ES104 Final Study Guide - Fall 2006

RECOMMENDED STUDY TECHNIQUES

1) review 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 some of the important figures in your lab manual and text
6) go back over the previous study guides
7) be able to link the terms to concepts, and the concepts to Earth processes
8) Go to the class website and view all "Slide Shows/Figures / Overheads to Accompany Class Notes"
    Plate Tectonics
    Solar System / Stars / Universe Figures
    Seismology / Earthquake Figures
    Periodic Charts of the Elements
    Mineral Identification Guide
    Rock Identification Guide
    Volcanism / Igneous Activity Figures

I would spend a MINIMUM of 10-12 hours studying for this exam... if I wanted to do well! WARNING - this exam is worth 125 points - it could make or break your grade! Study now!

Key Words for New Material Since Mid-Term

Plate Tectonics

Mineral
Element
Rock
Rock Types
Igneous
e.g. basalt
e.g. granite
Sedimentary
e.g. sandstone
Metamorphic
Magma
Lava
Weathering
Sediment
Volcano
Earthquake
Seismology
Crust
Oceanic
Continental
Lithosphere (Plate)
Crust
Upper Mantle
Moho
Asthenosphere
Silly Putty
Deep Mantle
Outer Core
Inner Core
Plate Tectonics
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 Wegner
Continental Drift
Jig-Saw Fit of Continents
Pangaea
Match-up of Fossils
Match-up of Geology
Modern Evidence
Paleomagnetism
Seafloor Stripes
Polar Wandering
Normal Polarity
Reverse Polarity
Seismic Distrib.
Volcanic Distrib.
Trench Distrib.
Hot Spots

Hot Spot Tracks
Hawaiian Islands
Emperor Seamount
Seamounts
Volcanic Islands
Subduction Zone Types
Oceanic-Oceanic
e.g. Japan
Oceanic-Cont.
e.g. Cascades
Cont.-Cont.
e.g. Himalayas
Plate Motion Rates
1-10 cm/yr
Continental Rifting
e.g. Red Sea

Plate Driving Mechanism
Internal Heat
Radioactive Source
Heat Exchange
Mantle Convection
Convection cells
rising hot rock
sinking cool rock
Ridge Push
Trench Pull
Density Driven

earthquake
epicenter
Earthquake Material
subduction zone earthquakes
crustal earthquakes
volcanic earthquakes
paleoseismology
last PNW big event = 300 yr
tsunami deposits (sand)
bay mud
coastal uplift
coastal subsidence
marsh submergence
tsunami cycle
Risk Factors
GPS / ground motion
hazard
risk

focus
wave refraction
wave reflection
s-wave shadow zone
p-wave shadow zone
seismic risk
seismic hazard
p wave
s wave
compressional wave
shear wave
surface wave
love wave
San Andreas Fault
Hayward Fault
Loma Prieta Earthquake
fault creep
stick-slip
fault
blind fault
seismic waves
source of earthquakes
normal fault
reverse fault
strike slip fault
fault strand
fault zone
fault segment
ductile deformation
elastic deformation
brittle deformation
elastic rebound
alluvium
bedrock
groundwater
Monmouth hazards
Willamette Valley hazards
saturated sediments
ground shaking

Basic Chemistry

matter
elements
compounds
nucleus
proton
neutron
electron

foreshocks
aftershocks
main shock
wave form
wavelength
frequency
amplitude
body waves
surface waves
longitudinal waves
primary waves
shear waves
transverse waves
seismograph
seismogram
first p-wave arrival
first s-wave arrival
p wave velocity
s wave velocity
surface wave velocity
epicenter / triangulation
Mercalli Scale
earthquake intensity
earthquake magnitude
Richter Scale
seismicity
tsunami
ground shaking
earthquake / landslides
liquefaction
Oregon / Pacific Northwest
PNW earthquake hazards
electron shells
atomic no.
octet rule
atomic weight
isotope
atomic charge balance
atomic bonding
noble gases
valence electrons
ionic bonds
positive ions (cations)
negative ions (anions)
covalent bonds
periodic chart
electron configuration

Mineralogy

mineral
rock
silica-oxygen tetrahedron
cubic atomic arrangement
atomic arrangement
mineral definition
physical properties
color
luster
streak
fracture
hardness
cleavage
fracture
specific gravity
density
rock forming minerals
crustal composition
silicate minerals
carbonate minerals
oxides
halides
sulfates
magnetic minerals
acid-fizz mineral
silica-oxygen tetrahedron
ferromagnesian silicate minerals
mafic minerals (Fe-Mg rich)
felsic minerals
granite = continental crust

basalt = oceanic crust

granite = yosemite park

basalt = Columbia river basalts, Coast Range

Andesite = Cascades, Andes Mountains, volcanic arcs

non-ferromagnesian minerals

Rocks / Igneous Rocks

rock
igneous
sedimentary
metamorphic
magma
lava
cooling / crystallization
weathering
erosion
agents of sediment transport
wind
water
ice
gravity
deposition
lithification
metamorphism
heat
pressure
rock cycle
magma cooling
igneous rock
magma
lava
buoyant magma
rising magma
less dense magma

extrusive
volcanic
intrusive
plutonic
rate of cooling
slow-phaneritic
fast-aphanitic
very rapid-glassy
muti-phase cool - porphyritic
mafic igneous rocks
plutonic = gabbro
volcanic=basalt
felsic igneous rocks
plutonic = granite
volcanic = rhyolite
intermediate igneous rocks
plutonic = diorite
volcanic = andesite
classification of igneous rocks
mineral composition
felsic
mafic
rock texture
aphanitic
phaneritic
glassy
porphyritic
know the igneous rock scheme on p. 75
rock-geology associations

Volcanism / Igneous Processes

volcanic eruptions
explosive eruption
quiescent eruption

factors affective magma viscosity
geothermal gradient
- temperature
- silica content
- gas content

>temp, < viscosity
<temp, > viscosity
>silica, > viscosity
<silica, <viscosity
>gas, > explosiveness
>viscosity, > explosiveness
partial differentiation
products of volcanic eruptions
- lava
  - low silica lava = basaltic
    - pahoehoe
    - aa
  - high silica lava = rhyolitic
- escaping gases
  - water vapor
  - carbon dioxide
  - hydrogen sulfide
- pyroclastic materials
  - fine ash
  - pumice
  - lapilli
  - cinders
  - blocks / bombs

anatomy of volcano
- crater
- caldera
- magma chamber
- central vent
- flank eruption
- parasitic cone

volcano types
- shield (e.g. Newberry)
- cinder (e.g. Lava Butte)
- composite / stratovolcano (e.g. Mt. Hood)
- collapsed caldera (Crater Lake)

Intrusive Igneous Bodies
- dikes
- sills
- laccoliths
- batholiths
- stocks
- volcanic necks

Other Concepts and Ideas Since the Mid-Term:

How do we know when the last great subduction zone earthquake was in the PNW?

What is a tsuami sediment cycle? What happens to the coast of oregon during an earthquake cycle?

can you determine the vital statistics of atoms / elements from the periodic chart?

Can you answer all of the homework questions from the chem / minerals homework?

Did you read the book and look at the figures?

Can you answer all of the online homework questions - correctly?

Can you relate the terms, their definitions, and how they relate to one another?

Can you cite lists of things? (e.g. list 4 physical properties used to I.D. minerals).

Do you know how the Three Stooges relate to mineralogy?

Do you remember anything from the video exercise on earthquakes in the Bay Area?

What is the method for classifying and interpreting igneous rocks?

Can you answer all of the questions from the rocks and volcano homeworks?

What are the types of volcanoes and why are they different (what is the controlling factor?)

How do we interpret the cooling history of igneous rocks?

Can you label and identify all of the intrusive igneous rocks features on a diagram?

Can you sketch the interior of the Earth?
Do you know how to read the period chart of elements?
Can you determine the number of protons, neutrons, electrons in an atom by reading the period chart?
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?

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?