

Chemistry



NISD GT Process Standards

GT Process Standards provide guidance on what GT students should know, understand, and do as part of GT program services. Each lesson makes a connection to specific standards; however, teachers are encouraged to incorporate every standard where applicable.

I. Creative Thinking

Ability to look at problems or situations from a unique perspective through the use of imagination and/or innovative ideas

II. Critical Thinking

Ability to demonstrate clear, rational, open-minded thinking, informed by evidence

III. Depth & Complexity

Ability to dig deeper into a concept and to understand that concept with greater complexity

IV. Scholarly Inquiry & Research

Ability to interpret information that leads to new understandings and connects to the world beyond the classroom

V. Effective Communication

Ability to convey new learning through the use of written, spoken, and technological media

VI. Leadership & Responsibility

Demonstrates initiative, task commitment, and the elements of compromise and diplomacy



Language of
the Discipline

chemistry

solution

mix

combine

rules

periodic table

compound

atoms

elements

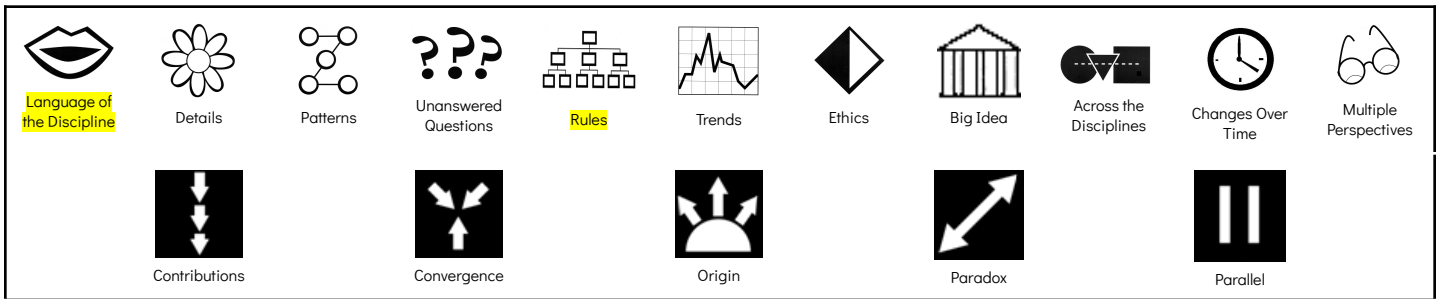
group

period

Scholarly Habits

- Scholars utilize varied resources
- Scholars exhibit curiosity
- Scholars demonstrate academic humility
- Scholars save ideas
- Scholars ponder the big idea
- Scholars see from different perspectives
- Scholars are always prepared
- Scholars display perseverance
- Scholars set goals
- Scholars take intellectual risks
- Scholars display excellence

Depth and Complexity & Content Imperatives



Thinking like a Disciplinarian

Thinking like a **chemist** (a scientist who studies the composition, structure, and interactions of elements and the compounds they form).

Universal Generalizations

- Systems have parts that work to complete a task
- Systems are composed of subsystems
- Part of systems are interdependent upon one another and form symbiotic relationships
- A system may be influenced by other systems
- Systems interact
- Systems follow rules

Essential Questions

- What is a system?
- How are the parts of a system related to the entire system?
- How are system models used to predict and understand real world situations?

Supported TEKS

Science

3.5AD (Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to: (A) measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float explore(D) and recognize that a mixture is created when two materials are combined such as gravel and sand or metal and plastic paper clips.)

3.2ABDEF (Scientific investigation and reasoning. The student uses scientific practices during laboratory and outdoor investigations. The student is expected to: (A) plan and implement descriptive investigations, including asking and answering questions, making inferences, and selecting and using equipment or technology needed, to solve a specific problem in the natural world; (B) collect and record data by observing and measuring using the metric system and recognize differences between observed and measured data;; (D) analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations; (E) demonstrate that repeated investigations may increase the reliability of results; and (F) communicate valid conclusions supported by data in writing, by drawing pictures, and through verbal discussion.)

RLA

3.1A, 4.1A, 5.1A (Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking--oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to listen actively, ask relevant questions to clarify information, and make pertinent comments)

3.1C, 4.1C, 5.1C (Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking--oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively)

3.1D, 4.1D, 5.1D (Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking--oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to work collaboratively with others by following agreed-upon rules, norms, and protocols)

3.1E (Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking--oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to develop social communication such as conversing politely in all situations)






3.4, 4.4, 5.4 (Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking--fluency. The student reads grade-level text with fluency and comprehension. The student is expected to use appropriate fluency (rate, accuracy, and prosody) when reading grade-level text.)

3.6E, 4.6E, 5.6E (Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to make connections to personal experiences, ideas in other texts, and society)

3.6F, 4.6F, 5.6F (Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to make inferences and use evidence to support understanding)

3.6G, 4.6G, 5.6G (Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to evaluate details read to determine key ideas)

3.7F, 4.7F, 5.7F (Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to respond using newly acquired vocabulary as appropriate)

Instructional Plan	Date:
Chemistry (2 weeks)	
Objectives: Students will understand... <ul style="list-style-type: none">• combining ingredients to make slime proves that systems follow rules.• how the periodic table follows sets of rules.• how the periodic table shows systems of elements and compounds in our world.	
Learning Experiences	Resources/Materials
<p>Week 1 (Slide 1)</p> <p>Skill Stations (Slide 2)</p> <p>Curiosity (Slide 3) Show students the Chemistry of Cookies video.</p> <p>Rules of a System and Define Chemistry (Slides 6-7) Show students the Skill Focus slide. Explain the definition of rules. Tell students that we will focus on how systems follow rules. In the next 2 weeks we will be studying a branch of science called Chemistry. Define chemistry and relate it to the curiosity viewed at the beginning of class. Ask students if they know of any other examples of chemistry in their daily life? (making perfumes, shampoos, cleaners, etc)</p> <p>Is Slime a System? (slide 8) Ask students what they know about slime or if they have ever made slime. Guide students to determine if they believe slime is a system. Tell students we are going to test the rules of slime by trying different recipes.</p> <p>Slime Time (Slides 9-13) Guide the students through 3 different slime labs. Let students know that there are many recipes to make slime and that you have chosen 3 to use for this experience. Some recipes may be different from what they have chosen to do at home, but for this class they will be following <i>your rules</i> for making the slime. (But shhhh! One of the slime labs will be a failure! This will be a great teaching moment about the rules of a system and what can happen if you don't follow those rules. Also a great SEL moment.)</p>	<p> BI_Chemistry Lesson Slides</p>  <p>Byrdseed.tv Rules</p> <p>Slime lab materials needed: baking soda, contact solution (Renu Fresh or Equate brand), 1 shaving cream(not gel) per student group, Elmer's white glue (at least one full bottle per slime lab student group), salt measuring cups, measuring spoons, bowls, ziploc bags to store slime</p> <p> CI_Slime Lab Student Page</p>  <p>Slime Recipe (#1)</p> <p> DI_Slime Lab #2 (failures)</p> <p>Fluffy Slime Recipe(#3)</p>

Students will follow the recipes and fill out their Slime Lab page along the way. Slime #1 and #3 will be guided by you. Slime #2 they will mix in their group on their own. Once slime labs are complete, answer the reflection questions together.

Week 2 (Slide 14)

Skill Stations (Slide 15)

Curiosity (Slide 17)

Show students video re: how rubber erasers are made.

- What did you notice?
- What do you wonder?

Rules of a System and Define Chemistry (slides 19 and 20)

Briefly review skills focus (systems follow rules) and review language of the discipline (Chemistry). Ask students what chemistry and systems they saw in the Mr. Rogers (curiosity) video.

Periodic Table of Elements Breakout (Slides 22-23)

Explain to students that we will be considering the Periodic Table of Elements and how it works with Chemistry. Ask students to share what they already know and/or understand about the Periodic Table.

Introduce the breakout box and tell students they will use their knowledge and learn some new things about the Periodic Table during the breakout. Allow students time to complete the box.

The Periodic Table of Elements (Slides 24-26)

Show students the video “The Periodic Table: Crash Course Chemistry #4” linked in the teacher notes and on slide 25. The video gives a history of how the Periodic Table of Elements was created and how it is structured (the rules it follows).

Note: stop video at 7:55.

Ask students what they noticed about how the Periodic Table was structured/designed (*based on the properties of the elements, and the # of protons, electrons, and neutrons they have*).

- What evidence did the video give to show that the

[How Erasers are Made](#)



 EI_Periodic Table Breakout

[The Periodic Table: Crash Course...](#)



Periodic Table is part of a system (*it follows rules*)?

- What did Mendeleev demonstrate about the power of research (*refer to his research helping find elements that had not been discovered yet – especially the one the French scientist “found” before him*)?
- Ask students what Mendeleev demonstrated about the power of intellectual risk taking and perseverance.

Teacher Note: There are two versions of the Periodic Table in case you would like to print them out for your class. They are from <https://www.typecalendar.com/periodic-tables.html>, which has a wealth of other free Periodic Tables for you to choose from.

Everyday Elements (Slide 27)

Using the *Periodic Table of Elements and their Uses*, your students will research how some of the most common elements are used in our daily lives. This will also be another opportunity for students to familiarize themselves with using the Periodic Table of Elements.

SEL moment: Discuss with students how systems are made up of parts that affect each other and that the system just wouldn't be the same without all of its parts. The Periodic Table is a system made up of parts that affect each other and work together to make new things (ex: $\text{Na} + \text{Cl}$ makes salt NaCl). Our GT classroom is just like that. GT is a system of important parts (the students), each of which are important on their own (like we saw elements are important on their own in our scavenger hunt), but when we come together and work together we can make new, amazing things! *This conversation will lead into the next activity.*

Periodic Me (Slides 28-29)

You will be creating a GT Periodic Table of Elements. Using slide 28, discuss the two given rules for the table, and guide your students to come up with one or two more additional rules your table will follow. For example, what rule will your table follow when two students have the same age and birth month? Remember to refer back to the table being a system, because it follows a set of rules.

Using the instructions on the “Periodic Me” assignment page, students will create their own element to become part of the GT Periodic Table. The instructions tell the students to put a

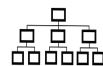
FI_Electron Configuration Periodic T...

GI_Periodic Table of Elements with ...

HI_Periodic Table of Elements and ...

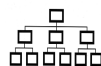
II_Everyday Elements

JI_Periodic Me



Pizza Boxes or
[80lb 12" x 12" Cardstock](#)

caption with each item they add to their element. You might want to tell students to leave the caption off to make their element neater and, instead, have them write their captions (explanations of their items) on a separate page.



The table can be displayed in your classroom or the hallway. Pizza boxes can be found in a wide variety of sizes on Amazon. You can also have your students make their elements on sturdy 12 inch x 12 inch scrapbooking paper or paperboard. If you use cardstock, it is recommended to use the heavier, 80lb cardstock.

Let's Reflect (Slide 30)

- What rules did your element follow to be placed in its spot in the GT Periodic Table?
- How might the rules be changed to arrange the elements differently in the GT Periodic Table?
- How does following a set of rules make it easier to use the Periodic Table (and the GT Periodic Table)?

Reflection/Metacognition

Week 1:

How did our breaking of the rule in Slime lab #2 change the results?
How much change would happen in other recipes if rules were not followed?
Defend the statement that Systems Follow Rules.

Week 2:

What rules did your element follow to be placed in its spot in the GT Periodic Table?
How might the rules be changed to arrange the elements differently in the GT Periodic Table?
How does following a set of rules make it easier to use the Periodic Table (and the GT Periodic Table)?

Extensions (Slide 31)

1. Periodic table pixel art [Periodic table pixel art](#)
2. Elements Scavenger Hunt [Elements Scavenger Hunt](#)
3. Tons of great periodic table activities/lessons [Additional Periodic Table Activities](#)

Songs for Fun (Slide 32)

(Optional, informative songs if you have time)

Periodic Table Song:

This song shows pictures of and talks about each element of the periodic table along with their everyday uses. This is a fun, catchy song your kids will get stuck in their heads (and yours, too!).

Science Wars - Acapella Parody:

This song pits each field of science against each other to the tune of famous Star Wars songs all the while teaching the essence of each of these fields.