NAME_____ **TEACHER**_____

Chemistry Summer Assignment

Welcome to Chemistry at GPAA! This summer, your goal is to build a strong foundation in the scientific skills and chemistry concepts that will prepare you to succeed in class this school year, and help you prepare for the science NJSLA. This work is due on the first day of school.

Part 1: Vocabulary Foundations- Complete the following for each key term. Write a definition *in your own words*, draw a simple picture and list an example for each.

Term: **Atom**	**Example:**
Definition:	**Drawing:**

Term: **Molecule**	**Example:**
Definition:	**Drawing:**

Term: **Element**	Example:
Definition:	Drawing:

Term: **Compound**	Example:
Definition:	Drawing:

Term: **Physical Change**	Example:
Definition:	Drawing:

Term: **Chemical Change**	Example:
Definition:	Drawing:

Term: **Reactant**	Example:
Definition:	Drawing:

Term: **Product**	Example:
Definition:	Drawing:

Term: **Law of Conservation of Mass**	Example:
Definition:	Drawing:

Term: **Periodic Table**	Example:
Definition:	Drawing:

Challenge: Choose two of the terms and explain how they apply, in any way, to your daily life.

_____

_____

_____

_____

_____

_____

Part 2: Scientific Skills Review (NGSS Science Practices)

Answer the following short questions:

1. What is the difference between a hypothesis and a theory?

2. Describe a situation in which you could **collect data**, **make a graph**, and **draw a conclusion** (this can be from real life—cooking, sports, weather, etc.).

3. Why is it important to change only one variable in an experiment?

Chemistry Current Event: Find a current (within the last year) chemistry article or video online. Write 3–5 sentences summarizing the chemical concept it discusses.

_____

_____

_____

_____

_____

_____

Part 3: Observation Activity – Chemistry in Your Kitchen

Chemistry is all around you. Pick **one** of the following simple tasks and observe it closely:

🍳 **Option A: Boil water**

1. What changes do you see (bubbles, steam, temperature)?
2. Is this a physical or chemical change? Why?

🧼 **Option B: Mix vinegar and baking soda**

1. Describe what happens. What gas is produced?
2. Is this a chemical change? How do you know?

🔥 **Option C: Burn a candle**

1. What are the reactants and products?
2. What evidence of a chemical change do you observe?

Option_____

_____

_____

_____

_____

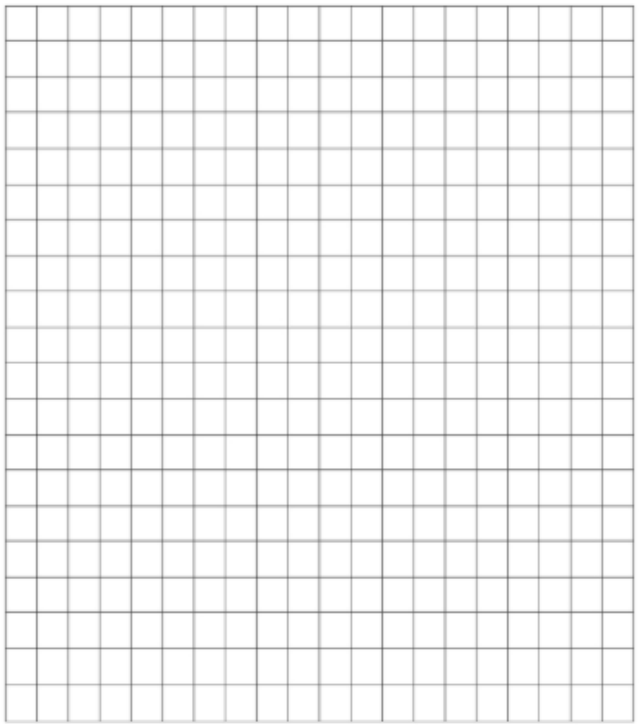
Take a photo or draw what you observe. Write a paragraph explaining the changes in scientific terms.

Part 4: Graphing Practice

Using the data below, create a **line graph**. Label your axes and give it a title.

Data Set: Temperature vs. Reaction Time

Temperature (°C)	Reaction Time (seconds)
10	60
20	45
30	30
40	20
50	10



Question: Make a claim (a one sentence summary) about what the graph tells you about how temperature affects reaction rate?

Part 5: NJSLA-Style Chemistry Questions (Practice)

Answer the following questions to practice the thinking style used on the NJSLA.

___1. Which of the following is a chemical change?
A. Water boiling
B. Ice melting
C. Sugar dissolving
D. Wood burning

___2. Which particle has a negative charge?
A. Proton
B. Neutron
C. Electron
D. Nucleus

___3. Two clear liquids are mixed and a solid forms. What type of change occurred?
A. Physical
B. State change
C. Chemical
D. Phase shift

___4. According to the Law of Conservation of Mass, what happens during a chemical reaction?
A. Mass is gained
B. Mass is lost
C. Mass stays the same
D. New atoms are created

Part 6: Real-World Chemistry Project – Environment Focus

Chemistry plays a critical role in solving real-world environmental problems. For this project, you will investigate a chemistry-related environmental phenomenon and create a short report or presentation to explain it.

Choose **one** of the following topics to explore:

- The chemistry of ocean acidification and its impact on marine life
- Plastic pollution and the chemical structure of biodegradable plastics
- How greenhouse gases trap heat – the chemistry behind climate change
- The chemistry of water purification and how clean drinking water is made

· How fertilizers affect ecosystems – the role of nitrogen and phosphorus

Project Requirements:

1. Write a 1-page summary or create a 5-slide digital presentation (Google Slides, PowerPoint, or Canva).

2. Explain the chemistry behind the issue: What molecules or reactions are involved?

3. Discuss why this issue matters to the environment and society.

4. Propose at least one solution or action people can take to help.

5. Include one visual (photo, diagram, or graph) with a short caption.

Real-World Chemistry Project Rubric – Environment Focus (Total: 20 points)

Criteria	Exemplary (4 pts)	Proficient (3 pts)	Developing (2 pts)	Beginning (1 pt)
1. Chemistry Explanation *(What molecules/reactions are involved?)*	Clearly and accurately explains the key chemistry with appropriate terms and examples. Shows strong understanding.	Mostly accurate explanation with some chemistry terms used appropriately.	Some chemistry explained, but lacks clarity or depth; may contain minor inaccuracies.	Little or no chemistry explained; may include major errors or misconceptions.
2. Environmental & Social Importance *(Why does this issue matter?)*	Thoughtful and insightful explanation of why the issue is important for the environment and society.	Clearly explains the relevance of the issue to the environment and people.	General explanation with limited connection to broader impacts.	Weak or missing explanation of why the issue matters.
3. Solution or Action Proposed	Creative, realistic, and well-explained solution or action that connects back to the chemistry of the issue.	Clear and relevant solution or action proposed.	Vague or somewhat relevant solution; limited connection to the chemistry.	No solution proposed, or idea is unclear or not relevant.

4. Visual with Caption	Visual is highly relevant, well-integrated, and caption clearly explains its connection to the topic.	Visual supports the topic; caption is present and mostly clear.	Visual is loosely related or caption is vague.	No visual included, or visual does not relate to the topic.
5. Format & Presentation Quality *(1-page summary or 5-slide presentation; organized and polished)*	Follows all format requirements; writing/presentation is clear, organized, and free of errors.	Meets format requirements; minor errors but overall organized.	Partially meets format requirements; disorganized or contains frequent errors.	Does not meet format requirements; hard to follow or very disorganized.

Scoring Guide

- **18–20 points:** Excellent – Demonstrates strong understanding and creativity
- **14–17 points:** Good – Meets expectations with minor gaps
- **10–13 points:** Basic – Some parts underdeveloped or unclear
- **Below 10 points:** Needs Improvement – Major components missing or inaccurate