ES 105 Practice quiz

The first slide of each lab set contains the goals and objectives published in the lab manual.

Remember to bring the lab manual with your corrected labs. Any printed keys of labs or this slide show will be confiscated! Also bring a scantron and calculator

Lab 1—Energy and energy transformations

- Investigate the concept of conservation of energy
- Explain transformation of energy
- Convert one type of energy to another
- Formulate explanations for energy that can *seem* to disappear

Lab 1—Investigate the concept of conservation of energy

- Microwaves are
  - Electromagnetic waves
  - Mechanical energy
  - Heat energy
  - Chemical energy
  - Gravitational potential energy

Lab 1—Explain transformation of energy

- Since there is conservation of energy
  - Energy is destroyed when it doesn't convert to a useful form
  - You can never get energy from nothing
  - You can create energy with friction
  - Chemical energy is not useful for light
  - All of the above

Lab 1—Convert one type of energy to another

- When you turn a crank and light a light bulb, you have
  - Invented electricity
  - Converted mechanical energy to electrical energy
  - Converted heat energy to mechanical energy
  - Converted mechanical energy to heat energy
  - Converted light energy into electrical energy
  - Converted light energy into heat energy

Lab 1—Formulate explanations for energy that can *seem* to disappear

- When you convert mechanical energy into electricity, you might lose energy.
  - It is destroyed
  - It could be lost to heat of friction
  - It could be saved in hidden places of the machine to be used later
  - You measured wrong; it wasn't really lost
  - Ultraviolet light becomes visible in fluorescent bulbs

Lab 2—Exploring Motion and Gravity

- Describe accelerated motion
- Determine the acceleration of gravity

Lab 2—Describe accelerated motion

- The difference between velocity and acceleration is
  - One is directional, the other is not
  - Velocity is an increase of a rate, and acceleration is an increase of distance
  - Acceleration is an increase of a rate, and velocity is an increase in distance
  - If you have no acceleration, you have no speed
  - You can go backwards without acceleration

Lab 2—Describe accelerated motion: Freefall

- When two objects that are similar in size and surface texture fall
  - The lighter one always hits the ground last
  - The lighter one always hits the ground first
  - The mass does not affect the falling rate
  - All of the above
  - None of the above

Lab 2—Describe accelerated motion: Freefall

- You can always count on feathers falling slower than rocks because
  - The feather has no terminal velocity
  - The air resistance force on the feather is equal to the air resistance force on the rock due to the mass of the rock compared to its surface area
  - You can't: it depends on the size of each
  - Of human error
  - None of the above

Lab 2—Describe accelerated motion: Freefall

- When objects fall in a vacuum
  - Their surface area is not a factor in the acceleration of their fall
  - Their mass is not a factor in the acceleration of their fall
  - Most things cannot fall if they are in a vacuum
  - They only fall upward
  - Small things fall faster than larger things

Lab 2—Measuring Gravitational Acceleration

- When you find the distances an object falls in equal intervals of time
  - The distances increase over time of falling
  - The distances are constant, because the time is equal
  - Distances will vary, depending upon the interval of time selected
  - All of the above
  - None of the above

Lab 2—Determine the acceleration due to gravity

- Look at page 2.6, and assume this data was gathered on Mars at 1/30 of a second intervals
- If you have measured these values for y_n in meters
  - 0.000
  - 0.004
  - 0.012
  - 0.025
  - 0.041
- what is the acceleration of gravity on Mars?

Choices:

- 2.7 m/s^2
- 3.6 m/s^2
- 4.5 m/s^2
- 0.0164 m/s^2
- 0.004 m/s^2

Lab 2—Determining the acceleration due to gravity

- If you know that the acceleration due to gravity on Moon is 1.60 m/s^2 and you find your data indicates that it is 1.62 m/s^2 then the error in your data is
  - + 0.012%
  - + 0.02%
  - + 1.2%
  - + 2%
  - + 1.62%

Lab 2—Acceleration due to gravity

- Error in gravity measurements may be due to
  - Location of the apparatus compared to ideal
  - Interference of the atmosphere
  - Measurement errors
  - All of these
  - None of these

Lab 3—Energy of Objects in Motion

- Further investigate the concept of conservation of energy
- Investigate the conversion of gravitational potential energy to kinetic energy
- Formulate explanations for energy that can seem to disappear
- Investigate frictional effect on motion

Lab 3—Potential Energy

- If a ball is 6 cm above the surface of reference, and it has a mass of 70 grams, it has a potential energy of
  - + 0.0042 J
  - + 0.04116 J
  - + 0.167 J
  - + 11.67 J
  - + 420 J

Lab 3—Kinetic Energy

- If the 70 gram ball is traveling at 1 m/s, its kinetic energy is
  - + 0.001225 J
  - + 0.035 J
  - + 0.167 J
  - + 35 J
  - + 1225 J

Lab 3—Kinetic Energy

- If the velocity of a rolling ball in an apparatus like on page 3.4 seems to have a kinetic energy less than the potential energy before it began moving, what could possibly the reasons for this
  - The friction of the apparatus has slowed the ball
  - The apparatus is not flat, and the ball is gaining some potential energy as it rolls us the NOT horizontal surface
  - Since the ball is rolling, some energy goes into the rotation of the ball
  - All of these may be influencing the ball movement
  - None of these can be a factor, only human error would lead to differences like this

Lab 3--Investigate frictional effect on motion

- What effect does sandpaper have on the angle of sliding of a stationary rock
  - The angle is greater without sandpaper
  - The angle is greater with the sandpaper
  - Wax paper increases the angle
  - Neither wax paper or sand paper have any effect on the angle
  - Since sandpaper is manmade, friction does not influence landslides

Lab 3—Forces influencing motion

- If a car has a mass of 500 kg, and the net force exerted on it is 0 N, about what is the acceleration of the car?
  - + 5000 J
  - + 0 m/s^2
  - + 2 m/s^2
  - + 500 m/s^2
  - + Unless you know how fast it is going, you cannot calculate it

Lab 4—Understanding geologic time

- Construct a time scale of geologic time
- Use fossils to determine the age of strata
- Develop a conceptual understanding of half-life
- Determine the ages of materials from known half life and elapsed half lives
- Determine half lives from known times of known amounts of radioactive decay

Lab 4—Geologic Time Scale

- If you look at geologic time drawn to scale, it is obvious that
  - Abundant marine invertebrates began about half of Earth's lifetime ago
  - The time from the oldest rock to the first fossil is about half as long as the time from the first fossil to the time of abundant marine invertebrates
  - Those two are both true
  - There was a long stretch of time between the first fossil and the time of abundant marine invertebrates
  - The events of Earth's history are very evenly spaced

Lab 4—Stratigraphic Correlation

- When you look at two sequences of rocks, the best way to match up the ages and layers is
  - Look for the fossils that are the same age
  - Look for the sediments that have the same grain types
  - Find the radioactive decay of the fossils
  - Flip one section over, as if the rocks had been folded
  - All of these would work equally well

Lab 4—Geologic Age of Strata

- If you know that a sedimentary layer has a Devonian fossil at the top
  - The layer must be Silurian in age
  - The layer must be Devonian in age
  - The layer cannot be younger than Devonian
  - The layer is younger than Devonian
  - The layer is Mississippian in age

Lab 4—Radioactive decay

- In determining half lives,
  - The larger the sample, the more accurate your results would be
  - The smaller the sample, the more likely it will represent the true half life of the substance
  - The sample size would not make a difference in the accuracy of the determination
  - The half life will change with the size of the sample
  - Most half lives are the same

Lab 4—Radioactive Decay

- If you have 2.448 mg of gold-189, with a half life of 30 minutes, how much gold-189 remains after 2 ½ hours?
  - + 0.0765 mg
  - + 0.98 mg
  - + 1.224 mg
  - + 5.9 mg
  - + 73.44 mg

Lab 4—Radioactive decay

- A sample of Nitrogen-13, which is radioactive, had a reading on a Geiger counter of 3200 counts per minute. One hour later it has a reading of 50 counts per minute.
- The half-life of N-13 is:
  - + 40 seconds
  - + 0.4 minutes
  - + 1.2 minute
  - + 10 minutes
  - + 64 minutes

Lab 5—Introduction to chemical reactions

- Become acquainted with the nature of chemical changes
- Identify whether a chemical change has occurred
- Study and explore types of reactions
- Perform experiments, make observations and determine if a reaction occurred

Lab 5—balancing reactions

- Which is correctly balanced?
  - 1 Mg + 2 O_2 ➔ 2 MgO
  - 2 Mg + 2 O_2 ➔ 2 MgO
  - 2 Mg + 1 O_2 ➔ 2 MgO
  - 1 Mg + 1 O_2 ➔ 2 MgO
  - None of these are balanced

Lab 5—Indicators

- Phenolphthalein is a good indicator for
  - Alkaline solutions because it turns bright pink
  - Acidic solutions because it turns bright green
  - whether reactions are occurring or not
  - Endothermic reactions
  - Exothermic reactions

Lab 5—chemical reactions

- When you mix KBr and NaCl:
  - You get a brown solid precipitate of NaBr
  - You get a white solid precipitate of KCl
  - The reaction is exothermic
  - The reaction is endothermic
  - There is no reaction

Lab 5—chemical reactions

- When you mix HCl with $CaCO_3$, you know there is a reaction because:
  - there is a release of gas
  - there is a release of smoke
  - there is a solid white precipitate
  - The shiny metal dissolves
  - There is no reaction

Lab 5—Chemical reactions

- An exothermic reaction
  - Makes the substances warm
  - Makes the substances cool
  - Is good for treating blisters
  - Can be measured on a balance
  - None of the above

Lab 5—Chemical Reactions

- When ice becomes water,
  - There is an exothermic reaction
  - There is an endothermic reaction
  - It is a physical change, not a chemical reaction
  - The bonds between the oxygen and hydrogen are reformed
  - Both the second and fourth choices are correct

Lab 6—Sediments and Sedimentary Rocks

- Become familiar with minerals associated with sedimentary rocks
- Investigate characteristics of sediment grains
- Recognize classes of sedimentary rocks
- Be able to distinguish clastic from chemical sedimentary rocks
- Classify and name samples of sedimentary rocks by their composition and grain size

Lab 6—Minerals associated with sedimentary rocks

- Diagnostic properties of quartz are:
  - Harder than glass
  - No cleavage
  - Pale in color
  - Shiny surface
  - All of these are diagnostic properties of quartz

Lab 6—Minerals associated with sedimentary rocks

- Diagnostic properties of calcite are:
  - Softer than glass
  - 3 directions of cleavage, not at 90^o
  - Pale in color
  - Fizzes in dilute HCl
  - All of these are diagnostic properties of calcite

Lab 6—Sedimentary rocks

- The most common grain type of clastic rocks is
  - Quartz
  - Feldspar
  - Mica
  - Calcite
  - Iron oxide

Lab 6—Sedimentary rocks

- If a rock is composed of rounded grains that are more than 2 mm in diameter, you have
  - Mudstone
  - Siltstone
  - Sandstone
  - Limestone
  - Conglomerate

Lab 6—Sedimentary rocks

- If a rock is composed of rock fragments, quartz, feldspar and mica, that range in size from ¼ mm to 2 mm, you have
  - Oolitic limestone
  - Rock gyspum
  - Coal
  - Shale
  - Lithic sandstone

Lab 6—Sedimentary rocks

- When you have a rock that fizzes vigorously in cold, dilute hydrochloric acid, and contains visible shell fragments imbedded in fizzable fine-grained material, you have
  – Quartzose sandstone
  – Rock gypsum
  – Shale
  – Fossiliferous limestone
  – Chalk

Lab 6—Sedimentary rocks

- The most likely environment for a limestone would be
  - Sand dunes
  - River channels
  - Lakes
  - Shallow marine
  - More than one of these could be a limestone environment

Lab 6—Sedimentary rocks

- Sedimentary rocks are important for oil and gas because
  - They tell you about the environment
  - You can preserve the environment with sedimentary rocks
  - They are good reservoirs of oil and gas
  - They are sources of oil and gas
  - Both of the last two are very important

Lab 6—Sedimentary rocks

- You will have a rock sample to describe
  - Grain size
  - Grain shape
  - Sorting
  - Composition
  - Rock name
- This will be structured as several multiple choice questions about a rock

Lab 7—Topographic maps and stream systems

- Become familiar with the information available on topographic maps
- Learn to use map scales to find distances
- Visualize the shape of Earth’s surface using contour lines
- Study landforms produced by stream processes

Lab 7—Topographic maps and stream systems

- Convert 24,000 feet to miles
  - + 0.22 miles
  - + 4.54 miles
  - + 2000 miles
  - + 126,720,000 miles
  - + None of these choices

Lab 7—Topographic maps and stream systems

- From the map shown, determine what city is closest to 75^o W, 5^{o}S
  - Rio de Janeiro, Brazil
  - Lima, Peru
  - Cairo, Egypt
  - Dhaka, India
  - Jakarta, Indonesia

Lab 7—Topographic maps and stream systems

- When you increase the stream gradient
  - There is more erosion along the channel
  - There is more deposition along the channel
  - The stream has smaller sediment
  - The channel becomes more curvy
  - There is no change in the channel

Lab 7—Topographic maps and stream systems

- When you put a dam into the stream
  - There is more erosion along the channel
  - There is more deposition along the channel
  - The stream has smaller sediment
  - The channel becomes more curvy
  - There is no change in the channel

Lab 7—Topographic maps and stream systems

- The general trend of the Willamette River is
  – Straighter channel downstream
  – Lower gradient downstream
  – Steeper gradient downstream
  – Smaller channel downstream
  – None of these choices

Lab 7—Topographic maps and stream systems

- The elevation at one point of a stream is 1200 feet. A location 4 miles downstream has an elevation of 1160 feet.
- The gradient of a stream is
  - + 40 ft
  - + 0.1 ft/mile
  - + 10 ft/mile
  - + 40 ft/mile
  - + 160 ft/mile

Lab 7—Topographic maps and stream systems

- You will have a set of elevation points that you need to contour to make a topographic map of an area