

Year 12 Preparation for hazards and synoptic links to carbon cycle

Watch the 'Ring of Fire' documentary on YouTube which can be accessed via the following link <https://www.youtube.com/watch?v=wJS7hGMr0Ws> .

As you are watching answer the following questions. You can either print the sheet off and answer the questions, or write down your answers on paper. Once completed, check your answers using page 9 of this document.

Questions:

1. What fraction of volcanoes are situated on the Pacific Ring of Fire?

2. What percentage of earthquakes occur on the Pacific Ring of Fire?

3. Over the last 200 years how many lives have hazards in this area claimed?

4. How many miles long is the Pacific Ring of Fire arc?

5. What date did Krakatou, Indonesia erupt, creating the loudest sound in recorded history?

6. When Mt Pinatubo, Philippines erupted in June 1991, how many miles up into the atmosphere did the eruption eject volcanic debris into?

7. How many dollars worth of damage did Mt St Helens cause when it erupted in May 1980?

8. What percentage of volcanoes in the USA are situated in Alaska?

9. What type of volcano is Mount Saint Augustine Volcano, Alaska?

10. What has built up on the volcanoes sides (flanks)?

11. How does the viscosity of stratovolcano lava (acid lava) differ to that of Hawaii type lavas (basic lavas)?

12. What determines the viscosity of lava?

13. Ring of Fire lavas (acid lava) are rich in silica, how does this affect the shape of the volcano?

14. Why are volcanoes on the Ring of Fire explosive in nature?

15. Which mineral has been found in the acid lavas on the Ring of Fire?

16. What does this prove is present deep in the earth (mantle) that helps to create magma?

17. What are volcanic vents found around volcanoes that emit steam and gas called?

18. Which carbon isotope has been found in gases coming from vents found in the Cascade Mountains which proves oceanic sediments are linked to volcanicity?

19. What is subduction?

20. How is this process important in understanding how magma plumes form to cause eruptions and how oceanic sediments are linked to volcanicity?

21. What magnitude earthquake hit Mexico City in September 1985?

22. How many people died?

23. North America's greatest ever recorded earthquake was recorded in Anchorage, Alaska. When did it occur?

24. What did this earthquake do to shorelines in some regions of Alaska?

25. What is the evidence for this?

26. What magnitude was the earthquake?

27. How long did it last for?

28. What type of earthquake was it?

29. How big was the tsunami that was created by this earthquake?

30. How many people were killed by the 2004 Boxing Day Tsunami?

31. How many earthquakes occur in Alaska every month?

32. Which geographical features are the deepest on our planet and mark the point of subduction?

33. How do geographers know tectonic plates are moving?

34. How far is the North American plate moving westwards each year?

35. What is the name of the process that occurs in the mantle which drive continental drift and processes such as subduction?

Year 12 preparation for hazards: Hurricane Katrina Case Study

Watch 'Katrina, The New Orleans Nightmare: Documentary on the Devastation of Hurricane Katrina' on YouTube. It can be accessed via the following link:

https://www.youtube.com/watch?v=JEAedjLXw7Q&feature=emb_logo .

As you are watching, answer the following questions. You can either print the sheet off and answer the questions, or write down your answers on paper. Once completed, check your answers using the final two pages of this document.

Stretch and Challenge: Supplement the knowledge from this documentary by watching 'New Orleans after Katrina: A tale of two cities' on YouTube via the following link: <https://www.youtube.com/watch?v=602rez0ZA60>

Questions:

1. When did Hurricane Katrina become a category 1 hurricane?

2. What is the wind speed that a tropical storm needs to reach to become a hurricane?

3. What wind speed does a category 5 hurricane reach?

4. How many people were killed and how much economic damage occurred when Hurricane Katrina made landfall in Florida?

5. What is the minimum sea surface temperature that is needed for hurricane formation which was reached in the Gulf of Mexico?

6. How many people lived in New Orleans?

7. Which three water bodies surround New Orleans?

8. How much lower are the city's streets than the Gulf of Mexico on average?

9. What was the issue with many of the levees surrounding New Orleans?

10. What does FEMA stand for?

11. What does FEMA do?

12. Why was the evacuation of oil rigs in the Gulf of Mexico a national impact?

13. When did Katrina become a category 3 hurricane?

14. The Superdome was opened as a shelter for people to use as a last resort. Why was this seen as being a good location for such a shelter?

15. What did 10,000s people in New Orleans decide to do?

16. Why?

17. How many people did not have personal transportation according to the New Orleans Emergency Management Plan?

18. What was the poverty rate in New Orleans? 23%

19. Which part of New Orleans did many of the poorest residents live within?

20. What is the issue with housing in this area?

21. Why was FEMA not as effective a government agency as it had previously been?

22. The levee systems and concrete flood walls around new Orleans were built to what height?

23. What were they designed to protect New Orleans against?

24. What is a storm surge?

25. When did Katrina become a category 4 hurricane?

26. When did Katrina become a category 5 hurricane?

27. What did the mayor of New Orleans (Ray Nagin) decide to announce when it was predicted that Katrina would make landfall within 24 hours?

28. How many people were in the Superdome by nightfall?

29. When did Katrina make landfall?

30. What happened to the roof of the Superdome?

31. When were the levees of New Orleans overtopped?

32. How high did flood waters reach in East New Orleans?

33. What happened to levee walls on the London Avenue Canal and 17th Street Canal at 10:30am?

34. What was the problem with media reports from New Orleans communicated back to Washington D.C?

35. What was the issue with relief efforts in the aftermath?

36. What did ABC News' New Orleans correspondent report had happened to levees?

37. On Tuesday 30th August 2005, what was the problem with national media reports?

38. What percentage of the Greater New Orleans area was submerged by floodwater?

39. How many homes were destroyed in the city itself?

40. What did the floodwater contain that made it even more hazardous?

41. How many police officers deserted their posts during the hurricane?

42. Why was this an issue?

43. What was the problem for local, state and federal officials in the immediate aftermath?

44. What was the issue with getting vital resources to those inside the Superdome?

45. How many people did the Superdome population increase to?

46. What other issues occurred inside the Superdome?

47. Where did over 25,000 residents and tourists flock to for refuge?

48. What was the issue with this?

49. What was the issue with the US Army's strategy of repairing the levee breaks using sandbags?

50. What problems did the broken levees create?

51. Why couldn't New Orleans use its pump system to remove floodwater?

52. What was ordered on Tuesday 30th August 2005 10:15pm?

53. Why could FEMA not get supply trucks into the city 48 hours (Wednesday 31st August) after the hurricane made landfall?

54. What did Mayor Nagin order police to do?

55. What was inaccurately reported as occurring in the Superdome and Convention Centre?

56. 200 deaths were reported to have occurred in the Superdome. How many were there in reality?

57. Why was the Louisiana National Guard and relief effort not taken over by The Federal Government?

58. What did some individuals (such as Jabbar Gibson) do due to the ineffective coordination of response efforts?

59. How long did it take to evacuate the Superdome?

60. Why was the offer of assistance from the Red Cross declined by Louisiana officials?

61. What did Army core engineers begin doing on Tuesday 6th September?

62. What percentage of New Orleans was still under water 11 days after Katrina made landfall (Friday 9th September)?

63. How many people were being sheltered by government agencies and volunteer groups?

64. Why were local officials concerned that generators had not been sent into the worst hit areas of New Orleans?

65. What did Director of FEMA, Mike Brown, do due to criticism of the response of the government agency?

66. When did President Bush accept responsibility for the failure of Federal Government to respond effectively to Hurricane Katrina?

67. Which hurricane entered the Gulf of Mexico on Tuesday 20th September 2005?

68. When did it make landfall in Louisiana?

69. Were responses judged to be more or less effective to this hurricane?

70. Who did Mike Brown blame for the failure?

Ring of Fire' documentary answers

1. $\frac{3}{4}$
2. 90%
3. 1 million
4. Approx 25,000 miles
5. August 1883
6. 22 miles
7. \$1 billion
8. 75%
9. Stratovolcano
10. Solidified lava flows (blocky lava)
11. It is more viscous
12. How much silica it contains
13. Makes them tall and cone-shaped (stratovolcanoes)
14. Viscous magma traps gas bubbles, which have formed due to pressure reduction as the magma rises towards the surface. This causes a build up of pressure, until it is overcome as an explosive eruption.
15. Hornblende
16. Water
17. Fumaroles
18. Carbon-12
19. What is subduction? When sea floor (oceanic plate) slides under continental plate.
20. It allows sea water (loaded in the oceanic plate) to get into the mantle, which is melted by the water to help create magma plumes. Subduction enables sedimentary rock (made from ocean sediments) to get into mantle which melts to rise as a magma plume to create volcanicity.
21. 8
22. More than 9,000
23. March 1964
24. Raised them due to tectonic uplift.
25. Relic beaches found inland
26. 9.2
27. 4.5 minutes of ground shaking
28. A mega-thrust earthquake
29. 200ft high
30. More than 200,000
31. 1500
32. Oceanic trenches (subduction trenches)
33. GPS data
34. 3 inches
35. Convection currents

Katrina, The New Orleans Nightmare ANSWERS

1. Thursday 25th August 2005
2. 74 mph
3. 155mph
4. 14 people and \$460m
5. 80 degrees Fahrenheit/27 degrees Celsius
6. Approx 500,000
7. Gulf of Mexico to south, Lake Pontchartrain to north and Mississippi meanders through it.
8. 6 ft
9. Sinking and in need of repair
10. Federal Emergency Management Agency
11. Works with states to create strategies and responses
12. 25% of USA oil and natural gas production comes from the Gulf of Mexico
13. Saturday 27th August 2005
14. Can hold a lot of people (70,000 seats) and designed to withstand winds of 200mph.
15. Stay
16. People didn't have anywhere else to go if they evacuated.
17. 100,000 people (over 20%)
18. 23% (over double the national average)
19. The Ninth Ward
20. Poor quality and can be 4ft below sea level
21. After 9/11 it was downgraded and was no longer a cabinet level agency. No longer in The White House
22. 13-18ft
23. A storm surge of a category 3 hurricane
24. When high winds push large amounts of water above normal sea level into large waves (often the storm winds and waves combine with high tide and low air pressure to make sea levels even higher).
25. Sunday 28th August 2005 12:40am
26. Sunday 28th August 2005 7:00am
27. A mandatory evacuation (was not actively enforced by police)
28. Nearly 10,000
29. Monday 29th August 2005
30. Sections blown off by hurricane force winds.
31. 7:00am Monday 29th August 2005
32. 12ft above sea level
33. They failed
34. Gave a sense that impact was not as bad as it really was.
35. The relief efforts between different actors were uncoordinated.
36. That they had been overtopped, not broken.
37. Did not portray how badly New Orleans was actually affected.
38. 80%

39. 200,000
40. Mud, gas, sewage, chemicals
41. 249
42. Depleted police force made response limited
43. They did not have a clear understanding of the situation which severely limits successfulness of responses.
44. Floodwaters meant trucks could not deliver vital food, water or medicine.
45. Over 20,000
46. Toilets overflowed, causing pollution and dangers to health
47. New Orleans Convention Center
48. Local authorities never intended to use it as a shelter, so it had no supplies. National Guard and FEMA were unaware people were taking shelter here initially. Many left outside for days afterwards.
49. The bags were too small and floodwaters carried them away.
50. Trapped floodwaters inside the city
51. They were either broken or full of debris
52. Full evacuation of Superdome to other shelters and Houston Astrodome
53. Floodwaters still blocked access
54. Stop search and rescue and focus on law and order to reduce looting.
55. Mass violence, murder and rape.
56. 6 deaths (4 natural causes, 1 drug overdose, 1 suicide)
57. It was reported that The Governor of Louisiana rejected this, fearing damage to her political reputation. This is disputed however.
58. Took matters into their own hands – Jabbar took a school bus and started evacuating citizens in need to the Houston Astrodome, Texas
59. 3 days
60. Could not guarantee safety of Red Cross workers and their vehicles may disrupt rescue efforts.
61. They began to pump water out of New Orleans back into Lake Pontchartrain and the Mississippi
62. Over 50%
63. Approximately 250,000
64. Sewage systems could not work without them, meaning sewage was going into the street and potentially affecting the health of citizens further.
65. Resigned
66. Tuesday 13th September 2005
67. Hurricane Rita
68. Saturday 24th September
69. More
70. Local and state authorities (Mayor Nagin and Governor of Louisiana, Kathleen Blanco) who did not work together