



# EVIDENCE PORTFOLIO

2<sup>nd</sup> EXTRAORDINARY OPPORTUNITY

SELECTED  
TOPICS IN  
CHEMISTRY

Student Name: \_\_\_\_\_

Group: \_\_\_\_\_

Student ID: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher: \_\_\_\_\_

This portfolio is worth **50%** of your final grade. This value will be obtained as long as the following requirements are met:

1. Write your complete identification information.
2. The portfolio must be submitted in printed form on the day of the exam.

**FOLLOW THE INSTRUCTIONS PROVIDED BY YOUR TEACHER FOR COMPLETING THIS PORTFOLIO.**

**ATTENTION!!!**

Plagiarism and the sale of academic material contained in this portfolio will be sanctioned according to University Regulations.



UANL

UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN



# Selected Topics in Chemistry

## Portfolio of Activities Second Chance

Student's name:

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Teacher:

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Plagiarism and unauthorized distribution of this material must be reported.

Faculty and support staff are not authorized to make the distribution and review of this material conditional.

## Learning Unit Objective

The Selected Topics of Chemistry Learning Unit (UA) (TSQ) has the primary objective of addressing a variety of advanced topics with very specific application within the area of Chemistry. This LU seeks not only to broaden the knowledge of Applied Chemistry, but also to seek the application of various skills such as mathematical reasoning, decision-making, critical thinking, among others. In order to comply with the foregoing, the following theoretical contents are addressed within the LU:

- **Important organic compounds:** The study of the main biomolecules present in beings is approached from various approaches such as their classification, functions and biological importance. In addition, the industrial application of some chemical compounds related to biomolecules is addressed.
- **Oxidation and reduction:** The main concepts related to oxidation-reduction reactions are analyzed, as well as the calculations related to the balance of oxidation-reduction equations and the applications of electrochemistry.
- **Gases and physicochemistry:** The main laws that govern the behavior of the gas state are studied, as well as their possible applications in our environment. In addition, the most relevant mathematical concepts and calculations related to the first law of thermodynamics are addressed
- **Thermodynamics and chemical kinetics:** The most relevant concepts related to the second and third laws of thermodynamics are analyzed. Also, the study of the main concepts related to chemical kinetics, the main factors that affect the speed of a reaction and the main chemical reactions from the point of view of chemical kinetics are addressed.

**General policies proposed by the faculty**  
**for the Learning Unit**

1. The student will perform each of the activities embodied herein in accordance with the instructions included herein.
2. The student must deliver the corresponding activities on the date and in the format requested by the teacher.
3. Only the teacher who taught the learning unit in the first opportunity will be responsible for assigning the corresponding points to the portfolio of activities. No other teacher can modify the number of points assigned in the second Chance portfolio.
4. Submitting all the activities is not a guarantee that the student will obtain the total of the corresponding points. This is because the teacher must review and evaluate the activities using an assessment instrument; this is in order to assign the points corresponding to the portfolio of activities.
5. If the student incurs plagiarism of all portfolio activities, then the latter will be invalidated. Likewise, if you plagiarize some sections of the portfolio, then these will be invalidated.
6. The delivery of a different version of the portfolio will be cause for automatic nullity of the document delivered.
7. Failure to read the policies of the academy, as well as the instructions for the resolution and preparation of this portfolio, does not take away the responsibility of the student and the impact that this could generate on the grade obtained.
8. It is the student's responsibility to contact the instructor in advance to clarify any questions they may have regarding the portfolio assignments, the due date, and the submission format. It should be noted that the instructor, to the extent of their availability, must provide guidance to the student, provided the student requests it in advance.
9. Failure to read the academy's policies, as well as the instructions for completing this portfolio, does not relieve the student of their responsibility or mitigate the impact this may have on their final grade.

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**Student's full name or signature**

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**Signature of the student's father, mother,  
or legal guardian**

## General instructions

Please read the following instructions very carefully.

- The portfolio must be completed entirely by hand using a blue ink pen. In addition, students must write their full name on every page of the portfolio.
- Each section of the portfolio contains an assessment rubric, which the student must read to meet all assessment criteria.
- The portfolio will only be accepted in the format specified by the academic department. To this end, the student must consult with the instructor or the Department of Academic Development (DECA).
  - a) If the academic department requests the portfolio in physical format, the student must submit it on the day of the make-up exam to the instructor administering the exam.
  - b) If the academic department requests the portfolio in digital format. The student must submit it on the day of the second-chance exam to a folder in MS Teams that the instructor must create.
  - c) If the portfolio is requested in digital format, the file name must follow the following format.

**Port2aOp\_TSQ\_Initials of the student's full name.**
- Students must follow the instructions, meet the deadline, and submit the portfolio in the required format.

### Activity Portfolio Scoring

STAGE	POINTS
Stage 1	<b>12.5 points</b>
Stage 2	<b>12.5 points</b>
Stage 3	<b>12.5 points</b>
Stage 4	<b>12.5 points</b>
<b>Total</b>	<b>50 points</b>

# Stage 1

# Important organic compounds

**Dimension 1**

**Instructions:** As a diagnostic activity, answer each of the following questions about organic compounds.

1- What is the difference between chemistry and chemistry?

R=

2- What are the main functions of lipids or fats in the body?

R=

3-What are the main vitamins and minerals that the human body requires?

R=

4-What are enzymes?

A=

**Dimensión 2**

**Instrucciones:** Defina correctamente cada uno de los siguientes conceptos.

Bioquímica

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Química

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Química orgánica

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Carbohidratos

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Proteínas

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Aminoácidos

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Lípidos

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Vitaminas

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Colesterol

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Triglicéridos

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Ácidos nucleicos

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Sustrato

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Enzima

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ADN

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Detergente

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Jabón

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Saponificación

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**Dimension 2**

**Instructions:** Correctly define each of the following concepts.

Biochemistry

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Chemistry

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Organic chemistry

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Carbohydrates

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Proteins

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Amino acids

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Lipids

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Vitamins

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Cholesterol

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Triglycerides

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Nucleic acids

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Substrate

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Enzyme

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DNA

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RNA

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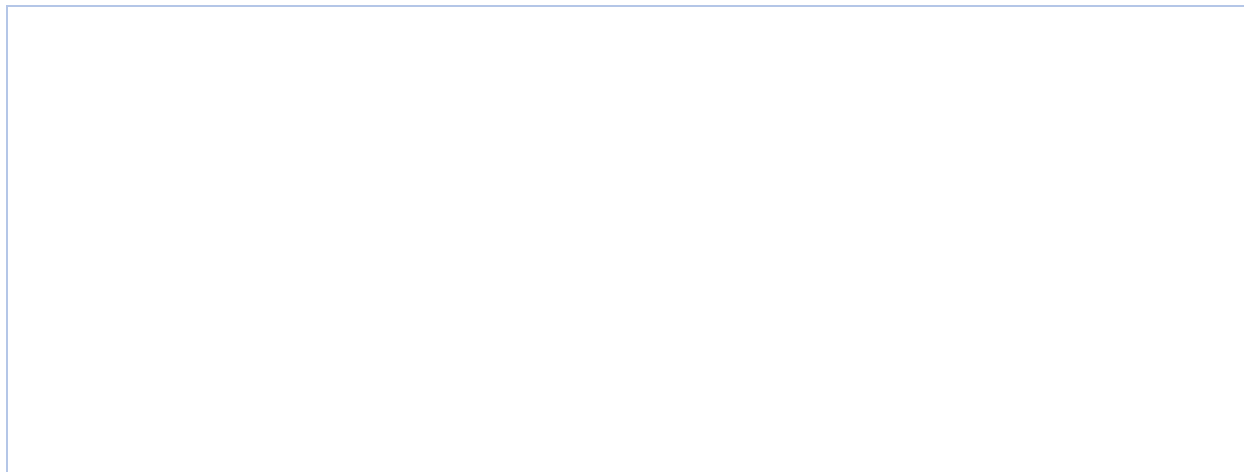
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**Part II:**

**Instructions:** Complete the following comparative table about the main concepts related to proteins.

Amino acids:	
Proteins:	
Simple proteins:	Conjugated proteins:
Main functions of proteins:	



**Dimension 4**

**Part I:**

**Instructions:** Make a graphic organizer about the general classification of lipids, which should contain the following concepts and their respective definitions.

- a) Lipids
- b) Fatty acids
- c) Cholesterol
- d) Phospholipids
- e) Triglycerides

**Part II:**

**Instructions:** Please read the following questions carefully and write the correct one or more answers, as appropriate.

1- What are the main physical and chemical differences between DNA and RNA?

R=

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2- What is the difference between a nucleotide and a nucleoside?

R=

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3- Mention the main biological functions of DNA.

R=

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4- Describe the name and function of the main types of RNA.

R=

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5- Describe the main functions of nucleic acids

R=

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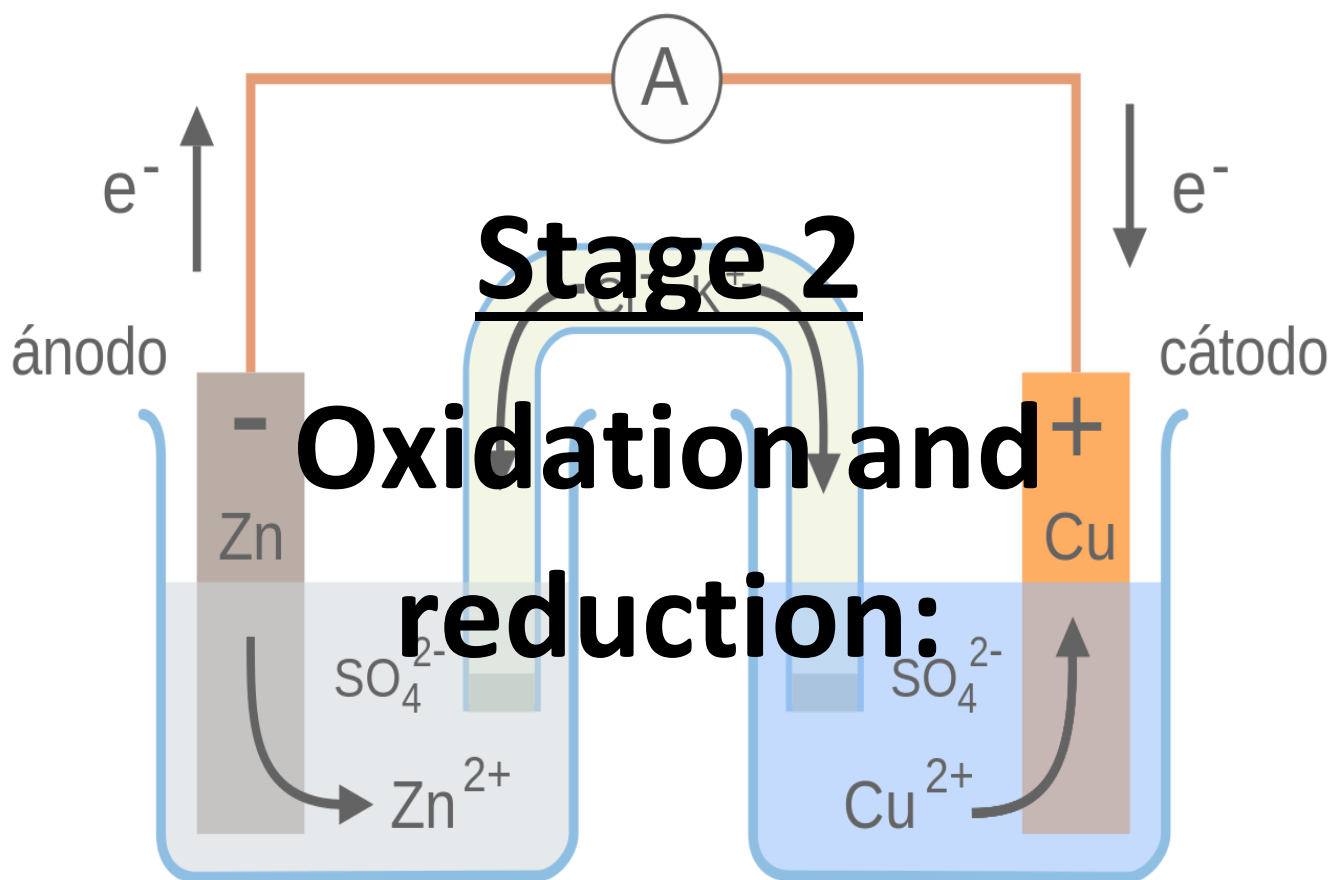


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 <b>Academy of Chemistry</b> <b>Selected Topics of Chemistry</b> <b>Stage 1</b> 			
Evaluation instruments:			
General activities			
Criteria	Conforms	Does Not Meet	Score
Student correctly defined all requested concepts.			<b>3 points</b>
The student made the summary about the classification and major biological functions of carbohydrates, the summary is original, and no plagiarism was detected.			<b>3 points</b>
The student successfully completed the Protein Classification Comparison Chart.			<b>2 points</b>
The student performed the graphic organizer with information regarding the general classification of lipids.			<b>2 points</b>
Student answered questions regarding nucleic acids correctly.			<b>1.25 points</b>
All activities were carried out following specific instructions, in order, with cleanliness and were delivered in a timely manner.			<b>1.25 points</b>
			<b>Total score</b> <b>12.5 points</b>



**Dimension 1**

**Instructions:** As a diagnostic activity, answer each of the following questions about oxidation and reduction.

1-What is the difference between oxidizing agent and reducing agent?

R=

2-What is the difference between an electrolyte cell and a galvanic cell?

R=

3-What is an oxidation-reduction reaction?

R=

4-What is electrochemistry?

R=

**Dimension 2**

**Instructions:** Match each of the following concepts with their respective statement.

<ol style="list-style-type: none"><li>1. Oxidation Number</li><li>2. Oxidation</li><li>3. Reduction</li><li>4. Oxidation-reduction reaction</li><li>5. Electrochemistry</li><li>6. Galvanoplasty</li><li>7. Electrolytic cell</li><li>8. Galvanic or voltaic cell</li><li>9. Oxidizing agent</li><li>10. Reducing agent</li></ol>	<p>A device that generates electrical energy from a chemical reaction of the redox type, which is spontaneous; i.e. does not require the application of electrical power to occur ( )</p> <p>Chemical that loses or gives up electrons during a redox reaction ( )</p> <p>Branch of Chemistry that is responsible for the study of the transformation of electrical energy into chemical energy and vice versa ( )</p> <p>A chemical that within a redox type reaction has the ability to release or lose electrons ( )</p> <p>Concept describing the gain of electrons by a substance in a chemical reaction ( )</p> <p>A type of chemical reaction characterized by the transfer (loss and gain) between the participating substances. In addition, it is characterized by a change in oxidation number ( )</p> <p>Procedure that consists in carrying out the coating of a metal with another metal, for example, when it is desired to restore shine to utensils made of silver ( )</p> <p>Chemical that loses or gives up electrons during a redox reaction ( )</p> <p>Numeric value that specifies the number of electrons gained or lost by a chemical species ( )</p> <p>Concept describing the loss of electrons by a substance in a chemical reaction ( )</p>
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### Dimension 3

**Instructions:** For each of the following cases, please indicate if it is a oxidation or reduction process.

1- Oxygen had an oxidation state of -2 and changed to 0.

R= \_\_\_\_\_

2- Nitrogen had an oxidation state of +2 and changed to +5.

R= \_\_\_\_\_

3- Chromium had an oxidation of +7 and changed to +3.

R= \_\_\_\_\_

4- Lithium had an oxidation number 0 and changed to +1.

R= \_\_\_\_\_

5- Fluorine had an oxidation number of 0 and changed to +5

R= \_\_\_\_\_

### Dimension 4

**Instructions:** Indicate the oxidation number for each of the following chemicals, whether they are in a free state or forming a compound, as the case may be.

a) Br<sub>2</sub>

b) H<sub>3</sub>PO<sub>4</sub>

c) AlCl<sub>3</sub>

d) KHCO<sub>3</sub>

e) Li



f) NaH

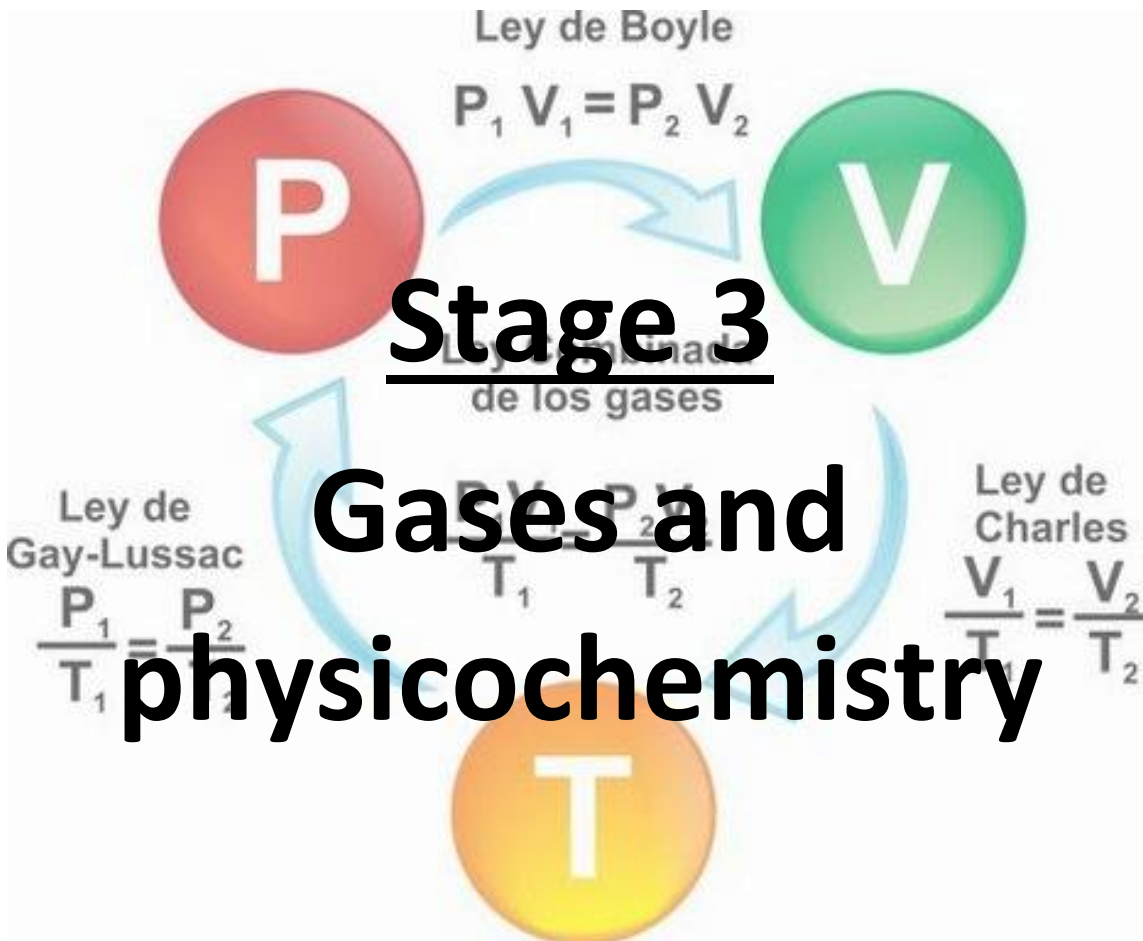
g) Fe(OH)<sub>3</sub>

h) H<sub>2</sub>O<sub>2</sub>

i) CO

j) AgCl

 <b>Academy of Chemistry</b> <b>Selected Topics of Chemistry</b> <b>Stage 2</b> 			
Evaluation instruments:			
General activities			
Criteria	Conforms	Does Not Meet	Score
The student correctly matched each of the concepts to their respective statement.			<b>3 points</b>
The student correctly identified whether each of the assigned cases corresponds to an oxidation or reduction process.			<b>3 points</b>
The student correctly assigned the oxidation number for each of the assigned cases.			<b>3 points</b>
All activities were carried out following specific instructions, in order, with cleanliness and were delivered in a timely manner.			<b>3.5 points</b>
			<b>Total score</b> <b>12.5 points</b>



**Dimension 1**

**Instructions:**As a diagnostic activity, answer each of the following questions about the laws of gases and physicochemistry.

1-What are the main variables applied in the study of gases?

R=

2-What does Charles' law state and what is its mathematical formula?

R=

3- What does the first law of thermodynamics establish?

R=

4- What is the difference between heat, work and energy within physicochemistry?

R=

**Dimension 2**

**Instructions:** Correctly define each of the following concepts.

Heat

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Energy

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Thermodynamics

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Heat capacity

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Work

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First Law of Thermodynamics

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Enthalpy

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Specific heat

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**Dimension 3****Part I:**

**Instructions:** Complete the following comparative table about the main laws applied in the study of gases.

<b>Law</b>	<b>Description</b>	<b>Math formula</b>
<b>Boyle's Law</b>		
<b>Charles' Law</b>		
<b>Gay-Lussac's Law</b>		
<b>General Law or Combined Gas Law</b>		

<p><b>Ideal Gas Law</b></p>		
<p><b>Dalton Law or Law of Partial Pressures</b></p>		





### **Dimension 4**

**Instructions:** Create a graphic stimulator about the main gas study variables. The organizer must include the definition of each variable and examples of the units of measurement for each one.

- a) Pressure
- b) Volume
- c) Temperature
- d) Amount of gas



**Academy of Chemistry**  
**Selected Topics of Chemistry**  
**Stage 3**

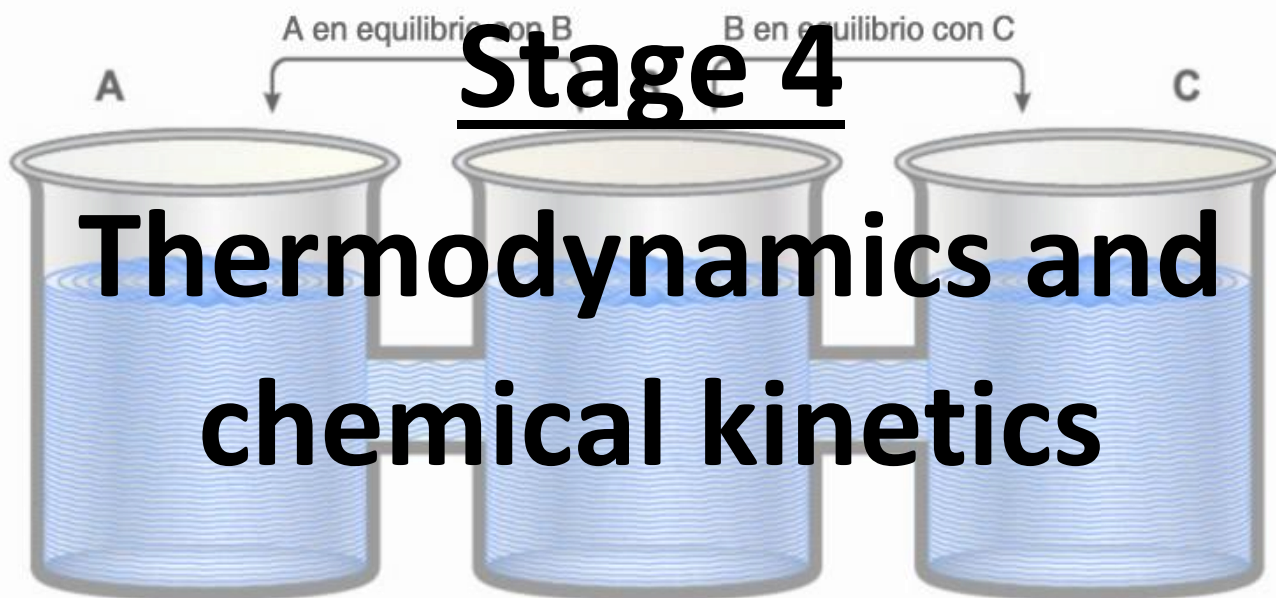


**Evaluation instruments:**

**General activities**

Criteria	Conforms	Does Not Meet	Score
Student correctly defined all requested concepts.			<b>3 points</b>
The student correctly completed the comparison chart about the major laws applied in the study of gases.			<b>3 points</b>
The student carried out the documentary research about the gas laws that were requested. In addition, the documentary research was done by hand and is original.			<b>3 points</b>
The student prepared the graphic organizer with information regarding the main gas study variables, as well as the respective applicable units of measurement.			<b>1 points</b>
All activities were carried out following specific instructions, in order, with cleanliness and were delivered in a timely manner.			<b>2.5 points</b>
			<b>Total score</b> <b>12.5 points</b>

## Equilibrio Térmico



**Dimension 1**

**Instructions:** As a diagnostic activity, answer each of the following questions about thermodynamics and chemical kinetics.

1- What does chemical kinetics study?

R=

2- Mention the main factors that can affect the speed of a reaction.

R=

3- What does the second law of thermodynamics establish?

R=

4- What is activation energy?

R=

**Dimension 2**

**Instructions:** Correctly define each of the following concepts.

Second Law of Thermodynamics

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Third law of thermodynamics

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Chemical Kinetics

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Entropy

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Activation Energy

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Reaction Mechanism

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Quickness of reaction

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Carnot Cycle

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**Dimension 3**



**Instructions:** Complete the following purchasing chart about the main factors that can affect the speed of a chemical reaction.

Variable	Effects


### **Dimension 4**

**Instructions:** Prepare a graphic organizer about the classification of chemical reactions, taking into account their degree of complexity from the point of view of chemical kinetics. In addition, the definition of each type of reaction must be included.

- a) Simple or elemental reaction
- b) Chain reaction
- c) Complex or compound reaction
- d) Bidirectional reactions
- e) Consecutive or successive reactions
- f) Parallel or Competitive Reactions

 <b>Academy of Chemistry</b> <b>Selected Topics of Chemistry</b> <b>Stage 4</b> 			
Evaluation instruments:			
General activities			
Criteria	Conforms	Does Not Meet	Score
Student correctly defined all requested concepts.			<b>3 points</b>
The student correctly completed the comparison chart about the main factors or variables that may affect the speed of chemical reactions.			<b>3 points</b>
The student developed the graphic organizer with information regarding the classification of chemical reactions from a chemical kinetic point of view.			<b>3 points</b>
All activities were carried out following specific instructions, in order, with cleanliness and were delivered in a timely manner.			<b>3.5 points</b>
			<b>Total score</b> <b>12.5 points</b>

**Prepared by: MC. Eduardo López Martínez (Coordinator)**

**Approved by: Members of the Chemistry Department**

**Verified by: Irene Treviño Burciaga, B.A. (Class Support and Development Office)**

**Validated by: ME. Nancy Elvira Tenorio Garza, (Academic Secretary)**