IPC A Review Sheet
Final Exam

This Final Exam Review can help you prepare for the final exam by giving you an idea of what you need to study, review, and learn. To succeed, you should be thoroughly familiar with the subject matter before you attempt to take the exam.

Materials Needed

If you are taking a print exam, you must bring a #2 pencil to complete the exam. You will receive a computer-graded answer sheet when you arrive at the testing center. The proctor will provide scratch paper.

Exam Structure

You will be allowed **3 hours** to complete this exam. The IPC A exam consists of 50 multiple-choice questions worth 2 points each for a total of 100 points. The exam covers a wide variety of topics. To help you study, we have isolated 6 key topics and provided study tips and sample questions for each. You can expect about 10 multiple-choice questions on each of the following unit topics:

Unit Topic 1: The Nature of Physical Science
Unit Topic 2: Matter
Unit Topic 3: Periodic Table and Bonding
Unit Topic 4: Chemical Reactions
Unit Topic 5: Solutions
Unit Topic 6: Nuclear Chemistry

Scholastic Honesty

When you arrive at the testing center you will be asked to carefully read the exam rules and sign a statement agreeing to take the exam in accordance with the rules. This is called the Examinee's Certification. The following is a copy of these rules:

Examinee's Certification

This certification must be signed *before* the exam is administered and then returned with the completed examination attached, or credit for the exam will not be given.

Scholastic dishonesty is a serious academic violation that will not be tolerated. Scholastic dishonesty encompasses, but is not limited to:

- copying from another student's work;
- using an unauthorized testing proctor or taking the exam at an unauthorized testing location;
- using materials not authorized by a testing proctor;
- possessing materials that are not authorized by a testing proctor, such as lessons, books, or notes;
- knowingly using or soliciting, in whole or Topic, the contents of an unadministered test;
- collaborating with or seeking aid from another student without authorization during the test;
- substituting for another person, or permitting another person to substitute for oneself, in taking a course test or completing any course-related assignment;
- using, buying, stealing, or transporting some or all of the contents of an unadministered test, test rubric, homework answer, or computer program.

Evidence of scholastic dishonesty will result in a grade of *F* on the examination and an *F* in the course (if applicable).

At the testing center, you will be asked to sign a statement that says
you have read the above and agree to complete the examination with scholastic honesty.

Preparing for the exam

Be aware that the Final Exam covers a full semester's worth of work; be prepared to devote an adequate amount of study and preparation time so that you are ready to take the exam.

Part of your preparation for this exam depends on the work you have done throughout the course. As you worked through each unit of the course, you should have

- read all of the information in each lesson.
- responded to all interactive notebook prompts, and checked your answers when appropriate.
- printed all Unit Glossaries and secured them in your interactive notebook.
- completed all graphic organizers and secured them in your interactive notebook.
- completed all Practice Quizzes.
- completed all Graded Quizzes.

In addition, before taking the exam, you should:

- review all of the information in your interactive notebook.
- complete the Review Sheet practice questions (listed below) and check your answer against the key provided on the last page.
- revisit the lessons for all practice quizzes that you found challenging.

Additional Study Tips

The following information provides direction for your studies. For each part, you will find study tips and sample questions to give you a general idea of the types of questions you can expect to see on the exam.

Unit Topic 1: The Nature of Physical Science

Science is defined as the use of evidence to construct testable explanations and predictions of natural phenomena and the knowledge generated during this process. It is limited to answering questions that are testable. We test hypotheses using safe laboratory practices and the scientific method to generate reproducible data. We analyze this data to provide evidence to communicate conclusions that incorporate reason-based thinking.

Study Tips for Unit Topic 1:

This topic relates to Unit 1 and TEKS 1A, 1B, 2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, and 3D. Review the information in Unit 1 and be prepared to:

- describe the general layout of a lab.
- identify safe and effective lab practices.
- define science and understand it limitations.
- summarize the steps of the scientific method.
- select appropriate lab equipment/technology.
- illustrate trends from data using appropriate graphs.
- report data using appropriate units of measure.
- apply proportional reasoning to relate variables.
- justify conclusions from scientific investigations.
- evaluate scientific explanations using reason-based thinking.
- judge the impact of scientific claims and research.

Sample Questions for Unit Topic 1:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

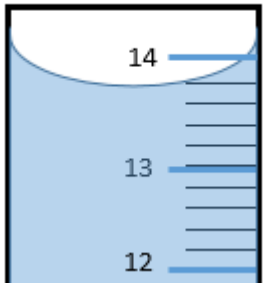
1. There are many safety rules that you must follow while you are performing a laboratory or field investigation. Which of the following correctly outlines one of these rules?

   A. Smelling chemicals directly to test the odor
   B. Determine if glassware is hot by grabbing it
   C. Properly disposing chemicals and materials
   D. Clean up spills before the instructor finds out

2. Which of the following can you do in science?

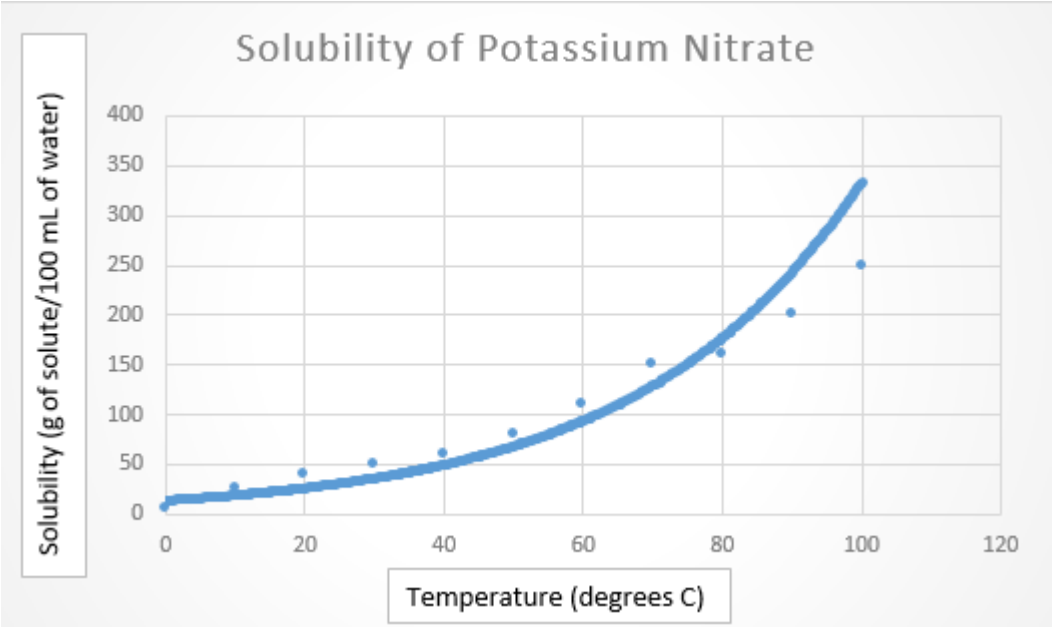
   A. Answer questions using opinions
   B. Model processes that occur in nature
   C. Provide answers to any question
   D. Discuss theories that cannot be disproven

3. Which of the following best describes the image below?



A. A graduated cylinder measuring 14.0 g.
B. A test tube measuring 13.8 mL.
C. A test tube measuring 14.0 g.
D. A graduated cylinder measuring 13.8 mL.

4. A student was asked to graph her data after a solubility lab, diagrammed below. According to this graph, how many grams of solute did she dissolve in water if she heated it to 90 degrees Celsius?



A. 250 g
B. 200 g
C. 150 g
D. 60 g

Unit Topic 2: Matter

Chemistry is the study of matter, which is anything that has mass and takes up space. The amount of space it takes up depends on the arrangement and motion of the atoms and molecules of matter. This also determines whether it is a solid, liquid, or gas. In addition to what state of matter it is in, we can also describe matter in terms of its physical and chemical properties.

Study Tips for Unit Topic 2:
This topic relates to Unit 2 and TEKS 6A, 7A, and 6C. Review the information in Unit 2 and be prepared to:

- examine the differences in the three states of matter.
- describe what happens to the arrangement of atoms and molecules in a sample of matter when it changes state.
- analyze the physical and chemical properties of matter.
- justify whether a sample of matter is real gold or fool's gold using its physical and chemical properties.

Sample Questions for Unit Topic 2:
The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

5. Which of the following best describes a state of matter?

   A. Solids: molecules are stationary
   B. Gases: molecules are very close together
   C. Solids: molecules are moving in random directions
   D. Gases: molecules are very far apart

6. Which of the following correctly fills in the blanks in the statement below?

As a substance is cooled, its molecules move more _____. An example is when a substance changes from a _____ to a _____ in a process called _____.

   A. quickly, liquid, gas, condensation
   B. slowly, gas, liquid, condensation
   C. slowly, liquid, gas, evaporation
   D. quickly, gas, liquid, evaporation

7. Which of the following correctly describes physical and chemical properties?

   A. To test physical properties, like color, a chemical reaction must occur.
   B. A chemical reaction is not needed to test chemical properties, like color.
   C. To test chemical properties, like reactivity, a chemical reaction must occur.
   D. A chemical reaction is not needed to test physical properties, like reactivity.

Unit Topic 3: Periodic Table and Bonding

All matter is made up of 118 elements that have different atomic structures. The Periodic Table organizes the elements based on their unique atomic structure, as well as their unique physical and chemical properties. Metals are organized on the left side of the Periodic Table. They are lustrous, malleable, conductive, reactive, and are solids at room temperature. Nonmetals (on the right side) are reactive and many are gases at room temperature. The Noble Gases are a group of elements that are completely unreactive. They have eight valence electrons, which makes them stable. All other elements have fewer than eight valence electrons, and they will form compounds with other elements to become stable. In this way, it is the atomic structure that determines the chemical reactivity of elements.

Study Tips for Unit Topic 3:
This topic relates to Unit 3 and TEKS 6B, 6D, 7B, and 3F. Review the information in Unit 3 and be prepared to:

- model the atomic structure of various elements using the Periodic Table.
- understand the role of atomic structure in the physical and chemical properties of elements.
- predict how a compound will form between elements using information from the Periodic Table.
- analyze the role of the physical and chemical properties of gold in history.

Sample Questions for Unit Topic 3:
The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

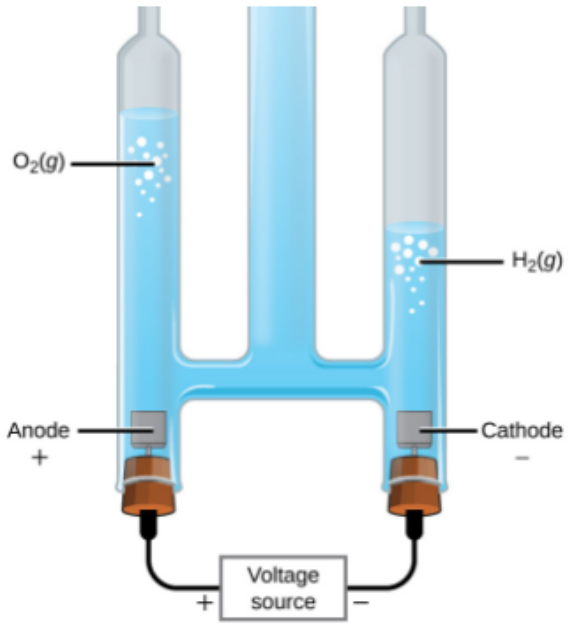
8. Which of the following is a correct analysis of an element's reactivity?

   A. Sodium is extremely reactive because it has one valence electron.
   B. Argon is extremely reactive because it has eight valence electrons.
   C. Potassium is completely unreactive because it has one valence electron.
   D. Chlorine is completely unreactive because it has seven valence electrons.

9. The first chemists, better known as alchemists, tried to create gold from lead through chemical reactions. Although they were unsuccessful, we learned a lot from their experimentation. Which of the following best describes a conclusion we can reach based on their failures?

   A. Lead and gold are two different nonmetals that are less reactive than other nonmetals.
   B. Lead is a reactive metal and gold is a reactive nonmetal.
   C. Lead is an unreactive nonmetal and gold is a reactive metal.
   D. Lead and gold are two different metals that are less reactive than other metals.

10. The diagram below shows what happens to water when an electric current is applied.



(This image adapted from OpenStax College. Download for free at http://cnx.org/contents/30189442-6998-4686-ac05-ed152b91b9de@18.13)

From this diagram we see that hydrogen gas (H_2) and oxygen gas (O_2) are produced in this process.

Which of the following correctly classifies this process?

   A. This is a physical change because new substances are formed with new properties.
   B. This is a physical change because the chemical makeup of the substance does not change.
   C. This is a chemical change because new substances are formed with new properties.
   D. This is a chemical change because the chemical makeup of the substance does not change.

Unit Topic 4: Chemical Reactions

Most elements are chemically unstable due to the arrangement of their electrons. The valence electrons of the atoms of these elements will interact with those of other atoms to form new substances that are stable. This interaction is what we call a chemical reaction. Chemical reactions can be represented by chemical equations that must be balanced to satisfy the Law of Conservation of Mass. Energy is also conserved during a chemical reaction, however the amount of energy stored in the molecules can change. If the amount of stored energy decreases, extra energy will be released as heat or light. This is known as an exothermic reaction. If the products store more energy than the reactants, then energy needs to be added to the reaction. This is known as an endothermic reaction. The end-products of chemical reactions occurring around us have serious impacts on our environment.

Study Tips for Unit Topic 4:

This topic relates to Unit 4 and TEKS 7C, 7D, 7F, and 3D. Review the information in Unit 4 and be prepared to:

- understand the information that a chemical equation gives us about a chemical reaction.
- demonstrate the conservation of mass during a chemical reaction.
- analyze the energy changes that accompany chemical reactions.
- describe the environmental impact of the end-products of different chemical reactions.

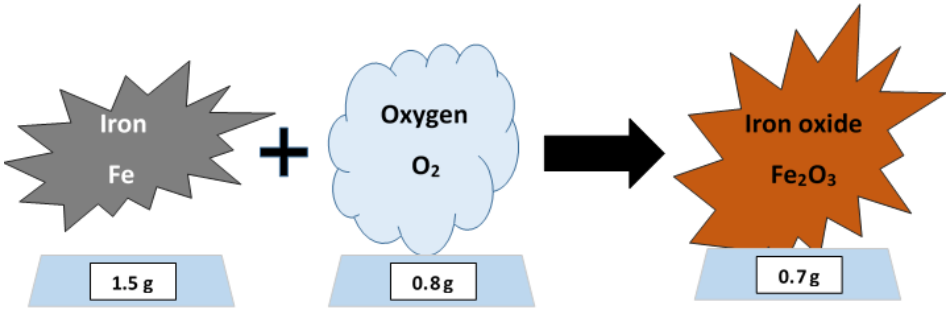
Sample Questions for Unit Topic 4:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

11. Which of the following demonstrates the law of conservation of mass?

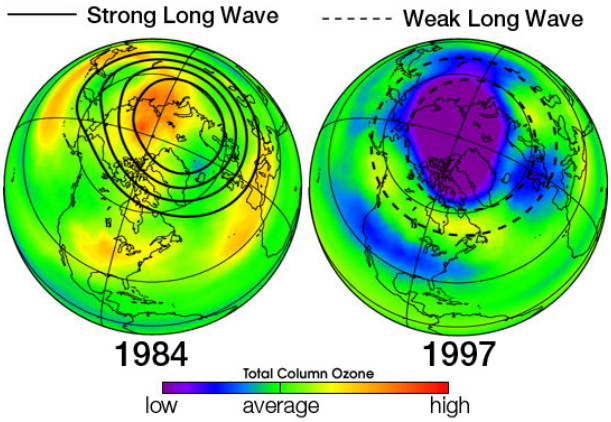
A. $(NH_4)_2CO_3 \rightarrow 2\ NH + 3\ H_2O$
B. The number and kids of atoms are the same in reactants and products.
C. Mass is destroyed during a chemical reaction.
D.



12. Which of the following correctly describes the image below?

A. This is an endothermic reaction. It feels cold to the touch, like cold packs.
B. This is an exothermic reaction. It feels hot to the touch, like hot packs.
C. This is an exothermic reaction. It feels cold to the touch, like cold packs.
D. This is an endothermic reaction. It feels hot to the touch, like hot packs.

13. The image below diagrams the depletion of the ozone layer as a result of the rise of pollutants in our atmosphere.



Which of the following describes what the depletion of the ozone layer is an example of?

A. The result of increasing levels of lead in our water supply
B. The result of decreasing the biodiversity of our ecosystems
C. The environmental impact of the end-products of nuclear reactions
D. The environmental impact of the end-products of chemical reactions

Unit Topic 5: Solutions

Water is an extremely important molecule on our planet due to its unique properties. A water molecule is made of two hydrogen atoms that share their electrons with an oxygen atom to become stable. This sharing is uneven and results in water being polar, meaning it has a positive end and a negative end. Water's polarity allows it to act like a magnet and temporarily pull apart other polar substances. This is what happens when a solute, like salt, dissolves in water, the solvent. The ability for a solute to dissolve in water depends on the nature of the solute and the temperature, pressure, and concentration of the solution.

Study Tips for Unit Topic 5:

This topic relates to Unit 5 and TEKS 6E, 6F, 7F, and 3E. Review the information in Unit 5 and be prepared to:

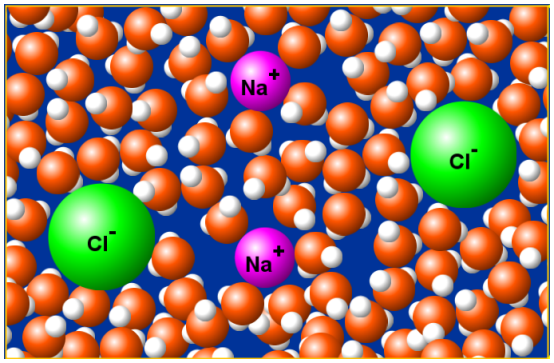
- analyze the relationship between the structure of water and its role as a solvent.
- investigate the properties of solutions.
- evaluate the factors that change how soluble a substance is in water.
- understand the environmental and economic implications of water quality and the careers involved.

Sample Questions for Unit Topic 5:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

14. What does the diagram below demonstrate?



A. Water is polar and can temporarily separate other polar substances.
B. Water is polar and can chemically separate other polar substances.
C. Water is nonpolar and can temporarily separate other nonpolar substances.
D. Water is nonpolar and can chemically separate other nonpolar substances.

15. Which of the following correctly describes a solution of salt water?

A. Salt is the solute and water is the solvent
B. Salt is the solvent and water is the solute
C. Salt is the solute and water is the solution
D. Salt is the solution and water is the solvent

16. Which of the following would increase the solubility of a gas in a solution?

A. Decreasing the pressure
B. Decreasing the temperature
C. Increasing the concentration
D. Making the gas nonpolar

Unit Topic 6: Nuclear Chemistry

The identity of an atom is determined by the number of protons. If the number of protons in the nucleus of an atom changes, the identity of the atom also changes. This occurs during a nuclear reaction. Fission and fusion are both examples of nuclear reactions. In fission, a large nucleus splits into smaller nuclei. In fusion, two small nuclei combine to form a larger nucleus. In both types of nuclear reactions, new elements are formed, enormous amounts of energy are released, and radiation is produced. This radiation can be used in fields of medicine to produce diagnostic images, treat diseases, and disinfect tools. Fission is currently being used in nuclear power plants and in weapons. Fusion occurs naturally on the sun and other stars.

Study Tips for Unit Topic 6:
This topic relates to Unit 6 and TEKS 7E and 3B. Review the information in Unit 6 and be prepared to:

- describe types of nuclear reactions such as fission and fusion.
- describe the role of nuclear reactions in medicine.
- research the role of nuclear reactions in energy production.
- evaluate the arguments for and against different types of power.

Sample Questions for Unit Topic 6:
The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST responses to the following questions.

17. Which of the following correctly compares fission and fusion?

    A. Fission makes heavier nuclei, while fusion makes lighter nuclei.
    B. Neither fission nor fusion occur naturally.
    C. Both fission and fusion produce different elements.
    D. Fission produces energy, while fusion destroys energy.

18. Which of the following correctly describes a role that nuclear reactions have in applications such as medicine and energy production?

    A. The light produced in nuclear reactions drives solar cars.
    B. Nuclear reactions produce electrons that generate electricity.
    C. The radiation produced in nuclear reactions is used to treat diseases.
    D. Nuclear reactions produce greenhouse gases that trap harmful UV radiation.

Answer Key

Item Number	Correct Answer	TEKS expectation
1	C	1A, 1B
2	B	2A
3	D	2B, 2C
4	A	2D
5	D	6A
6	B	7A
7	C	6C
8	A	6B
9	D	6D, 3F
10	C	7B
11	B	7C
12	A	7D
13	D	7F, 3D
14	A	6E
15	A	6E
16	B	6F
17	C	7E
18	C	7F