

The subject areas for this test include Marshak, 2004, Chapters 9, 10, 11, 12, and 13.

1. Crustal Deformation and Mountain Building (Marshak, Chapter 9)

- a. Know definitions to the Key Terms listed on the webpage.
- b. What is orogenesis and where does it occur?
- c. How do geologists recognize ancient orogenic belts?
- d. What are the different types of stress and strain?
- e. Compare and contrast brittle vs. ductile deformation. Where in the crust do each occur?
- f. What are strike and dip measurements and how do geologists use them?
- g. How does a joint differ from a fault? How do joints form?
- h. How do fault blocks move in a normal fault, a reverse fault, a thrust fault and a strike slip fault?
- i. What is the tectonic setting of normal, reverse and thrust faulting?
- j. What is the difference between a reverse fault and a thrust fault?
- k. Draw and label the axial plane, fold axis, hinge and limbs of an isoclinal fold.
- l. Draw an anticline and a syncline..
- m. How do geologic structures change crossing from undeformed land toward an orogenic belt?
- n. What are cratons and what do they reveal about past orogenic events?
- o. What are suspect terranes, how do they form and where are they observed?

2. Deep Time (Marshak Chapter 10)

- a. Know definitions to the Key Terms listed on the webpage.

- b. List a chronologic sequence of events based on a relative and an absolute time scale.
- c. Describe why the principle of uniformitarianism is important to geologic thinking?
- d. How do geologists use superposition, original horizontality and cross-cutting relations?
- e. What is the principal of fossil succession?
- f. Describe the special significance of an angular unconformity.
- g. Describe how radiometric dating is used. How does it differ from absolute dating?
- h. What is an isotope? What is a half-life?
- i. What is the age of the earth and how is this age arrived at?
- j. What is the age of the earth and how do know this value?
- k. Know the major subdivisions of the geologic time scale (pp. 290 and 299).

- I. What do the following time names mean? Hadean; Archean; Proterozoic; Phanerozoic; Paleozoic; Mesozoic; Cenozoic; Tertiary; Quaternary.

3. Earth History (Marshak Chapter 11)

- a. Know definitions to the Key Terms listed on the webpage.
- b. List the methods by which geologists study the past.
- c. What are the major divisions of the geologic time scale?
- d. Be able to recreate the names and the dates that define the Phanerozoic portion of the geologic time scale that appears in your book. Practice. You are **guaranteed** to see it on the exam!
- e. What was the Earth like during the Hadean? What was life like then?
- f. What was the Earth like during the Archean? What was life like then?
- g. How were plate tectonics different in the Archean?

Eon	Era	Period	Epoch	Ma
	Cenozoic	Quaternary	Holocene	0.011
			Pleistocene	1.8
		Tertiary	Pliocene	5.3
			Miocene	23
			Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5
	Mesozoic	Cretaceous		145
		Jurassic		200
		Triassic		251
	Paleozoic	Permian		299
		Pennsylvanian		318
		Mississippian		359
		Devonian		416
		Silurian		444
Ordovician			488	
Cambrian			542	

- h. What is the significance of banded iron formations?
- i. What is Rodinia? Pannotia? Pangea?
- j. What defines the Pre-Cambrian - Cambrian boundary?
- k. What happened to North America during the Paleozoic?
- l. What is the Mesozoic known for?
- m. What do geologists think is indicated by the K-T Boundary Event?
- n. Know the salient features of the Evolution of Life time line in your book..

4. Energy Resources (Marshak Chapter 12.1 to 12.10)

- a. Know definitions to the Key Terms listed on the webpage.
- b. Why are fossil fuels correctly considered to be "fossilized sunshine?"
- c. What is the chemical reaction that embodies your answer to 4b above.
- d. What geologic materials are petroleum source rocks? Petroleum reservoirs?
- e. What is thermal cracking and why is it a necessary step in petroleum formation?
- f. What is the oil window and where does it occur?
- g. "Timing everything" relative the geologic formation of petroleum? What does this mean?
- h. How do tar pits and tar sands form?
- i. What is the origin of natural gas?
- j. Coal forms only in specific sedimentary environments. Why?
- k. Abundant coal and lignite accumulation has occurred several times in Earth history. Why?

- l. What is the difference between peat, lignite, bituminous coal and anthracite?
- m. What are some of the most significant environmental impacts of coal combustion?
- n. Write the chemical reaction describing CO₂ release by fossil fuel combustion (Hint: see 4c).
- o. What are the primary differences between nuclear fission and nuclear fusion?
- p. What is Hubbert's Peak and how has it been used to predict oil U.S. and global oil production?
- q. What do YOU think humanity will do when the petroleum resource is exhausted?

5. Mineral Resources (Marshak Chapter 12.11)

- a. Know definitions to the Key Terms listed on the webpage.
- b. Human history is interwoven with mineral exploitation. Describe some important examples.
- c. Give 4 examples of metallic mineral resources? Non-metallic mineral resources?
- d. Give 5 examples of ore minerals and the elements they are mined to recover.
- e. How are ores processed to recover mineral resources?
- f. What are the geological processes by which ore minerals are concentrated?
- g. Describe the special mechanism of mineral formation occurring at the mid-ocean ridge.
- h. How does a primary mineral differ from a secondary mineral?
- i. What is a placer deposit and how does it form?
- j. How are mineral resources discovered?
- k. How are mineral resources extracted?
- l. How does mineral extraction create acid mine drainage; what does AMD do to the environment?

6. Mass Movements (Marshak, Chapter 13)

- a. How does the rate of motion influence the kind of mass motion?
- b. What processes result in soil creep and what land features exhibit creep effects?
- c. Draw and label the features of a rotational slump block.
- d. What are the characteristics of a mudflow, a debris flow and a lahar?
- e. What drives mass movement? What resists mass movement? Why does movement occur?
- f. What is the angle of repose? How do material properties influence this angle?
- g. What special roles do water and vegetation play relative to slope stability?
- h. How could the natural disasters at the Vaiont Dam and Caraballeda, Venezuela have been averted?
- i. How can ancient mass movements be recognized?
- j. How can future mass movement destruction be prevented?