

Answers – Handout 75

- **What is magnitude?**
 - The amount of energy release by an earthquake.
- **What scale is used to measure magnitude?**
 - The Richter Scale.
- **How is the magnitude of an earthquake determined?**
 - It is based on the largest amplitude of the seismic wave (in relation to epicenter distance).

Answers

- **Summarizing the last paragraph on p. 57.**
 - For every 1.0 increase in magnitude on the Richter Scale, there is a 10x increase in amplitude on a seismogram and there is 32 times more energy released.
 - The larger the earthquake magnitude, the longer the earthquake lasts.

Answers

- **How much more energy in a 7.2 than a 6.2?**
 - 32 times more energy because the difference in magnitude is 1.0.
- **Challenge:** How much more energy in a 6.7 than a 5.4?
 - About 90 (89.124). Energy released is calculated by raising 31.6227 to the power of the magnitude (or difference). Ex: $31.6227^{1.3} = 89.124\dots$

Answers

- **What is the relationship between magnitude and frequency?**
 - The higher magnitude of earthquake, the less frequently it occurs in a year.
- Or
- The lower magnitude of earthquake, the more frequently it occurs in a year.

Answers

- **What is intensity?**
 - Intensity describes the kind of damage done by an earthquake, as well as people's reaction to the damage.
- **What factors affect intensity?**
 - Distance from the epicenter, earthquake depth, population density, local geology, type of building construction, duration of the shaking, and magnitude.

Answers

- **Intensity of an earthquake that scares children with falling furniture and the loss of Santa's entrance?**
 - VIII (yes, it must be written as a Roman numeral)
- **Intensity of an earthquake where a parent mistakes an earthquake as a burp and a car alarm?**
 - III

Answers

- **Will two people at an equal distance from the epicenter experience the same magnitude?**

– Yes. A couple ways to explain this:

- Magnitude is a measure of energy released by the earthquake. No matter where you are, the energy released at the epicenter is still the same.
- Magnitude is measured by wave amplitude. If you're the same distance, you'll measure the same wave.

Answers

- **Will two people the same distance from the epicenter experience the same intensity?**

– No. There are a number of factors that will affect this. Although they may be the same distance, their area may be different and therefore they will experience the earthquake in different ways (i.e. think of the 3 little pigs: same wolf magnitude, different intensity based on their houses).