualified*		
Do you know what institution publishes this document and is that institution valid? (.edu, .gov, .org, .net) **anyone can set up a webpage, but some are governed by an overseeing agency that checks the accuracy, it is better if the site is published by an institution*		

Objectivity	**Yes**	**No**
Do you know the goals/ objectives of the website and are those met?		
Is the information detailed enough? **better if they provide detailed information, not just general information*		
Does it provide information for and against? Or provide alternative explanations? **better if they provide information for and against an issue*		
Is this an advertisement for a product? **advertisements are trying to sell something so may not provide all the information, not good if this is an advertisement*		

Currency	**Yes**	**No**
Do you know when this document was created? **should provide a date when created and updated*		
Do you know when the document was last updated? Is this recent (in last 5 years) **better if the site was updated in the last 5 years so you know that the information is recent*		
Are the links up-to-date? **better if the links work, otherwise the site is probably older and they haven't kept up their own site*		

Your overall rating of the webpage should take all this information into account, but some points are more important than others. For instance, it is more important that you know who wrote the page and that they are qualified to write the information than is do they provide alternative views. You also want a site to be current. Sometimes an advertisement is appropriate to use, as long as you are aware that the information is biased and are finding other information that is from an alternative point of view.

Resources:

Indonesia tourism info
http://www.tourismindonesia.com/
http://www.lonelyplanet.com/worldguide/destinations/asia/indonesia
http://www.indonesia-tourism.com/
http://my-indonesia.info/indexpromo.php

Likelihood of tsunami hitting Indonesia
http://blogcritics.org/archives/2005/03/29/064013.php

2004 Tsunami info
http://geology.com/articles/tsunami-map.shtml

General tsunami info
http://www.tsunami.noaa.gov/
http://www.tsunami.org/summary.html

Tsunami visualizations
http://serc.carleton.edu/NAGTWorkshops/visualization/collections/tsunami.html

Hawaii tourism info
http://www.gohawaii.com/
http://www.hawaiitourismauthority.org/
http://www.hvcb.org/

Hawaii tsunami
http://www.pdc.org/iweb/tsunami_zones.jsp
http://www.tsunami.org/faq.html

Wave that Shook the world/Wave of the Future
http://www.pbs.org/wgbh/nova/tsunami/wave.html

Teacher Domain Background essays

Once and Future Tsunamis

Just as scientists cannot predict precisely when earthquakes or volcanic events will occur, neither can they determine exactly when a tsunami will be generated. However, by studying past tsunamis, scientists can predict where they are most likely to occur in the future and what their impact on specific coastal locations is likely to be. Using physical evidence and, where available, eyewitness accounts, geologists work to piece together entire tsunami histories, beginning with the causal event and ending with the aftermath.

From numerous studies, scientists know that not all underwater or near-shore seismic events cause tsunamis. To generate a tsunami, an earthquake -- the most commonly cited cause of tsunamis -- must be very large and centered at depths no greater than 50 kilometers (30 mi). About 85 percent of all recorded tsunamis originated in the Pacific Ocean, which is replete with faults, and scientists can create prediction models based on known subduction zones that fit the profile.

In addition to earthquakes, volcanoes may also initiate tsunamis. Violent eruptions or massive slope failures can result in the displacement of the large volumes of water needed to trigger a tsunami. Although less frequently than volcanic events, rock falls and submarine landslides may also produce tsunami waves. Sudden slope failures like these are sometimes triggered by strong earthquakes. Although evidence suggests that wave energy generated by point-source events such as landslides tends to dissipate quickly, historical events in Japan, Alaska, and elsewhere demonstrate that the local effects of tsunamis caused by these sources can be devastating.

In areas where tsunamis have occurred in the last several hundred years, eyewitness reports or written accounts sometimes provide scientists with the information needed to gauge the potential impact of future tsunamis in the same area. In such cases, scientists seek to learn how many waves came ashore, how high they were, which one was the biggest, and how far the tsunami moved inland.

When no human documentation exists, geologists rely on the fact that tsunamis erode, transport, and deposit sediments. For example, the presence of sand or gravel deposits normally found on a coastline in an inland location might indicate that a tsunami transported the material. Thicker deposits suggest larger waves because larger waves are capable of carrying more sediment from the seafloor. Also, the discovery of flattened plants entombed in a layer of sand suggests that powerful waves rolled quickly in and out of an area.

Anatomy of a Tsunami

Earth's hard outer shell, known as the lithosphere, is not continuous across the surface of the planet. Instead, it consists of 12 rigid plates between 60 km (37 mi) and 200 km (124 mi) thick that are composed of continental crust, oceanic crust, and the upper part of the mantle. These plates "float" on the underlying and more flexible layer known as the aesthenosphere. When two plates converge, pressure forces sections of crust to pile up, and mountain systems and volcanoes form on the overriding plate. Meanwhile, the subducting plate plunges deep into the mantle. Large earthquakes with epicenters located at undersea subduction zones are the most frequent causes of powerful ocean waves known as tsunamis.

Tsunamis carry the energy produced by earthquakes or, less frequently, other Earth disturbances such as volcanoes, landslides, and meteorites. When tsunami waves break on land, this energy is released and can cause catastrophic damage. Certain physical characteristics of tsunami waves along with the waves' behavior upon reaching land explain a tsunami's enormous capacity for destruction.

The deeper the water, the faster tsunami waves travel. Despite their high speed, in the open ocean tsunami waves have a low amplitude (height) and long wavelength (distance between crests). Because waves lose energy at a rate inversely related to their wavelength, tsunami waves typically experience very little energy loss as they travel across the ocean.

When a tsunami wave nears land, its wave profile changes drastically. In the open ocean, the wave energy extends from the surface to the bottom, but in shallower water, the wave gets compressed. As the wave's leading edge interacts with the rising seafloor, it slows. The water moving in behind piles up, so that when the wave finally reaches the shore, it may have risen to tens of meters (tens of yards) in height.

If the trough (or low part) of the wave is first to reach the shore, water at the shore gets drawn seaward before the peak (or high part) arrives. To help understand why this happens, imagine a string arranged in a wave pattern on a table. If you shorten the wavelength, the amplitude increases and the ends of the string pull inward. Likewise, as a tsunami wave approaches shore, its wavelength shortens, pulling water from all directions, including the shoreline.

Because water is very heavy -- a cubic meter weighs a metric ton -- a tsunami wave is capable of inflicting immense destruction on land. The presence of reefs and steep coastal shelves, however, can act as a breakwater to lessen the force of the wave.

Wave of the future

The undersea earthquake that struck 160 kilometers (100 mi) west of Sumatra in December 2004 was more powerful than all of the world's earthquakes over the last five years combined. The magnitude 9.0 to 9.3 event, which shifted the entire planet, spawned a tsunami that killed as many as 300,000 people and displaced more than 1.5 million people living near the Indian Ocean.

Many of those who were killed, especially in places far from the earthquake's epicenter, might have been saved if a comprehensive tsunami warning system had been operating in the Indian Ocean. With 600 million or more people across the globe predicted to be living within 100 kilometers (62 mi) of coastlines by 2025, setting up effective tsunami warning systems in all the world's oceans is a critical task. Still, there are challenges, including technological limitations, fiscal constraints, and the bureaucratic red tape that hinders international cooperation and communication.

A warning system comprised of a seismic detection system, a tide gauge system, and a communications system has been in place in the Pacific Ocean since 1948, and it provides a model for an Indian Ocean system. The Pacific system has accurately detected every major tsunami since its installation. New sea-floor sensors, designed to monitor pressure changes in the water above them, were installed in 2002 to help reduce the high false-alarm rate (75 percent). The cost of implementing a system with similar instrumentation in the Indian Ocean would be between US$250 million and US$400 million.

Self/Peer Evaluation

<u>Individual</u>

Name________________________

Period ________

Scale 1-10 (1 = low, 10 = high)

1. I participated in the group ____
2. I completed my portion of the assignment _____
3. I listed to my group members suggestions _____
4. I learned information about tsunamis ____

<u>Group</u>

Answer questions 1-3 for each of your group members

Scale 1-10 (1 = low, 10 = high)

Name	Score Q1 – Participation	Score Q2 – Complete assignment	ScoreQ3 – Listen to suggestions

How would you rate this activity overall ____

Would you like to do another activity like this again ____

Final Assessment Rubric

Categories	Score	1	2	3
Group participation		Self/peer and facilitator evaluation with average score of 1-3	Self/peer and facilitator evaluation with average score of 4-6	Self/peer and facilitator evaluation with average score of 7-10
Box chart		1 section complete with 1-2 points per section	2-3 sections complete with 2-3 points per section	4 sections complete with 4-5 points per section
Product		Medium used is not appropriate to role selected. 2-3 pieces of the following information is missing cause/effects of Tsunamis, prediction methods & impact on the topography	Medium used is appropriate to role selected. 1-2 pieces of the following information is missing cause/effects of Tsunamis, prediction methods & impact on the topography	Medium used is appropriate to role selected. Information includes all of the following cause/effects of Tsunamis, prediction methods & impact on the topography.
Reference selection/ Learning issues		Few references are properly cited & web source used has no completed evaluation forms; incomplete learning issue forms	Some references are properly cited & web source used has a completed evaluation form for at least 3; partially completed learning issue forms	All references are properly cited & each web source used has a completed evaluation form; completed learning issue forms
Presentation performance		Not entertaining, poor voice projection and no eye contact	Somewhat entertaining, good voice projection and some eye contact	Entertaining, excellent voice projection and eye contact