UNIT 5: NATURAL DISASTERS

PART 1: Weather hazards

1. Weather and climate

1.1. Lots of people do not know the difference between these two terms. Try to define both of them:

Weather:

Climate:

1.2. Write a sentence using the word weather and another one using climate.

Weather →

Climate →

2. Tornados

2.1. What is a tornado?

2.2. A **waterspout** is a funnel cloud over water. Waterspouts do not suck up water, the water seen in the main funnel cloud is actually water droplets formed by condensation. While many waterspouts form in the tropics, locations at higher latitude within temperate zones also report waterspouts, such as Europe and the Great Lakes. Search what waterspouts are called in the Balearic Islands.

2.3. Where in the world do tornadoes occur?

Tornado Alley is a colloquial term most often used to refer to the area of the United States in which tornadoes are most frequent. Schools in Tornado Alley often have tornado drills, and many homes have tornado shelters where people can go for safety.

What does drill stand for in the previous paragraph?

Use a US blank map and paint in green the area known as Tornado Alley. List all the states included in that area.

Find other places in the world where tornadoes are formed:

2.4. The _____ is a scale used for rating tornado strength, based on the _____ tornadoes cause on _____ and _____.

Complete the following table and assign a picture to each scale:

A 

B 

C 

D 

E 

F 

	Wind speed	Damage		Picture
F0		Small damage		
F1		Medium damage		
F2		Fairly bad damage		
F3		Bad damage		
F4		Very bad damage		
F5		Worst damage		

a. *Next summer we won't be able the go to a road trip, our mobile home is useless.*

b. *My parents lost their house last year. It was a strong building but they found it hundreds of meters away.*

c. *There are reports of two trains rolled over. Luckily there are no casualties.*

d. *There is a path of uprooted pines from the road to the lake.*

e. *Do you know anyone that can help me restore a chimney?*

f. *I was driving home when the wind pushed me off the road.*

g. *The street is full of branches*

h. *Do you know anyone that can fix my roof? It loosed part of the tiles last week during the tornado.*

i. *The dam has been damaged by the tornado*

j. *After last tornado season I had to rebuild my garage.*

k. *I parked my car outside my house but I found it three blocks away.*

l. *We need to remove the big tree from the road.*

m. *All frame houses off the neighborhood have lost their roof.*

n. *I have had problems to find this place, maybe some sign boards are missing since the last tornado.*

o. *When I returned home I found my mobile home upside-down.*

p. *I wish I had bought a house with stronger foundations, that way I could still have a home.*

q. *All houses off the neighborhood have lost their roofs.*

2.5. From the following list choose all safety tips that you need to follow to keep safe if you face a tornado.

- ❑ Go to the roof of the building.
- ❑ Stay away from windows.
- ❑ If you are in a school, do not go to the gymnasium.
- ❑ Stay away from the center of the building.
- ❑ Highway overpasses are one of the best places to hide.
- ❑ Avoid places that have a high ceiling.
- ❑ If you don't find shelter, get low in a ditch.
- ❑ Stay close to the center of the building.
- ❑ Avoid highway overpasses.
- ❑ If you are driving, park your vehicle far to the side and stay inside.
- ❑ Stay close to a window.
- ❑ Go to a place with a high ceiling.
- ❑ Squat near the wall, placing your hands on the back of you beck.
- ❑ If you cannot find shelter, find the lowest, most protected ground and cover your head with your hands.
- ❑ Go to the lowest floor of the building.
- ❑ If you cannot find shelter, run.
- ❑ If you are in a school, go to the gymnasium.
- ❑ If you are driving, park your vehicle far to the side and find a shelter.
- ❑ If you cannot find shelter, find the highest, most protected ground and cover your head with your hands.
- ❑ If you are driving, park your vehicle in the middle of the road.
- ❑ Go to the basement of the building.
- ❑ If you are driving, keep driving away from the tornado.

3. Hurricanes

3.1. A **tropical cyclone** or **hurricane** is a circular air movement over the warm ocean waters in the warm part of the Earth near the Equator. Most tropical cyclones create strong winds and heavy rains. While some tropical cyclones stay out in the sea, others pass over land, which can be dangerous because they can cause a lot of damage.

What is the difference between a hurricane and a **typhon**?

3.2. Some cyclones have their names retired. Can you say why some names are retired while others can be assigned to more than one cyclon in a six year cycle?

3.3. In the map of the US used in previous activities, paint in red the areas affected by the hurricane Katrina and in blue the states that are usually affected by hurricanes. List the name of the states here.

3.4. Use a blank map of the World and paint all areas affected by hurricanes. What do they have in common?

3.5. Search information about hurricanes Mitch, Rita and Katrina: year, countries affected, casualties, damages...

	Mitch	**Rita**	**Katrina**
Year			
Countries			
Casualties			
Damages			

PART 2: Geological hazards

4. Earthquakes and volcanoes

4.1. Read the piece of news *Canary Island volcanic eruption may be imminent* (09/29/2011) and answer the following set of questions:

Canary Island volcanic eruption may be imminent

The Canary Islands are on watch for what scientists believe is a pending volcanic eruption.

MADRID, SPAIN (Catholic Online) - The 108 square mile island of El Hierro is home to about 10,000 people. And the population is on standby orders for emergency evacuation. The island has seen thousands of small earthquakes in what seismologists refer to as an, "earthquake swarm." They believe the earthquake swarm is a sign that an eruption is imminent. Nearly 9,000 tremors have been detected in the last two months.

On Monday a 3.8 quake was felt across the whole island.

Volcanologists cannot be certain that the volcano will erupt, but they believe it is likely. Of greatest concern are landslides that are being triggered by the near-constant earthquakes. At least 50 people have already been evacuated because of landslide risk.

Schools on the island have been closed as well as a tunnel which links the two small towns on the island.

Scientists are saying that a ball of magma is rising to the surface and causing the seismic activity that has so many worried. Volcanologist Juan Carlos Carrecedo said, "We don't know if that ball of magma will break through the crust and cause an eruption." However, he warned that an eruption could certainly occur within days to months.

The last eruption in the Canary islands occurred in 1971 on the island of La Palma. The last eruption on El Hierro took place in 1793 and lasted for a month.

At this time, the Spanish government has sent rescue personnel to be ready to assist in evacuations, if needed. And volcanologists raised the alert level to "yellow" on Sunday, which is the highest alert status the island has seen in a very long time.

A volcanic eruption might not be all bad news for the tiny island. Some predict that the pending eruption could attract tourists who are interested in such things. Eumenio Ancochea, a volcanologist from Madrid's Complutense University told reporters, "An eruption could fill the island with people interested in these phenomenon. It's normal that people are scared but there is no danger. After an eruption the lava advances at a few meters per hour and you can easily take photographs as it descends."

The Canary Islands, much like Hawaii, are situated atop a hot spot in the Earth's crust through which magma boils to the surface. Both the Hawi'ian and Canary Island chains were formed in this way. Hawaii is still growing, and it appears that the Canary Islands are too.

Researchers are also noting that the island of El Hierro is not the well-known island of La Palma, which may be bisected by a previously undetected fault. Researchers have long warned that an eruption on La Palma could cause the island to split further in two (there is already a crack that bisects the island) and slide into the ocean.

This would cause a mega-tsunami that would virtually destroy every coastal city on the on the east coasts of North and South America as well as potentially wiping out cities in Western Europe and the Caribbean Islands.

a. There are a lot of technical terms in the text related to geology and natural disasters. Search all of them and try to write a brief definition of each one. You can also translate all these words into Spanish and Catalan in order to add them to your scientific vocabulary.

b. Why do you think seismic movements are used to predict volcanic eruptions?

c. In the text you can read “On Monday a 3.8 quake was felt across the whole island.” What does this number stand for?

d. Which is the maximum value of the Richter magnitude scale?

e. Which of the following adjectives is more suitable to define El Hierro earthquake swarms: micro, light, moderate, strong or great?

f. Japan and the Canary Islands are different and at the same time similar. Find which is the common origin of both groups of islands and in what way they differ (also related to the origin of the archipelago). [You need to send this answer via Moodle]

4.2. The Richter Magnitude Scale.

Read the information related to the Richter Magnitude Scale in the Moodle site or in other sources.

a. What is the strongest earthquake ever registered?

b. How many times stronger was the earthquake of Tohoku (Japan, 2011) compared to the earthquake of Lorca (Spain, 2011)?

4.3. Mark in a map the most important earthquakes. You can find a list of Largest earthquakes by magnitude and Deadliest earthquakes on record in the wikipedia article Lists of earthquakes. You have to create a map working with all the class. Use Google Maps to create the map. When you finish, one of you have to send me the link. The whole class will share the same mark. Since you are a lot of people working on the same map we expect a reasonable number of earthquakes and a little information on each of them (date, casualties…).

4.5. As in activity 4.3, make a map of all the volcanic activity of the Earth. Here you have a few lists of volcanoes. Add some information about each volcano (last eruption, active – dormant, country). Try to highlight all ongoing volcanic eruptions.

http://en.wikipedia.org/wiki/List_of_volcanoes

http://www.geo.mtu.edu/volcanoes/world.html

http://www.volcanolive.com/active2.html

http://www.infoplease.com/ipa/A0763388.html

4.4. Why is all the seismic activity on Earth grouped in certain areas? Look at the following links to see the recent seismic activity all around the world:

http://neic.usgs.gov/neis/qed/

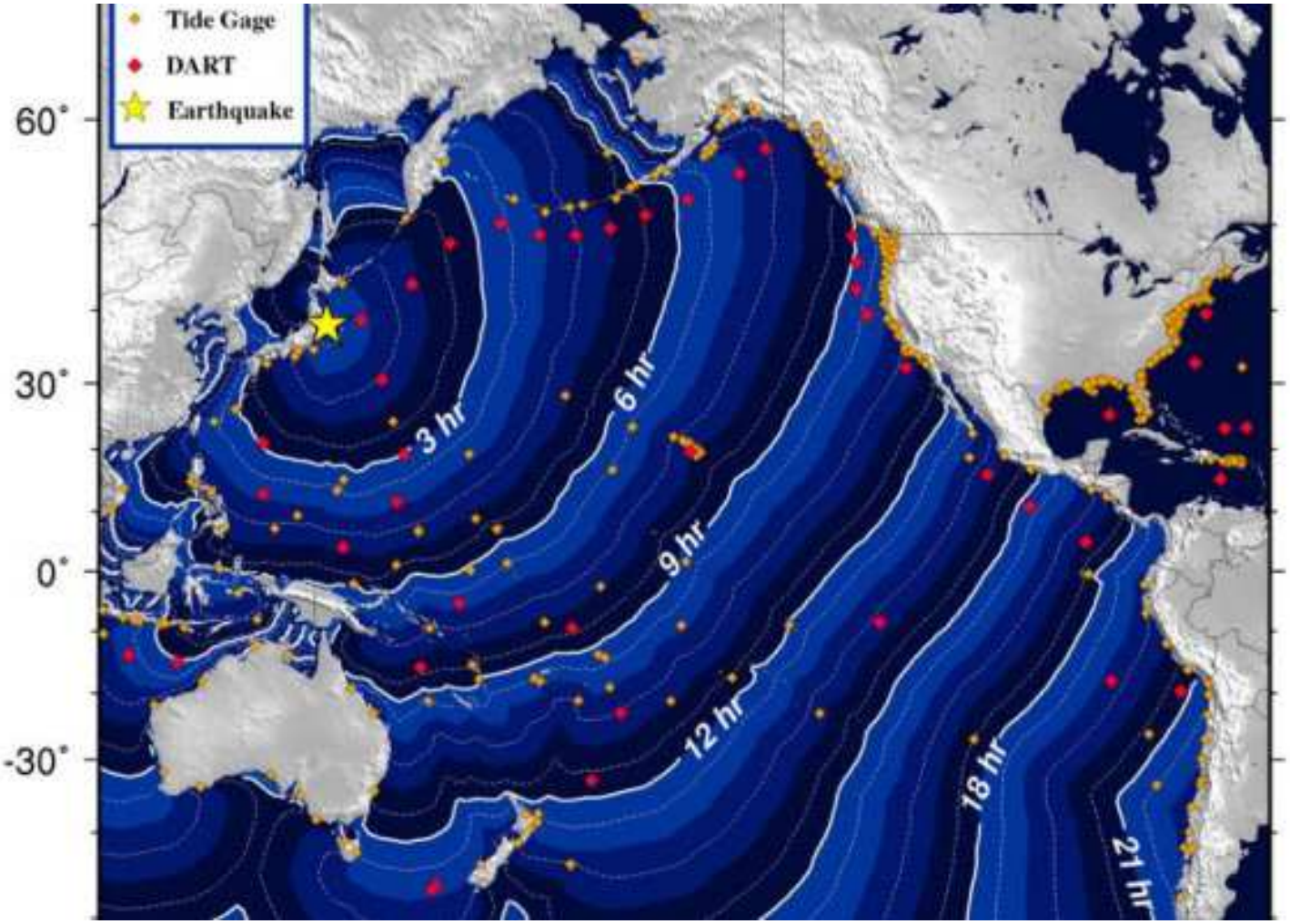
http://earthquake.usgs.gov/earthquakes/recenteqsanim/world/

5. Tsunamis

5.1. What is a tsunami?

5.2. How are tsunamis produced?

5.3. The following picture shows the propagation of the wave produced by the 2011 Japan earthquake through the Pacific Ocean. Try to calculate the speed of the wave (explain how you do that).



UNITED STATES

THE WORLD