

LIFE AND PHYSICAL SCIENCES
Student Learning Outcome Alignment Form

Course Prefix/Number: CHEM 1305

Course Title: Introductory Chemistry I

| Core Objective | Course SLO | General Learning Activities | Assessment |
|---------------------------------|---|---|--|
| Critical Thinking Skills | (SLO #3) The student will differentiate between the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic table, bonding patterns, and shapes of molecules. | Student lab teams will complete the lab activity “The Ties That Bind.” Students investigate the physical properties of compounds with ionic and covalent bonding. The experiments include melting point, conductivity, and solubility in water and acetone. Based on the trends that they observe, they classify various unknowns, given only the formula, as being either ionic or covalent. As a team, the student complete and submit a lab report. See attached activity. | Grade, see attached rubric |
| Communication Skills | (SLO #3) The student will differentiate between the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic table, bonding patterns, and shapes of molecules. | Student lab teams will complete the lab activity “The Ties That Bind.” Students investigate the physical properties of compounds with ionic and covalent bonding. The experiments include melting point, conductivity, and solubility in water and acetone. Based on the trends that they observe, they classify various unknowns, given only the formula, as being either ionic or covalent. As a team, the student complete and submit a lab report. See attached activity. | Grade, see attached rubric. |
| Empirical & Quantitative Skills | (SLO #3) The student will differentiate between the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic | Student lab teams will complete the lab activity “The Ties That Bind.” Students investigate the physical properties of compounds with ionic and covalent bonding. The experiments include melting point, conductivity, and solubility in water and acetone. Based on the trends that they observe, they classify | Grade, see attached rubric |

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| | table, bonding patterns, and shapes of molecules. | various unknowns, given only the formula, as being either ionic or covalent. As a team, the student complete and submit a lab report. See attached activity. | |
| Teamwork | (SLO #3) The student will differentiate between the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic table, bonding patterns, and shapes of molecules. | Student lab teams will complete the lab activity "The Ties That Bind." Students investigate the physical properties of compounds with ionic and covalent bonding. The experiments include melting point, conductivity, and solubility in water and acetone. Based on the trends that they observe, they classify various unknowns, given only the formula, as being either ionic or covalent. As a team, the student complete and submit a lab report. See attached activity. | Grade, see attached rubric |

CRITICAL THINKING VALUE RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
|---|---|---|--|---|---|
| Explanation of Issues | Did not state issue. | Issue is stated without clarification or description. | Issue is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined and/or backgrounds unknown. | Issue is stated, described, and clarified so that understanding is not seriously impeded by omissions. | Issue is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding. |
| Evidence | Does not identify the basic components of an issue | Information is taken from sources without any interpretation. Viewpoints of experts are taken as fact, without question | Information is taken from sources with some interpretation but not enough to develop a coherent analysis or synthesis. | Information is taken from sources with enough interpretation to develop a coherent analysis or synthesis. | Information is taken from sources with enough interpretation to develop a comprehensive analysis or synthesis. |
| Influence of Context and Assumptions | Did not show awareness of the issue. | Show an emerging awareness of present assumptions. | Questions some assumptions. Identifies relevant information when presenting a position. | Identifies own and others' assumptions and several relevant contexts when presenting a position. | Thoroughly analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position. |

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|---|--|--|--|--|---|
| Student's Position | Takes no position on issue | Specific position is stated but is simplistic and obvious. | Specific position acknowledges different sides of an issue. | Specific position takes into account the complexities of an issue. Others' points of view are acknowledged within position. | Specific position is imaginative. Limits of position acknowledged. Other points of view are synthesized. |
| Conclusions and Related Outcomes | Does not use previously learned information in new situations. | Conclusion is inconsistently tied to some of the information discussed; related outcomes are oversimplified. | Conclusion is logically tied to information; some related outcomes are identified. | Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes are identified clearly | Conclusions and related outcomes are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order |

Communication RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric and Making Learning Real

Definition

Written communication is the development and expression of ideas in writing.

Oral Communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Visual Communication is the use of images to persuade, entertain, inform, and enlighten an observing audience of products, ideas, and messages.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
|--|--|--|---|---|---|
| Quality of Information and Organization | Presentation lacks main points and related details. Information lacks connection to the presentation topic. Information is not organized. | Main points are not clear and lack significant detail. Some information is linked to the presentation topic. Information is loosely organized. | Main points are somewhat clear but could use more detail. Most information is linked to the presentation topic. Information is organized. | Main points are clear and detailed. Information is linked to presentation topic. Information is well organized. | Main points are very clear and very detailed. Information is directly linked to presentation topic. Information is very organized. |
| Nonverbal Communication | Speaker appears very uneasy and insecure. Speaker faces away from the audience or makes no eye contact. Speaker appears disengaged from the audience. Speaker uses few body motions or gestures or has gestures or movements that distract the audience. | Speaker appears uneasy and somewhat insecure. Speaker rarely faces the audience or makes eye contact. Speaker rarely appears to be engaging with the audience. Speaker uses few body motions or has gestures or movements that distract the audience.. | Speaker appears generally at ease and confident. Speaker sometimes faces the audience and maintains eye contact. Speaker sometimes appears to be engaging with the audience. Speaker's body motions and gestures neither support nor detract from presentation. | Speaker appears fairly comfortable and confident. Speaker generally faces the audience and maintains good eye contact. Speaker generally appears to be engaging with the audience. Speaker uses body motions and gestures well. | Speaker appears very comfortable and confident. Speaker consistently faces the audience and maintains good eye contact. Speaker consistently appears to be engaging with the audience. Speaker uses body motions and gestures very effectively. |

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| Quality of Verbal Communication | Speaker's voice is consistently too weak or too strong. Speaker fails to use inflections to emphasize key points and create interest or often uses inflections inappropriately. Speaker's talking paces is consistently too slow or too fast. | Speaker's voice is frequently too weak or too strong. Speaker rarely uses inflections to emphasize key points and create interest or speaker sometimes uses inflections inappropriately. Speaker's talking pace is often too slow or too fast. | Speaker's voice is generally steady strong and clear. Speaker sometimes uses inflections to emphasize key points and create interest. Speaker's talking pace is appropriate. | Speaker's voice is steady, strong, and clear. Speaker often uses inflections to emphasize key points and create interest. Speaker's talking pace is mostly appropriate. | Speaker's voice is very confident, steady, strong, and clear. Speaker consistently uses inflections to emphasize key points or to create interest. Speaker's talking pace is consistently appropriate. |
| Visual Tools | Visual aids demonstrate no creativity or clarity and are often difficult to read. Presentation is weakened by the visual tools. | Visual aids have limited creativity or clarity or are sometimes difficult to read. Presentation is not enhanced by the visual tools. | Visual aids are reasonably creative, clear, and easy to read. Presentation is sometimes enhanced by the visual tools. | Visual aids are usually creative, clear, and easy to read. Presentation is often enhanced by the visual tools. | Visual aids are very creative, clear, and easy to read. Presentation is consistently enhanced by the visual tools. |
| Appropriate Use of Vocabulary | Few or no terms are included in the presentation. May or may not be used appropriately. Lacks context. | Several terms are included in the presentation. May or may not be used appropriately. May lack context. | Most terms are included in the presentation. Generally used appropriately. Generally used in appropriate context. | All terms are included in the presentation. Used effectively. Used in context. | All terms are included in the presentation. Used in unique and creative ways. Used in context |
| Precision and Detail in Documents Produced | Written documents have numerous errors and lack detail. Little care taken in the production. | Documents may have some errors and show some detail. Some care has been taken in production. | Evident that written documents are correct and show a general attention to detail and accuracy. General care has been taken in production. | Clearly evident that written documents are correct, detailed and accurate. Care has been taken in production. | Documents are clear, well-constructed, accurate, and show attention to detail. Extra care has been taken in the production of written documents. |

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| Overall Presentational Effectiveness | The presentation was weak and not effective. | The presentation was average and somewhat effective. | The presentation was good and effective. | The presentation was very good and effective. | The presentation was exceptional and extremely effective. |
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Empirical and Quantitative Skills RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

The ability to formulate an inquiry that is scientific or mathematical in nature, and then manipulate and analyze numerical data and/or follow an investigative process using empirical and/or quantitative reasoning to satisfy the inquiry and create informed conclusions.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
|-----------------------|---|--|---|---|--|
| Identification | The purpose, components, and variables of the investigation/project are not identified. | The purpose, components, and variables of the investigation/project are somewhat identified. | The purpose, components, and variables of the investigation/project are mostly identified | The purpose, components, and variables of the investigation/project are clearly identified.. | The purpose, components, and variables of the investigation/project are clearly identified. |
| Assimilation | The information that is required for an analysis of all investigative components is not evident. If applicable, values are incorrectly translated into variables and no necessary formulas are present. | The information that is required for an analysis of all investigative components is somewhat evident. If applicable, values are incorrectly translated into variables and some necessary formulas are present. | The information that is required for an analysis of all investigative components is mostly evident. If applicable, some values are correctly translated into variables and most necessary formulas are present. | The information that is required for an analysis of all investigative components is evident. If applicable, most values are correctly translated into variables and all necessary formulas are present. | The information that is required for an analysis of all investigative components is clearly evident. If applicable, values are correctly translated into variables and all necessary formulas are present. |
| Analysis | Most investigative or quantitative components are not scrutinized. The | Some investigative or quantitative components are scrutinized. Some | All investigative or quantitative components are somewhat | All investigative or quantitative components are scrutinized. The | All investigative or quantitative components are methodically |

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| | steps followed are illogical and/or irrelevant to the desired result. The proper tools/ technology were not used and/or integrated into the final product. Any notation is not consistent and not defined. | steps followed are somewhat logical and relevant to the desired result. The proper tools/ technology were somewhat used and not integrated into the final product. Any notation is somewhat consistent but not defined. | scrutinized. The steps followed are mostly logical and relevant to the desired result. The proper tools/ technology were mostly used and somewhat integrated into the final product. Any notation is mostly consistent and defined. | steps followed are logical and relevant to the desired result. The proper tools/ technology were used and mostly integrated into the final product. Any notation is consistent and well defined. | scrutinized. The steps followed are logical and relevant to the desired result. The proper tools/ technology were used and well integrated into the final product. Any notation is consistent and well defined. |
| Presentation | A summary of the analysis is either inadequately presented or not presented at all. The presented information is mostly incorrect, and/or of poor quality, and/or the terminology/figures are inaccurate and/or hard to understand. Few or no visual representations of evidence are acceptably scaled/ represent the analysis findings. | A partial summary of the analysis is presented. The presented information is somewhat correct, of adequate quality, and the terminology/figures are somewhat accurate and relatively easy to understand. Some visual representations of evidence are acceptably scaled and represent the analysis findings. | A summary of the analysis is presented. The presented information is mostly correct, of good quality, and the terminology/figures are mostly accurate and easy to understand. Most visual representations of evidence are acceptably scaled and represent the analysis findings. | A good summary of the analysis is presented. The presented information is correct, of good quality, and the terminology/figures are accurate and easy to understand. Most visual representations of evidence are well-scaled and/or well represent the analysis findings.. | A concise summary of the analysis is presented. The presented information is correct, of high quality, and the terminology/figures are accurate and easy to understand. All visual representations of evidence are well-scaled and well represent the analysis findings. |
| Application | The integration does not include all steps of the investigation and does not lead to an accurate, nor complete conclusion | The integration of most steps of the investigation lead to a somewhat accurate, partially complete conclusion that is | The coherent integration of most steps of the investigation lead to an accurate, mostly complete, acceptable conclusion that is | The coherent integration of all steps of the investigation lead to an accurate, mostly complete, relevant conclusion that is | The coherent integration of all steps of the investigation lead to an accurate, complete, relevant conclusion that |

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| | that relates to the initial investigative argument. | relative to the initial investigative statement. | relative to the initial investigative statement. | relative to the initial investigative statement. | is relative to the initial investigative statement. |
|--|---|--|--|--|---|

Teamwork Skills RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

Teamwork is behaviors under the control of individual team members, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
|---|---|---|--|---|--|
| Contributes to Team Meetings | Does not collect any relevant information; no useful suggestions to address team's needs; | Shares ideas but does not advance the work of the group. | Offers new suggestions to advance the work of the group | Offers alternative solutions or courses of action that build on the ideas of others. | Helps the group move forward by articulating the merits of alternative ideas or proposals |
| Facilitates the Contributions of Team Members | Often argues with team mates; doesn't let anyone else talk; occasional personal attacks and "put-downs"; wants to have things done his way and does not listen to alternate approaches; | Engages group by taking turns and listening to others without interrupting. | Engages group by restating the views of other members and/or asking questions for clarification. | Engages group by constructively building upon or synthesizing the contributions of others.. | Engages group by both constructively building upon and synthesizing the contributions of others as well as noticing when someone is not participating and inviting him/her to engage. |
| Individual Contributions Outside of Team Meetings | Completes no assigned tasks outside of team meetings. | Completes some assigned tasks by deadline. | Completes all assigned tasks by deadline; work accomplished advances the project. | Completes all assigned tasks by deadline; work accomplished and is thorough, comprehensive, and advances the project. | Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project. Proactively helps other team members complete their assigned tasks to a similar level of excellence. |
| Fosters Constructive Team Climate | Is argumentative and does not work with the team. | Supports a constructive group climate by treating other members respectfully. | Supports a constructive group climate by treating other | Supports a constructive group climate by treating other members respectfully, | Supports a constructive group climate by treating other members respectfully, |

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| | | | members respectfully and conveying a positive attitude about the group and its work. | conveying a positive attitude about the group and its work, and motivating other group members. | conveying a positive attitude about the group and its work, motivating other group members, and providing assistance to group members. |
| Responds to Conflict | Is not present enough to engage in conflict. | Passively accepts alternate viewpoints/ideas/opinions. | Redirects focus toward common ground, toward task at hand (away from conflict).. | Identifies and acknowledges conflict and stays engaged with it. | Addresses conflict directly and helps to manage/resolve it in a way that strengthens overall group cohesiveness. |

Syllabus: Introductory Chemistry

Course Number: Chem 1405

Semester & Year: Spring 2013

Instructor Information

- Name: Monica Smith
- Telephone: (903) 278-8463
- E-mail: monica.smith@texarkanacollege.edu or msmith@pgsid.net
- Office Hours: I have no assigned office hours, but I can meet with you before or after class upon request.

Textbook Information

- Basic Chemistry, ISBN #978-0-321-66310-8, Timberlake & Timberlake, 3rd Edition
- Laboratory Guide for Introductory Chemistry, C. Howard and M. Sheets

Other required materials

- Safety goggles
- Scientific calculator (does not have to be graphing)
- Dry erase marker

Student Learning Outcomes for the Course

1. The student will demonstrate understanding of the science process and terms used in scientific communication, and will be able to recognize and define basic chemical terminology involving matter and energy.
2. The student will understand and be able to use different measurement units and tools, convert from one unit to another, and perform calculations involving density and heat.
3. The student differentiate the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic table, bonding patterns and shapes of molecules.
4. The student will be able to name and write the formulas for simple inorganic compounds including salts, acids, and covalent molecules.
5. The student will be able to balance and characterize chemical equations and I be able perform calculations involving the mole and stoichiometry.
6. The student will be able to explain solvation and solve problems related to solution concentration and dilution.
7. The student will be able to describe the three acid-base theories and be able to use pH.
8. The student will be familiar with basic chemical lab equipment, and able to follow simple experimental protocol.

Student Requirements and Assessment

- Tentative dates for unit tests are as follows:
 - **Unit 1 Test** February 5
 - **Unit 2 Test** March 5
 - **Unit 3 Test** April 2
 - **Unit 4 Test** April 23
 - **Unit 5 Test** May 7
 - **Weekly Quizzes** **Weekly**
 - **Labs** **Every Thursday**
 - **Semester Exam** May 14
- Your grades will be taken from 5 unit test grades, lab grades, weekly quiz grades, homework grades, and a final exam. In averaging your grades, I will count the lab average as one test grade, the homework average as one test grade, quizzes as two test grades, each unit test will each count as a test grade, and the final will count as two test grades. This gives a total of 11 grades. However, I will drop one grade—either one unit test, one of the quiz grades or one of the final exam grades. I will not drop the homework or lab grade. I also will not drop a zero or missing grade.

Grading Scale

- You are encouraged to keep track of your grades at www.engrade.com. I will give you a password to join this online grade book.

| Grade | |
|-------|----------|
| A | 90-100 |
| B | 80-89 |
| C | 70-79 |
| D | 60-69 |
| F | 59-below |

Class Schedule

- During the Tuesday night class meetings, the lecture method will be used and new course material will be presented. You will be required to participate in activities and discussions. Quizzes and test will also be given. They will be announced the class period before. Power point slides used in the course and some video lessons will be available at www.edmodo.com.

You will need to join the site with your own user name and password. The group that you want to join is: **syzkee**

- The Thursday night class is the scheduled lab session. We will also use this night to answer questions over homework, take weekly quizzes, and occasionally take tests. In short, this time will be used for experimentation and hands on learning as well as serve as a study session for the course.

| Month | Week of | Material to be covered in lecture |
|---------|---------|--|
| January | 22 | Go over syllabus and discuss lab equipment and lab safety, begin chapter 2 |
| | 29 | Chapter 2 continued |

| | | |
|----------|----|------------------------------------|
| February | 5 | Chapter 3 |
| | 12 | Test over Unit 1, Begin chapter 4 |
| | 19 | chapter 4 continued |
| | 26 | Chapter 5 |
| March | 5 | Test over Unit 2, Begin chapter 6 |
| | 11 | Spring Break |
| | 19 | Chapter 6 continued |
| | 26 | Basic molecular geometry |
| April | 2 | Test over Unit 3, begin chapter 7 |
| | 9 | Chapter 8 and 9 |
| | 16 | Chapter 9 continued |
| | 23 | Test over Unit 4, Begin chapter 12 |
| | 30 | Chapter 14 |
| May | 7 | Test on Unit 5, review for finals |
| | 14 | Finals |
| | | |

Attendance Policy

- The maximum number of allowed absences by the Biology and Chemistry Department at TC is 4. Exceeding this limit may cause you to be withdrawn from TC courses. If there is a problem, please contact me. The last date that you attend class will be listed on the final grade sheet and you most likely will have to pay back money received from grants or scholarships if you are dropped from the course.

Make-up Policy

- **As a general policy, I do not give make up exams.** Test dates will be announced at least one week in advanced. Arrangements need to be made in advance if there is a conflict. If there is a problem, please contact me.
- If you miss a quiz, I will allow you to make this up at the end of the next class. If you fail to make it up, this will result in a zero for the quiz. If there is a problem, please contact me.

Academic Integrity Statement

Scholastic dishonesty, involving but not limited to cheating on a test, plagiarism, collusion, or falsification of records will make the student liable for disciplinary action after being investigated by the Dean of Students. Proven violations of this nature will result in the student being dropped from the class with an "F".

This policy applies campus wide, including TC Testing Center, as well as off-campus classroom or lab sites, including dual credit campuses. This information can be found in the Student Handbook at <https://texarkanacollege.edu>.

Disability Act Statement:

Texarkana College complies with all provisions of the Americans with Disabilities Act and makes reasonable accommodations upon request. Please contact Larry Andrews at (903)823-3283, or go by the Recruitment, Advisement, and Retention Department located in the Administration building for personal assistance.

If you have an accommodation letter from their office indicating that you have a disability which requires academic accommodations, please present it to me so we can discuss the accommodations that you might need for this class. *It is best to request these changes at the beginning if not before the start of class* so there is ample time to make the accommodations..

Financial Aid:

Attention! Dropping this class may affect your funding in a negative way! You could owe money to the college and/or federal government. Please check with the Financial Aid office before making a decision.

Student Learning Outcomes (SLO)

CHEM 1305

1. The student will demonstrate understanding of the science process and terms used in scientific communication, and be able to recognize and define basic chemical terminology involving matter and energy.

2. The student will understand and be able to use different measurement units and tools, convert from one unit to another, and perform calculations involving density and heat.

3. The student differentiate the basic parts of the atom, how the concept of atoms evolved historically, what role these parts play, and how they influence the periodic table, bonding patterns and shapes of molecules.

4. The student will be able to name and write the formulas for simple inorganic compounds including salts, acids, and covalent molecules.

5. The student will be able to balance and characterize chemical equations and be able perform calculations involving the mole and stoichiometry.

6. The student will be able to explain solvation and solve problems related to solution concentration and dilution.

7. The student will be able to describe the three acid-base theories and be able to use pH.

8. The student will be familiar with basic chemical lab equipment, and able to follow simple experimental protocol.

Name _____ Date _____ Day M T W Th F Hour _____

"People must understand that science is inherently neither a potential for good or for evil. It is a potential to be harnessed by man to do his bidding. Man will determine its direction and its effects. Man, therefore, must understand science if he is to harness it, to live with it, to grow with it." Glenn T. Seaborg.

CHEMISTRY 1405

Laboratory 6

The Ties That Bind

Introduction

Two or more elements chemically combined form a compound. A chemical bond is the force that holds the elements in a compound together. In general bonds are classified as either ionic or covalent depending on the electronegativity differences between the elements involved. An ionic bond results from a transfer of electrons generally from a metal to a nonmetal where the electronegativity difference is large. The anion and the cation are held together electrostatically. Covalent bonds form when two or more nonmetals share electrons. The electronegativity difference between these elements is not large.

Ionic and covalent compounds have different properties. On the basis of such characteristics as melting point, boiling point, solubility, electrical conductivity, color, odor, etc., we can distinguish between them in the lab. In this experiment you will be observing several properties of some ionic and covalent compounds looking for patterns in their properties. On the basis of these patterns, you will identify each compound as either ionic or covalent. *Remember that these are generalized patterns so not every compound will fit neatly into one category or the other.*

Procedure

1. Begin heating a water bath for later use.
2. Cut a piece of notebook paper into six sections and label each with the name of one of the solids being tested. On each paper weigh out about one (1) gram of each substance. With a spatula or pencil divide the one gram in half on the paper.
3. Label each of six test tubes 1-6 corresponding to the numbers of the solid compounds in the data table.
4. Place 10 mL distilled water in each of the test tubes. Place 0.5 gram (half of the pile) of each of the solids in the appropriate tubes. Stopper the tubes and shake for two minutes. If the substance dissolves, it is soluble. Record. Remember that a solution is a homogeneous mixture. You should not be able to see the components of it if it dissolves completely. Some of these may dissolve partially. Note how much solid is in the bottom of the tube before shaking and compare to the amount after. If some solid seems to have "disappeared" the compound is soluble. If the substance does not dissolve at all, it is insoluble. Record.
5. Place the test tubes that contain insoluble compounds into the water bath for three minutes. Be sure to remove corks. Again shake the test tubes. Record your observations.

Name _____

- Pour the contents of one test tube into a small beaker. Place the electrodes of the conductivity tester into the solution. If the solution conducts electricity, the light bulb will light. If the solution does not conduct, the light will not go on. If the light is dim, the solution is considered to be a poor conductor. Test the conductivity of each of your six solutions recording the results. Rinse the electrodes with water from a wash bottle between tests.
- Clean all test tubes and stoppers.
- Place 5 mg acetone in each of the test tubes. Use caution when handling acetone. It is very flammable. Make sure there is no Bunsen burner operating around you. Place 0.5 gram (the rest of the pile) of each of the solids into the appropriate test tubes. Stopper the test tubes and shake them for two minutes. Record the solubilities.
- Do not test for conductivity with acetone. Rinse the test tubes and stoppers and clean up your bench.

Data

| | compound | solubility in room temp. water | solubility in hot water | solubility in acetone | melting point (°C) | conductivity |
|----|--------------------|--------------------------------|-------------------------|-----------------------|--------------------|--------------|
| 1. | sodium chloride | | | | 801 | |
| 2. | naphthalene | | | | 81 | |
| 3. | ammonium chloride | | | | 328 | |
| 4. | benzoin | | | | 135 | |
| 5. | copper(II) sulfate | | | | 560 | |
| 6. | glucose | | | | 158 | |

Conclusions

Determine whether each of the compounds is ionic or covalent by comparing the physical properties of each to sodium chloride, an ionic compound. Refer to your textbook to check your predictions. Complete the following table.

| | name | formula | bond type |
|-----|--------------------|--|-----------|
| 7. | sodium chloride | NaCl | ionic |
| 8. | naphthalene | C ₁₀ H ₈ | |
| 9. | ammonium chloride | NH ₄ Cl | |
| 10. | benzoin | C ₁₄ H ₁₂ O ₂ | |
| 11. | copper(II) sulfate | CuSO ₄ | |
| 12. | glucose | C ₆ H ₁₂ O ₆ | |

Questions

1. Look at your results carefully. In general what could you say about the solubility of ionic compounds? covalent compounds?
2. In general how did the melting points of ionic compounds compare to the melting points of covalent compounds?
3. Again, generally, how did the conductivity of ionic compounds compare to the conductivity of covalent compounds?
4. Did any compounds seem not to fit exactly into either category? Which ones? Offer an explanation.
5. Based on your lab conclusions, make the following predictions.

| | | |
|-----|--|--|
| 13. | solubility of sodium iodide | |
| 14. | melting point of sodium iodide | |
| 15. | conductivity of pentanol, $C_5H_{12}O$ | |
| 16. | conductivity of magnesium nitrate | |

6. Based on your lab conclusions, predict whether each of the following is primarily ionic or covalent Explain your answer for each.

| | | |
|-----|------------------|--|
| 17. | sodium iodide | |
| 18. | methane, CH_4 | |
| 19. | calcium chloride | |
| 20. | water | |

7. What would you expect the trend in melting point, conductivity, and solubility to be for polar covalent compounds? Give an example of a polar covalent compound.