DIRECTIONS: Identify 3-5 skills or competencies for each program/program area. Complete and submit columns, A-E by October 15, 2003. By April 26, 2004, complete and submit columns, F-G and any modifications to columns, A-E. Submit all materials including the Assessment Schedule to the assessment representative in your department.

MISSION STATEMENT: Joliet Junior College is committed to providing a quality education that is affordable and accessible to the diverse student population it serves. J.J.C. prepares its students for success in higher education and employment. It also provides a broad spectrum of transitional, extension, adult, continuing and work force education.

DEPARTMENT GOAL(S) To build student gen-ed skills (understanding relationships between the natural world (chemistry) and society.

<table>
<thead>
<tr>
<th>A.) Student Competencies /Skills (related to program)</th>
<th>B.) What is the anticipated student outcome (desired level of competency)</th>
<th>C.) Assessment Instruments /Measures (can have more than one)</th>
<th>D.) Target Population</th>
<th>E.) Who is involved and identify their responsibilities?</th>
<th>F.) What were the results of the assessment? (Attach any relevant data or assessment instruments).</th>
<th>G.) How will the results be used to improve/modify the course or program? (delivery, content, sequencing, text, objectives, assessment, etc)</th>
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<tbody>
<tr>
<td>Competency/Skill 1 Students should know about the composition of the atom and the history of atomic theory.</td>
<td>70% of Chem 104 students should be able to answer exam questions about atomic theory and structure correctly.</td>
<td>Chemistry 104 exams</td>
<td>Chemistry 104 students, students who need general education science credit</td>
<td>M. Wolff</td>
<td>89% of 47 students tested answered 5 out of 6 (83%) exam questions correctly. See raw data for details.</td>
<td>These results reinforce what is being done currently for these topics in Chem 104</td>
</tr>
<tr>
<td>Competency/Skill 2 Students should know about the composition of the earth's atmosphere, greenhouse effect, and impact of certain chemicals on the air they breathe.</td>
<td>70% of Chem 104 students should be able to answer exam questions about the composition of the earth's atmosphere, greenhouse effect, and impact of certain chemicals on the air they breathe correctly.</td>
<td>Chemistry 104 exams</td>
<td>Chemistry 104 students, students who need general education science credit</td>
<td>M. Wolff</td>
<td>71% of 42 students tested answered 9 out of 11 (82%) exam questions correctly. See raw data for details.</td>
<td>Course materials will be reviewed and revised with a goal of improving understanding of environmental issues.</td>
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<td>Competency/Skill 3 Students should have a basic knowledge about what plastics are and their importance in everyday life.</td>
<td>70% of Chem 104 students should be able to answer exam questions about what plastics are and their importance in everyday life. correctly.</td>
<td>Chemistry 104 exams</td>
<td>Chemistry 104 students, students who need general education science credit</td>
<td>M. Wolff</td>
<td>71% of students tested answered 5 out of 6 (83%) exam questions correctly. See raw data for details.</td>
<td>Course materials will be reviewed and revised with a goal of improving understanding of the impact of plastics on their lives.</td>
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DATA FOR CHEM 104 ASSESSMENT

COMPETENCY #1
QUESTIONS FROM EXAM #1 THAT PERTAIN TO ATOMIC THEORY

1. Which sub-atomic particle has the incorrect charge indicated?
   a) proton – positive  
   b) electron – negative  
   c) neutron – neutral  
   d) nucleus – neutral

2. The name given to the number of protons in an atom’s nucleus is
   a) atomic number  
   b) family number  
   c) electron number  
   d) mass number

3. Two atoms which have the same atomic number but different mass numbers are called
   a) sisters  
   b) neutrinos  
   c) allotropes  
   d) isotopes

4. What are the three basic components (particles) that make up an atom?
   a) particles, neutrons, electrons  
   b) protons, nucleus, electrons  
   c) protons, neutrons, elements  
   d) protons, neutrons, electrons

5. Why is the overall charge of the atom neutral?
   a) Because the number of protons is equal to the number of electrons.  
   b) Because the number of protons is equal to the number of neutrons.  
   c) Because the number of neutrons is equal to the number of electrons.  
   d) Because the number of protons is greater than the number of electrons.

6. How does the size of the nucleus compare to the size of the atom?
   a) The nucleus is MUCH LARGER than the atom.  
   b) The nucleus is the same size as the atom.  
   c) The nucleus is much smaller than the atom.  
   d) none of the above

CORRECT RESPONSES TO QUESTIONS PERTAINING TO COMPETENCY #1
<table>
<thead>
<tr>
<th>QUESTION #</th>
<th>FRACTION OF SPRING 04 STUDENTS WITH CORRECT RESPONSE</th>
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COMPETENCY #2
QUESTIONS FROM EXAM #4 THAT PERTAIN TO THE EARTH'S ATMOSPHERE ETC.

1. Which are the most abundant gases in the atmosphere?
   a) oxygen and neon
   b) nitrogen and oxygen
   c) carbon dioxide and nitrogen
   d) oxygen, carbon dioxide, and helium

2. What do the letters CFC stand for?
   a) chlorofluorocarbon
   b) carbofluorochlorine
   c) chloroflowerocarbon
   d) none of these

3. Ozone-depleting substances typically contain this element.
   a) oxygen
   b) sulfur
   c) hydrogen
   d) chlorine
4. Which is not a greenhouse gas?
   a) carbon dioxide  b) methane
   c) carbon monoxide  d) oxides of nitrogen

5. What was the source of the gases in the earth’s early atmosphere?
   a) volcanic eruptions  b) the sun
   c) the big bang  d) the ocean

6. A primary air pollutant ______.
   a) is a pollutant that enters the air as the direct result of a specific activity
   b) is a pollutant formed by the further reaction of an air pollutant
   c) is a pollutant that is naturally present in the environment.
   d) none of these

7. What gases are thought to be in the earth’s early atmosphere?
   a) methane  b) ammonia
   c) water  d) all of these

8. What is meant by the greenhouse effect?
   a) The cooling of the atmosphere due to the absorption of EMR by the atmosphere.
   b) The warming of the atmosphere due to the absorption of EMR by the atmosphere.
   c) The destruction of the ozone layer.
   d) none of these

9. How have scientists been able to monitor changes in the earth’s atmosphere? They study ______.
   a) tree rings  b) ice cores
   c) sediment cores  d) all of these

10. What is the chemical formula for ozone?
    a) O  b) O₂
    c) O₃  d) O₄
11. What region of the electromagnetic spectrum is absorbed by ozone?

   a) ultraviolet           b) X-ray
   c) visible              d) infrared

**CORRECT RESPONSES TO QUESTIONS PERTAINING TO COMPETENCY #2**

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**COMPETENCY #3
QUESTIONS FROM EXAM #4 THAT PERTAIN TO POLYMERS**

1. The small molecules used to synthesize polymers are called _____ .
a) macromolecules   b) monomers
c) elastomers       d) peptides

2. Which type of polyethylene has the greatest amount of branched chains?
   a) low density polyethylene
   b) high density polyethylene
   c) polyethylene
   d) none have any branches

3. Which polymer material occurs naturally?
   a) nylon
   b) dacron
   c) polycarbonates
   d) rubber

4. Polymerization is a (n) _____ .
   a) formation of large molecules out of little ones
   b) formation of small molecules out of large ones
   c) analysis of the chemical content of polymers
   d) effective means of producing molecules of intermediate size, but not very large ones

5. ______ discovered the process of vulcanization of rubber.
   a) Giulio Natta
   b) Karl Ziegler
   c) Charles Goodyear
   d) Leo H. Baekeland

6. The discovery of Nylon in 1935 was made by this DuPont employee
   a) W. Carothers
   b) S. Kwolek
   c) L. Baekeland
   d) C. Goodyear
### Correct Responses to Questions Pertaining to Competency #3

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<tr>
<th>QUESTION #</th>
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