

GS104 Mid-Term Study Guide - Fall 2002

BRING A SCANTRON, PENCILS, PENS, AND CALCULATOR TO THE EXAM!

RECOMMENDED STUDY TECHNIQUES

- 1) Follow the "How to Study Physical Science" guide available on the web site.
- 2) use the concepts below as a guide to help you focus on your notes
- 3) memorize terms and concepts (make flash cards, rewrite definitions 100 times, etc.)
- 4) go back over the labs and make sure you can do the tricks / skills
- 5) review the important figures in your lab manual and text
- 6) review your homework questions and answer sheets, they will be on the exam
- 7) study until you're sick of it, then study some more until you pass out
- 8) change your socks and drink plenty of water
- 9) clean your room....

NOTE: This is only a guide and not a comprehensive listing of all material covered. You are responsible for knowing what material was covered in the textbook readings, class notes, lab exercises, and lectures. Some of this material may or may not be on the exam; other material may be on the exam that is not listed here.

Key Words

Introduction

Earth System Science

system

astronomy

geology

meteorology

oceanography

geosphere

atmosphere

hydrosphere

biosphere

inner core

outer core

mantle

crust

oceanic crust

continental crust

asthenosphere

nitrogen-oxygen-carbon dioxide

photosynthesis

earth rotational axis

scientific method

observation

hypothesis

hypothesis testing

model

theory

law

mass

matter

energy

kinetic energy

potential energy

thermal energy

mechanical energy

law of energy conservation

system

model

solar system

earth system

boundary conditions

open system

closed system

isolated system

energy and mass flux

energy-mass cycles

positive feedback

negative feedback

examples of feedback

global warming

greenhouse effect

energy cycle

solar energy

photosynthesis

hydrogen fusion

ROYGBIV

infrared radiation

ultraviolet radiation

geothermal energy

examples of geothermal

albedo

energy absorption / reflection

heat transfer

convection

conduction

radiation

Earth Controls:

solar energy

geothermal energy

gravity

age of earth

4.6 b.y.

big bang

rock record

fossils

uniformitarianism

Math Review

scientific notation

metric system

English system

unit algebra

unit conversions
 length
 time
Basic Science Review

 hypothesis
 fact
 law
 theory
 model
 observational data
 experimental data
 hypothesis testing / validation
 matter
 elements
 compounds
 atom
 nucleus
 proton
 neutron
 electron
 time
 distance
 velocity
 force
 weight vs. mass
 friction
 heat energy
 Newton's law of gravitational
 attraction
 phases of matter
 solid
 liquid
 gas
 heat flow
 pressure differential

Universe / Solar System

 Earth system
 rotational period
 rotational direction
 orbital period
 lunar cycle
 lunar system
 lunar cycle
 full moon
 new moon
 lunar orbital direction

mass
 volume
 density
 terrestrial planets
 jovian planets
 "gas giants"
 planets: m,v,e,m,j,s,u,n,p
 "sun" / star
 planet vs. moon
 star vs. planet
 milky way
 comet
 asteroid
 meteoroid / meteorite
 EM Spectrum
 gamma ray
 x ray
 uv radiation
 ROYGBIV
 infrared
 radio
 wavelength
 frequency
 amplitude
 speed of light
 visible light
 light year
 doppler effect
 red shift star
 blue shift star
 nebular hypothesis
 know your planet
 characteristics
 heliocentric
 geocentric
 gravity
 $c = \text{wavelength} \times \text{frequency}$

Plate Tectonics

 Mineral
 Element
 Rock
 Rock Types
 Igneous
 e.g. basalt
 e.g. granite
 Sedimentary
 e.g. sandstone

velocity

 Metamorphic
 Magma
 Lava
 Weathering
 Sediment
 Volcano
 Earthquake
 Seismology
 Crust
 Oceanic (basalt)
 Continental (granite)
 Lithosphere (Plate)
 Crust
 Upper Mantle
 Asthenosphere
 Silly Putty
 Deep Mantle
 Outer Core (solid)
 Inner Core (liquid)
 Plate Tectonics
 Alfred Wegener
 Continental Drift
 Plate Boundaries
 Convergent
 Divergent
 Transform
 Convergent
 Subduction
 Trench
 Volcanic Arc
 (e.g. Cascades)
 Plate Destruction
 accretionary tectonics
 Divergent
 Seafloor Spreading
 Mid-Oceanic Ridge
 Plate Creation
 Transform
 Fault
 e.g. San Andreas
 e.g. Offset Mid-
 Ocean Ridge
 Alfred Wegener
 Continental Drift
 Jig-Saw Fit of Continents
 Pangaea

Match-up of Fossils
Match-up of Geology
Modern Evidence
Emperor Seamount
Seamounts
Volcanic Islands

Seismic Distribution
Volcanic Distribution
Trench Distribution

Hot Spots
Hot Spot Tracks
Hawaiian Islands

Plate Motion Rates
1-10 cm/yr
Plate Driving Mechanism
Internal Heat
Radioactive Source
Heat Exchange
Mantle Convection
Convection cells
rising hot rock
sinking cool rock

earthquake
source of earthquakes
fault
volcanism
man-induced
earthquake epicenter

Key Concepts

Can you identify examples of open, isolated, closed systems?
Can you identify examples of positive and negative feedback?
What do you know about the energy cycle?
Can you sketch the interior of the Earth?
Can you complete basic unit calculations from English to Metric and vice versa?
Can you calculate density?
How about Newton's law of gravitational attraction?
If given conversion factors, can you work a unit conversion problem?
What is the scientific method? Can you list the elements of the process?
Which direction does heat flow and why?

Why does a hot air balloon rise? Why do hot rocks rise? Why does magma rise, Why do their cold counterparts sink?

What is the difference between a star and planet? A planet and moon? A galaxy and solar system?
Explain why we look back in time when we look into space?
How do we analyze stars and formulate hypotheses such as the big bang?
Can you list 3 essential characteristics of each of the planets? Can you name the planets in order from the sun?

Can you draw and label a diagram of the lunar cycle
Can you draw and label a diagram of the seasonal climate cycles of the Earth? Why do we have seasons?
Why is gravity important with respect to celestial mechanics?

What types of geologic features are found at what types of plate boundaries? (e.g. volcano, earthquake,

mountains, volcanic islands?)

Can you draw and label a cross-section of a subduction zone? a seafloor spreading center?

How do we know that Hawaii is located over a hotspot? What is a hot spot ?

What is the difference between continental drift and plate tectonics?

How did the theory of plate tectonics evolve?

Can you draw a diagram of the plate tectonic setting of the Pacific Northwest?

Can you associate / match plate tectonic setting to geologic/geographic areas, as discussed in class?

Example Test Questions

1. The geosphere is composed of

a. hydrosphere, lithosphere, biosphere

b. rock and soil

c. meteorites

d. oceans, lakes, rivers, plants, animals

2. A system that allows energy but not matter to cross its boundaries is called:

a. open

b. closed

c. isolated

d. dead meat

e. none of the above

3. True or false: the earth is 3.7 billion years old.

4. An _____ system is one in which neither mass nor energy are in flux.

5. True or False: the solar system formed 4.5 billion years ago.

6. Newton's second law of gravity is expressed as $F = \frac{GMm}{r^2}$

7. The acceleration due to gravity is _____.

8. The terrestrial planets are comprised of:

a. rocky material

b. gas and liquid

c. hydrogen

d. none of the above

9. True or False: oceanic crust is thinner and less dense than continental crust.

10. List the planets of the solar system in alphabetical order.

11. True or False: the sun is an example of a red giant star.

12. Visible light forms a portion of the _____.

13. Mid ocean ridges commonly occur at _____ boundaries.

14. Convergent margins

a. occur where two plates are moving toward each other

b. are characterized by mid-ocean ridges

c. involve formation of new crust

d. none of the above.

15. A star is 2.5 light-years away from Earth. Given that the speed of light is 3×10^8 m/sec, how many kilometers is the star away from the Earth? (hint $V = d/t$, 1 yr = 365 day). Show all of your math work and unit algebra.