**GeoSci 1060 – Exam 2 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Describe how to complete an assessment of geological hazards. Use the terms hazard, risk and vulnerability in your answer. Use your notes and the information on pages 124-127 of your text.
   1. When assessing geological hazards it is important to determine the probability of an event. You then get the risk by taking the probability that it will happen \* the consequences. Some areas are subject to a higher vulnerability than others though, we can use general locations for doing this. An area by a mountain for example may be more prone to earthquakes than a flat area.
2. Describe why geologists and other scientists forecast rather than predict geological hazards. Include the 4 parts of a forecast in your answer. Use your notes and the information on pages 124-127 of your text.
   1. Because geological hazards are random events, geologists would rather forecast than predict so that a specific date doesn't have to be provided. When forecasting they Identify the location where a hazardous event will happen, then determine the probability and magnitude this event will be, then note the precursors, finally they make their official prediction and warn the public.
3. As discussed in class, two of the major concepts in environmental studies are population growth and sustainability. Summarize the information section 5.5 of your text (pages 130-133) about population, Land Use and Hazards.
   1. As the population increases, the way that we use the earth around us changes also. We begin to modify the earth. One of the examples in the book is a river in China flooding because trees were cut down. This caused for the river to flood easier. So as we use the land, sometimes we may change how hazards being to influence us.
4. Use you notes and information in your text to describe the types of landslides, role of earth materials, slope, climate, water and time in determining the likelihood of a landslide.
   1. There are a few types of movements that constitute a landslide. Things like rock falls, dep failure of slopes, and shallow debris flows. These will either deal with rock flow or soil flow and are usually driven by gravity. Sometimes things like rain or flooding will set off landslides, or sometimes its just time and human interaction that causes a landslide.
5. Define fault and the earthquake cycle/elastic rebound theory. Also, list the 3 rules of energy in your answer, and list the two main ideas we discussed regarding earthquakes?
   1. A fault is where a rock has been cracked or displaced, usually a long stretch of ground. A fault is very important when looking at earthquakes. An earthquake happens when pressure build up on the fault and releases. The elastic rebound theory is how the movement is tracked in an earthquake. You reference the rock before the earthquake, during the earthquake, and after the earthquake. Typically when talking about earthquakes we follow the rule that there are fewer bigger earthquakes than smaller ones, and the farther away you are, the less you will feel.
6. Describe how to find an earthquake epicenter and an earthquake magnitude. As part of the answer indicate how many magnitude 7 (Wasatch) earthquakes it would take to equal the energy released during a magnitude 9 (Japan) earthquake.
   1. To find the epicenter of an earthquake, you need to have 3 seismographs. By using these we can triangulate the center of an earthquake. When finding the magnitude we have to use the shaking (mm/ the distance or time). A 9 magnitude earthquake puts out around 1000 times more energy than a magnitude 7 because its measured logarithmically.
7. Describe the main types of volcanoes and the type of plate boundary associated with each type of volcano. Give an example (St Helens etc.) of each type of volcano and indicate the location and name of the largest volcanic eruption in historical times.
   1. A cinder cone volcano is small and made of cinders without very much lava. Strato or composite volcanoes are large, and made of ash. These ones are found by convergent plates. Then there are Shield volcanoes which are huge and usually found by Hawaii. These types usually form together and form huge islands. The last type is a fissure eruption which is just a crack in the ground that large volumes of basalt are erupted from kind of by oregon and washington.
8. What is magma and what are the main properties of magma. Why do some volcanoes explode and others erupt more quietly? Which type usually explodes? Also, briefly describe the VEI. Use class notes and text as needed.
   1. Magma is hot melted rock. There are two types, silicic and mafic. They are measured by their viscosity, gases they contain, the pressure they are in, and their temperature. The way that magma erupts is based on all of these properties. For example magma that is under a higher pressure may be more likely to erupt than magma that isn't under a lot of pressure. There is no one set way to measure an eruption, but the VEI is commonly used. This takes in a lot of different factors that may help to describe how bad an eruption was.
9. What happened at Nevado del Ruiz and Mt Pinatubo in terms of loss of human life, and why is hazard communication important? Use your notes from class discussion and text on pages 277 and 132-133.
   1. Nevado del Ruiz was essentially buried after a volcanic eruption. Not only had this happened in the past, but they rebuilt and it happened again. There were people that tried to warn them but nobody listened and as a result thousands of people were buried alive. Something similar happened in the Philippines when Mt Pinatubo erupted, the only difference was people listened to the warnings, and only about 300 people ended up dying.
10. Summarize the information in sections 6.1 and 6.5 of your text about Historical Use and Effects of Land Use Changes as related to flooding.
    1. As we start to modify rivers, we change how they control flooding. As we begin to modify the path that they travel we change their velocity, which in turn controls how much sediment they can carry. The result of all of this is more unplanned, unnatural flooding.
11. Summarize the information in section 6.8 of your text about Urbanization and Flooding.
    1. As we begin to urbanize the land around us, we reduce the area of land that can help handle the water from rain. Things like cement and asphalt prevent water from sinking into the ground. Because of this we need storm drains to help guide the water to safety. There is always the possibility of those drains becoming clogged with sediment, which will cause flooding.
12. What is a flash flood? What is a 100-year flood? Use the information on pages 148-150 of your text and these webpages: <http://water.usgs.gov/edu/100yearflood.html> and <http://www.8newsnow.com/story/26477250/i-15-closed-for-days-flooding-impacting-overton-logandale>
    1. A flash flood is a flood that happens on the upper part of the drainage basin and is a result of heavy rainfall for a period of time. Although these don't really affect the rivers downstream, they can be really harmful to local areas. A 100-year flood isn't a flood that happens every year, its a flood that has the probability of happening every 100 years. We could have one 3 times in one year, but it would be very unlikely.
13. Describe the concepts of gradient and base level as applied to rivers and streams. How do dams affect this process?
    1. Base level is the lowest area a river can usually flow to, this would typically be the ocean which is what is called the ultimate base level. However if a dam is introduced into a river, that will modify the base level and reduces the gradient and reduces the velocity of the stream. This helps control the amount of sediment that is carried through the river ultimately helping with erosion.
14. Use the information in your book (section 7.3) and notes and describe the ideas of driving force, resisting force and slip surface as used in landslide studies. As part of the answer list some ways to prevent landslides (things you should and should NOT do).
    1. The driving force in relation to a landslide is the usually the weight of the material or the gravity. The resisting force is the “strength, or the resistance to failure by sliding or flowing of the slope material acting along potential slip planes.” To prevent landslides we should avoid tampering with slopes or areas by slopes. Also we should perform vulnerability assessments looking for things like slopes, water saturation, vegetation growth, and irrigation.