WEST LOS ANGELES COLLEGE  
SLO Course Assessment Tool

<table>
<thead>
<tr>
<th>Date and Semester:</th>
<th>SPRING 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Name or Team Names:</td>
<td>Abraha Bahta</td>
</tr>
<tr>
<td>Course Name and Number:</td>
<td>PHYSICAL SCIENCE 001</td>
</tr>
</tbody>
</table>

### Institutional SLOs: (ILOs)

<table>
<thead>
<tr>
<th>Check Box(s) Below</th>
<th>Select from the list below all institutional learning outcomes (ILOs) integrated to this course <em>(select all that apply).</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>A. Critical Thinking</td>
</tr>
<tr>
<td>X</td>
<td>B. Communication</td>
</tr>
<tr>
<td>X</td>
<td>C. Quantitative Reasoning</td>
</tr>
<tr>
<td></td>
<td>D. Self-awareness/Interpersonal Skills</td>
</tr>
<tr>
<td></td>
<td>E. Civic Responsibility</td>
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<tr>
<td>X</td>
<td>F. Technical Competence</td>
</tr>
<tr>
<td>x</td>
<td>G. Cultural Diversity</td>
</tr>
<tr>
<td>X</td>
<td>H. Ethics</td>
</tr>
<tr>
<td></td>
<td>I. Aesthetics</td>
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For additional SLO information:  
http://www.wlac.edu/staffandfaculty/SLO_rating_scale/tables4web/slo_list.pdf

### Program SLOs:

<table>
<thead>
<tr>
<th>Check Box(s) Below</th>
<th>Select the Program SLO's assessed in this course <em>(insert all that apply)</em></th>
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<tbody>
<tr>
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<td>For additional Program SLO information:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.wlac.edu/staffandfaculty/SLO_rating_scale/tables4web/">http://www.wlac.edu/staffandfaculty/SLO_rating_scale/tables4web/</a></td>
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<tr>
<td></td>
<td>1. Gain proficiency in measurement, in both the English and metric systems of measurement and employ the scientific method on any inquiry of a phenomenon by logical reasoning</td>
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<tr>
<td></td>
<td>2. Employ principles of physics to explain the nature of basic things such as motion, force, energy, matter, heat, sound, and light.</td>
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<td></td>
<td>3. Explain and describe atomic theory pedagogically from Dalton's to Bohr's and up to the quantum mechanical model.</td>
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<td></td>
<td>4. Understand the Periodic Table and its application in the dissemination of vast array of chemical information.</td>
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<td></td>
<td>5. Describe the different types of bonds and skillfully sketch Lewis, as well as molecular (geometric) structures of inorganic compounds acquiring a firm grasp on carbon (organic) compounds as the chief constituents of all living things.</td>
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<td>6. Discuss the Big Bang theory and explain how the Milky Way Galaxy and our solar system originated; name the planets of the solar system and distinguish each on the basis of its physical compositions; discuss the age of the Earth</td>
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### Assessment Instrument:

<table>
<thead>
<tr>
<th>Check Box(s) Below</th>
<th>Select the assessment designed to determine how well students achieve the SLO <em>(select the most comprehensive assessment instrument used in class)</em></th>
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<tbody>
<tr>
<td>X</td>
<td>Written exam</td>
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Presentation
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<tr>
<th>Type of Assignment</th>
<th>X</th>
<th>Multiple choice exam</th>
<th>Portfolio</th>
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<tr>
<td>Exam Structure</td>
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<td>Essay/Research Paper</td>
<td>Department exam</td>
</tr>
<tr>
<td>Type of project</td>
<td></td>
<td>Case scenarios</td>
<td>Skill evaluation</td>
</tr>
<tr>
<td>Other:</td>
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**Rating/Rubric Scale:**

- **A**
  
  Student demonstrates a skillful utilization of dimensional analysis; follows through a sequence of chain calculations and adheres to strict significant figures protocol in reporting quantitative findings.

- **B**
  
  Student is well organized and has a good grasp of dimensional analysis methodologies; exhibits some difficulties with chain calculations and in monitoring significant figures on measured quantities.

- **C**
  
  Student is somewhat shaky in navigating through a chain of calculations, but has a sense of what is needed; pays little attention to significant figures rules in reporting findings.

- **D**
  
  Student shows very little organizational skills needed to navigate through a maze chain calculations, although there is some comprehension of the task that is needed.

- **F**
  
  Student is inept; has trouble through all phases of the scientific method of inquiry.
<table>
<thead>
<tr>
<th>Plan of Action:</th>
<th>outcomes expected upon the completion the course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What do I want to change? More one-on-one tutoring to sharpen the math skills required for the course. Encourage students to attend conference sessions and work/study/practice in groups.</td>
</tr>
<tr>
<td></td>
<td>What changes do you propose to improve student learning for the SLOs assessed?</td>
</tr>
<tr>
<td></td>
<td>Encourage students to incorporate online programs from various websites that would add depth and mastery to their study and comprehension skills.</td>
</tr>
<tr>
<td>If Applicable: What changes have been implemented since the previous course assessment?</td>
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</tr>
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</table>

Resources:
View sample course assessment projects on WLAC SLO website:
http://www.wlac.edu/staffandfaculty/SLO_rating_scale/index.htm

For additional information contact:
Todd Matosic (310)287-4213 / CE-213
matosit@wlac.edu
### Sample of Student Projects:

Submit: Essays, research projects, skill evaluation forms or department exams illustrating grades of A through F (one sample of each grade) to Todd Matosic, WLAC SLO Coordinator.

Attach to this form or email as attachments to: matosit@wlac.edu

Todd Matosic college mail box #169A or Office CE 213, Phone # 310 287-4213.

As part of their final exam, worth 40% of the final grade, the physical science 1 students of Spring 2011 were assessed through a two-part comprehensive final exam that covered questions from disciplines that are covered under Physical Science—Astronomy, Physics, Chemistry and the Earth Sciences. It was a closed-book, and closed-note exam.

Part 1 contained 50 multiple choice questions, and Part 2 contained 14 problems and short answer questions. Students' results from the various components were tabulated and appropriately weighed (among the various disciplines) to fit into the rubric for a letter grade distribution.

Below are samples of the results for A, B, C, D, and F in line with the rubric established:
3. A bank is considering building a 10-story building. The manager's average velocity in miles per hour is 12 miles per hour. What is the average velocity in miles per hour?

Given: \( v = 12 \, \text{miles/hour} \)

Find: \( v \)

6. What force is needed to give a 250 lb. human an acceleration of 5.0 m/s²?

Given: \( m = 105 \, \text{kg} \)

Find: \( F \)

7. If you own a 300-meter clock, how many feet have you traveled? [If not, fill in your own results.]

Given: \( d = 300 \, \text{meters} \)

Find: \( d \)
CHEMISTRY

SHORT ANSWERS/SHOW SETUP AND CALCULATIONS.

An equation that you may need:
\[ Q = c \cdot m \cdot \Delta T, \text{ where } c \text{ represents specific heat, } m \text{ represents mass of sample, and } \Delta T \text{ is change in temperature.} \]

1. The specific heat of iron is 0.45 J/g°C. How many joules of energy are needed to warm 1.99 g of iron from 20.00°C to 29.00°C?

\[ \Delta T = 29.00 - 20.00 = 9.00°C \]

\[ C = 0.45 \text{ J/}g°C \]

\[ m = 1.99 \text{ g} \]

\[ Q = 0.45 \text{ J/}g°C \cdot 1.99 \text{ g} \cdot 9.00°C = 83.85 \text{ J} \]

2. The heat of fusion of water is 80.0 cal/g. Calculate the energy required to melt 62.3 g of ice.

\[ 80.0 \text{ cal/g} \cdot 62.3 \text{ g} = 5000 \text{ cal} \]

3. Write the name of the element with the following symbol: Ag

Silver

4. Classify each of the following as a metal, nonmetal, or metalloid.

a. arsenic
b. argon
c. calcium
d. phosphorus

- metalloid
- nonmetal
- metal

5. State the maximum number of electrons allowed in each.

a. sixth principal energy level
b. any sublevel
c. a 2p orbital

- 6
- 2
- 6
EARTH SCIENCES

1. a) What is the hardest known mineral? Diamond
   b) What is the name of the softest mineral? Talc
   c) A mineral can be scratched by quartz, but not by diamond. That mineral is: Diamond

2. a) On the map given below, write the names of the plates indicated by # 1, 3, 5, and 7.
   b) Using the letter 'B', indicate where a divergent plate boundary is located on this map.
   b) Using the letter 'C', indicate where a convergent plate boundary is located on this map.

3. Explain in two or three sentences the reason why geologists say that a major earthquake is long overdue for southern California.

   The San Andreas fault, the cause of most major earthquakes in the area, has not moved in an earthquake in over a hundred years. Also, the tension caused by this slow movement is overdue.

4. C-14 has a half life of 5,730 years. How old is a fossil that contains 50% of the original C-14? Show your work.

   \[
   \begin{align*}
   \frac{3.75}{7.50} & = 0.50 \\
   \frac{2.86}{1.865} & = 0.50 \\
   \end{align*}
   \]

5. a) Name one sedimentary rock that is a good aquifer. Sandstone
   b) What is the name of the largest aquifer in the USA? Ogallalla

6. How can you apply knowledge of geology in your daily life? Explain in no more than three sentences.

   If I need to find water, I know what types of rocks contain water. If I want salt easily, I just boil seawater. Limestone is good for removing calcium.
1. If you run a 300 meter dash, how many feet have you traveled? (1m = 3.28 ft)

\[
\left(\frac{300 \text{ m}}{1}\right) \cdot \left(\frac{3.28 \text{ ft}}{1 \text{ m}}\right) = 984 \text{ ft}
\]

2. What force is needed to give a 20.0 kg box an acceleration of 5.0 m/s²?

\[
20 \text{ kg} \cdot 5.0 \text{ m/s}^2 = 100 \text{ J}
\]

3. It took a physical science student 1.5 hours to drive 12 miles down the 405 freeway. What was the student's average velocity in miles per hour?

\[
\left(\frac{12 \text{ mi}}{1.5 \text{ hr}}\right) = 8 \frac{\text{ mi}}{\text{ hr}}
\]

Page 1
An equation that you may use:

\[ Q = c \cdot m \cdot \Delta T \]

where \( c \) represents specific heat, \( m \) represents mass of sample, and \( \Delta T \) is change in temperature.

1. The specific heat of iron is 0.45 J/g°C. How many joules of energy are needed to warm 1.99 g of iron from 20.00°C to 29.00°C?

\[ Q = 0.45 \cdot 1.99 \cdot 9 = 8.0595 
\]

8,059.5 J are needed to warm 1.99 g of iron.

2. The heat of fusion of water is 80.0 cal/g. Calculate the energy required to melt 62.5 g of ice.

\[ 80.0 \text{ cal/g} \cdot 62.5 = 5,000 \text{ cal} \]

5,000 cal are needed.

3. Write the name of the element with the following symbol: Ag

Ag is silver.

4. Classify each of the following as a metal, nonmetal, or metalloid.

a. arsenic [metalloid]
   b. argon [nonmetal]
   c. calcium [metal]
   d. phosphorus [nonmetal]

5. State the maximum number of electrons allowed in each.

   a. sixth principal energy level [at most 32]
   b. any sublevel [at most 18]
   c. 2s orbital [at most 2]

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SLO Assessment Tool 5/23/11
WEST LOS ANGELES COLLEGE
SLO Course Assessment Tool

LAST NAME (all in caps): 
First Name: 

EARTH SCIENCES

1. a) What is the hardest known mineral? ________ 
   b) What is the name of the softest mineral? ________
   c) A mineral can be scratched by quartz, but not by diamond. That mineral is: ________
   (No mineral can be scratched by quartz, but not by diamond.)

2. a) On the map given below, write the names of the plates indicated by # 1, 3, 5, and 7.
   b) Using the letter 'D', indicate where a divergent plate boundary is located on this map.
   c) Using the letter 'C', indicate where a convergent plate boundary is located on this map.

3. Explain in two or three sentences the reason why seismologists say that a major earthquake is long overdue for southern California. ________

4. A earthquake builds every 100 years. So California has a 7 earthquake in more than 150 years.

5. C-14 has a half life of 5,730 years. How old is a fossil that contains 50 of the original C-14? Show your work.
   100 10 50 150 25 175 50 original carbon 50 halves = 6,730 years

6. a) Name one sedimentary rock that is a good aquifer. ________
   b) What is the name of the largest aquifer in the USA? ________

6. How can you apply knowledge of geology in your daily life? Explain in no more than three sentences.
   We can apply geology in our daily life in many ways. One way is by knowing where earthquake can happen. We can also use it to know what rocks are valuable and how to test them.
1. If you run a 300-meter dash, how many feet have you traveled? [Ans: 3280]

\[
300 \text{ m} \times \left( \frac{3.281 \text{ ft}}{1 \text{ m}} \right) = 984.4 \text{ ft} 
\]

\[
\boxed{984.4 \text{ ft}}
\]

2. What force is needed to give a 200 kg box an acceleration of 30 m/s^2?

\[
F = (200 \text{ kg}) \times (30 \text{ m/s}^2) = 6000 \text{ N}
\]

\[
\boxed{F = 100 \text{ N}}
\]

3. It took a physics student 1.5 hours to drive 126 miles down the 405 freeway. What was the student's average velocity in miles per hour?

\[
\text{Average velocity} = \frac{\text{distance}}{\text{time}} = \frac{126 \text{ miles}}{1.5 \text{ hours}} = 84 \text{ miles/hour}
\]

\[
\boxed{\text{Average velocity} = 84 \text{ miles/hour}}
\]
1. The specific heat of water is 4.18 J/g°C. How much heat is needed to warm 1.99 g of water from 30.0°C to 70.0°C?

\[ Q = \Delta H = \Delta T \times \text{mass} \times \text{specific heat} \]

\[ T_f = 70.0°C - 30.0°C = 4.00°C \]

\[ Q = (1.99 \text{ g})(4.18 \text{ J/g°C})(4.00°C) = 8.05 \text{ J} \]

2. The heat of fusion of water is 80.0 kcal/mol. Calculate the energy required to melt 62.5 g of ice:

\[ Q = m \times \Delta H \]

\[ Q = (62.5 \text{ g})(80.0 \text{ kcal/mol})(62.5 \text{ g}) = 5.00 \text{ kcal} \]

3. Write the name of the element with the following symbol: Au

- [Gold]

4. Classify each of the following as a metal, nonmetal, or metalloid:

- a. arsenic: nonmetal
- b. argon: noble gas
- c. calcium: metal
- d. phosphorus: metalloid

5. State the maximum number of electrons allowed in each orbital:

- a. s orbital: 2
- b. p orbital: 6
- c. d orbital: 10
- d. f orbital: 14

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WEST LOS ANGELES COLLEGE
SLO Course Assessment Tool

LAST NAME (all in caps): __________   ______   ______ First Name

EARTH SCIENCES

1. a) What is the hardest known mineral? __________
   b) What is the name of the softest mineral? __________
   c) A mineral can be scratched by quartz, but not by diamond. That mineral is: __________

2. a) On the map given below, write the names of the plates indicated by # 1, 3, 5, and 7.
   b) Using the letter 'D', indicate where a divergent plate boundary is located on this map.
   c) Using the letter 'C', indicate where a convergent plate boundary is located on this map.

3. Explain in two or three sentences the reason why seismologists say that a major earthquake is long overdue for southern California:

   Records reveal that every hundred or so years a catastrophe of at least an 8.0 magnitude. The last major earthquake occurred 100 years ago.

4. C₁₄ has a half-life of 5730 years. How old is a fossil that contains 50% of the original C₁₄? Show your work:

   \[
   \text{Initial C₁₄} = \frac{1}{2} \times \text{Current C₁₄} \\
   \text{So, } 50\% = \frac{1}{2} \times \frac{1}{2} \times 2 \times 5730 \times 2 \\
   \text{Current C₁₄} = \frac{1}{2} \times \frac{1}{2} \times 2 = 11460 \text{ years}.
   \]

5. a) Name one sedimentary rock that is a good aquifer.
   b) What is the name of the largest aquifer in the USA?

6. How can you apply knowledge of geology in your daily life? Explain in no more than three sentences.

   You can choose to live in the middle of a plate so that you don't have to suffer earthquakes.
PART 2

PHYSICS/ASTRONOMY

For the following problems, show all your work including given information, what you want to find, the equation you use (if applicable), plugging the numbers into the equation, and the final answer boxed.

1. If you run a 300 meter dash, how many feet have you traveled? [1 m = 3.28 ft]
   
   **Given:** 300 m, 1 m = 3.28 ft
   
   **Find:** feet (ft)
   
   \[
   \text{Given: } 300 \text{ m} \times 3.28 \text{ ft/m} = 984.24 \text{ ft}
   \]

2. What force is needed to give a 20.0 kg box an acceleration of 5.0 m/s²?
   
   **Given:** 20.0 kg, a = 5.0 m/s²
   
   **Find:** force (F)
   
   \[
   F = ma
   F = 20.0 \text{ kg} \times 5.0 \text{ m/s}^2 = 100 \text{ kg m/s}^2
   \]

3. It took a physical science student 1.5 hours to drive 12 miles down the 405 freeway. What was the student's average velocity in miles per hour?
   
   **Given:** 1.5 hrs, 12 m
   
   **Find:** Vave
   
   \[
   V_{ave} = \frac{d}{t} = \frac{12 \text{ miles}}{1.5 \text{ hrs}} = 8 \text{ mph}
   \]
CHEMISTRY
SHORT ANSWERS/SHOW SETUP AND CALCULATIONS.

An equation that you may need:

\[ Q = \text{c.m.} \Delta T, \text{ where } \text{c} \text{ represents specific heat, } m \text{ represents mass of sample, and } \Delta T \text{ is change in temperature} \]

1. The specific heat of iron is 0.453 J/°C. How many joules of energy are needed to warm 1.99 g of iron from 20.0°C to 29.0°C?

\[ Q = \text{c.m.} \Delta T = 0.453 \frac{\text{J}}{\text{g} \cdot \text{°C}} \times 1.99 \text{ g} \times (29.0 - 20.0) \text{ °C} \]

2. The heat of fusion of water is 80.0 cal/g. Calculate the energy required to melt 62.5 g of ice.

3. Write the name of the element with the following symbol. Ag

4. Classify each of the following as a metal, nonmetal, or metalloid.
   a. arsenic
   b. argon
   c. calcium
   d. phosphorus

5. State the maximum number of electrons allowed in each.
   a. sixth principal energy level?
   b. any sublevel
   c. a 2d orbital
EARTH SCIENCES

1. a) What is the hardest known mineral? ____________
   b) What is the name of the softest mineral? ____________
   c) A mineral can be scratched by quartz, but not by diamond. That mineral is: ____________

2. a) On the map given below, write the names of the plates indicated by #1, 3, 5, and 7.
   b) Using the letter 'X', indicate where a divergent plate boundary is located on this map.
   c) Using the letter 'Y', indicate where a convergent plate boundary is located on this map.

3. Explain in two or three sentences the reason why seismologists say that a major earthquake is long overdue for southern California.

4. C-14 has a half-life of 5730 years. How old is a fossil that contains 50% of the original C-14? Show your work.

5. a) Name one sedimentary rock that is a good aquifer.
   b) What is the name of the largest aquifer in the USA?

6. How can you apply knowledge of geology in your daily life? Explain in no more than three sentences. You can apply knowledge of geology in your everyday life by relating natural disasters (such as earthquakes) to what you already know about them.
<table>
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<th>Subjective Score</th>
<th>PART 1</th>
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**PART 2**

- **Name:** [Redacted]
- **Date:** [Redacted]
- **Subject:** [Redacted]
- **Form:** [Redacted]
- **Period:** [Redacted]
- **No.:** [Redacted]

**TEST RECORD**

- **Total:** [Redacted]

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SLO Assessment Tool 5/23/11
PART 2

PHYSICS/ASTRONOMY

1. If you run a 300 meter dash, how many feet have you traveled? [1 m = 3.281 ft]

\[
\text{300 m} \times \frac{3.281 \text{ ft}}{1 \text{ m}} = 984.3 \text{ ft}
\]

2. What force is needed to give a 200 kg box an acceleration of 5.0 m/s²?

\[
F = ma = 200 \text{ kg} \times 5.0 \text{ m/s}^2 = 1000 \text{ N}
\]

3. It took a physics student 1.5 hours to drive 12 miles down the 405 freeway. What was the student's average velocity in miles per hour?

\[
\text{Average velocity} = \frac{12 \text{ miles}}{1.5 \text{ hours}} = 8 \text{ miles/hour}
\]
WEST LOS ANGELES COLLEGE
SLO Course Assessment Tool

LAST NAME (all in caps) _ First Name: 

SHORT ANSWERS/SHOW SETUP AND CALCULATIONS

An equation that you may need: 
Q = c.m.ΔT, where c represents specific heat, m represents mass of sample, and ΔT is change in temperature.

1. The specific heat of iron is 0.45 J/g°C. How many joules of energy are needed to warm 1.99 g of iron from 20°C to 29°C?

2. The heat of fusion of water is 80.0 cal/g. Calculate the energy required to melt 62.5 g of ice.

3. Write the name of the element with the following symbol: Ag ________

4. Classify each of the following as a metal, nonmetal, or metalloid
   a. arsenic__________
   b. argon__________
   c. calcium__________
   d. phosphorus__________

5. State the maximum number of electrons allowed in each
   a. sixth principal energy level __________
   b. any sublevel __________
   c. a 2d orbital __________

Page 3 of 4
1. a) What is the hardest known mineral? **Diamond**
   b) What is the name of the softest mineral? **Talc**
   c) A mineral can be scratched by quartz, but not by diamond. That mineral is: **Quartz**

2. a) On the map given below, write the names of the plates indicated by # 1, 3, 5, and 7. **India, Pacific, North American, European**
   b) Using the letter "D", indicate where a divergent plate boundary is located on this map. **D**
   c) Using the letter "C", indicate where a convergent plate boundary is located on this map. **C**

3. Explain in two or three sentences the reason why seismologists say that a major earthquake is long overdue for southern California. **Pacific Plate subducts under the North American Plate, generating stress.**

4. C-14 has a half-life of 5,730 years. How old is a fossil that contains 50% of the original C-14? Show your work. **2,865 years**

5. a) Name one sedimentary rock that is a good aquifer. ** песок**
   b) What is the name of the largest aquifer in the USA? **Great Plains Aquifer**

6. How can you apply knowledge of geology in your daily life? Explain in no more than three sentences. **Geology helps us understand the environment and natural resources.**

Faculty Reflection:
Faculty member’s reflection on the process
What did I learn? Most students are ill-prepared—insufficient math skills—handle a multi-discipline course such as this; however, determined students with good study skills were successful.

It is vital to clearly spell out the mission that would be reflective of the learning...