Curriculum Sample Template

Max. 8 Pages

Grade Level	8th	**Content Area**	Science
Course Title (grades 9-12 Only)			
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Transfer and conservation of energy. Knowledge of the human body and body systems. Functions of vital organs. Chemical compounds. Roles of proteins in the body.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Within this Homeostasis unit plan, a heavy emphasis is placed upon writing short descriptive answers about Science. As a science unit, the content itself is aligned to STEM. The roots of homeostasis are also in the core knowledge sequence, specifically knowledge of enzymes and chemical reactions taking place inside the cell. Kagan Cooperative Strategies (individual whiteboards, gallery walks, centers, think-pair-share) are used in these lessons and Marzano high yield strategies (objective driven vocabulary) are also built into these lessons.		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	8.4.4.2. Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.		
Materials/Resources Needed	Mimeo board. Individual Whiteboards. Interactive notebooks.		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	**Instructional Strategies**	**Student Activities**

1	**Objective:** Explain how unicellular organisms maintain homeostasis **Key Points:** • Homeostasis is your internal thermostat	Students will ("SW") open their interactive notebooks to a new page and write the objective and key points. SW look up any unknown vocabulary in their science glossary, write the definitions, and rewrite the definitions in their own words.
	Activation of Prior Knowledge: Teacher will ("TW") put a list of unicellular organisms on the Mimeo board and direct students to name each organism.	SW actively listen while their classmates name each organism
	Introduction to New Material ("INM")/Modeling: TW illustrate homeostasis on the Mimeo board. TW use the "think aloud" method to introduce regulating an internal environment.	SW actively listen while the teacher engages in the think aloud activity.
	Guided Practice: TW pass out whiteboard to students. TW put 10 equations about unicellular organisms on the board, SW define the affected cell parts using their individual whiteboards. If less than 80% of the classroom answers correctly, TW model the correct method for maintaining homeostasis.	SW engage in the whiteboard activity, answer all teacher questions, and make reference the key points in their answers. .
	Independent Practice: TW pass out a large paper describing a unicellular organism per table. SW must correctly describe how each cell part is affected. TW monitor student progress and answer and clarifying questions.	SW participate in the independent practice activity and justify answers while referencing the key points.
	Assessment: SW write a one paragraph essay putting themselves in the shoes of a unicellular organism. SW describe the ongoing process of homeostasis inside their cell bodies.	SW complete the assessment activity and justify the answers using key points. SW describe the ongoing process of homeostasis inside their cell bodies.
2	**Objective**: Explain how multicellular organisms maintain homeostasis **Key Points:** • Homeostasis is your internal thermostat • Selectively Permeable: In the plasma membrane. Regulating the passage of some substances while preventing others from entering the cell.	SW open their interactive notebooks to a new page and write the objective and key points. SW look up any unknown vocabulary in their science glossary, write the definitions, and rewrite the definitions in their own words.
	Activation of Prior Knowledge: TW put a list of multicellular organisms on the Mimeo board and direct students to name each organism. SW reference the key points from unicellular organisms.	SW actively listen while their classmates name multicellular organisms. SW note the key points from last lesson and review work from prior class
	INM/Modeling: TW illustrate how multicellular organisms maintain homeostasis on the Mimeo board. TW use the "think aloud" method to introduce regulating an internal environment, even when the external environment changes.	SW actively listen while the teacher engages in the think aloud activity.
	Guided Practice: TW direct students through a think-pair-share	SW engage in the think-pair-share activity, answer all teacher questions,

	activity of heterogeneous groups of 4. Questions will be on the Mimeo board. TW use checks for understanding ("CFUs"; call on non-volunteer to restate instructions, ask students to define key points in their own definitions, ask student to reteach their neighbor) to assess progress. **Independent Practice:** TW pass out papers describing the process of homeostasis in multicellular organism to each student. SW must correctly describe how each cell part is affected during homeostasis. TW monitor student progress and answer and clarifying questions. **Assessment**: SW write a one page essay comparing and contrasting the process of homeostasis in unicellular organisms and multicellular organisms.	and make reference the key points in their answers. . SW participate in the independent practice activity and justify answers while referencing the key points. SW compare and contrast unicellular and multicellular organisms in their interactive notebooks.
3	**Objective:** What happens when homeostasis is unmaintained? **Key Points:** • Unmaintained means the equilibrium has been disrupted. **Activation of Prior Knowledge**: TW put a list of unicellular and multicellular organisms on the Mimeo board. SW reference the key points from these organisms. **INM/Modeling:** TW introduce the key points. TW use the "think aloud" method as she discusses factors than can influence the maintenance of homeostasis within his/her own body. **Guided Practice**: TW direct students through a gallery walk activity around the classroom. At each location, SW discern the factor influencing the maintenance of homeostasis. Questions will be on the Mimeo board. TW use CFU's (call on non-volunteer to restate instructions, ask students to define key points in their own definitions, ask student to reteach their neighbor) to assess progress. **Independent Practice:** TW put 5 questions on the Mimeo board. SW choose three to answer with short responses about how homeostasis is affected in each example. **Assessment**: SW document how their internal environments are stabilized of destabilized throughout the school day. SW note when they feel changes occurring. At the end of the day, SW write about their experiences and reflect on their bodies maintain their internal environments.	SW open their interactive notebooks to a new page and write the objective and key points. SW look up any unknown vocabulary in their science glossary, write the definitions, and rewrite the definitions in their own words. SW actively listen and note the key points from last lesson and review work from prior class SW actively listen while the teacher engages in the think aloud activity. SW reflect on what is happening within their own bodies. SW engage in the gallery walk activity, answer all teacher questions, and make reference the key points in their answers. . SW participate in the independent practice activity and justify answers while referencing the key points. SW document the changes happening within their own bodies. SW reflect about the process of homeostasis and what they should do to regulate their environment when homeostasis is unmaintained.
4	**Objective:** Explain how the cardiovascular system helps endothermic organisms maintain homeostasis **Key Points:**	SW open their interactive notebooks to a new page and write the objective and key points. SW look up any unknown vocabulary in their science glossary, write the definitions, and rewrite the definitions in their

	• Endothermic organisms are mammals and birds. **Activation of Prior Knowledge**: TW ask students to reference the key points learned earlier from the past 3 lessons. TW direct students to engage in a think-pair-share to reflect on each key point. **INM/Modeling:** TW introduce the key points. TW use the Mimeo board to show the relationship between the cardiovascular system and the cardiovascular system. **Guided Practice**: TW direct students through a centers activity around the classroom. At each location, SW answer questions listed on the Mimeo board. TW use CFU's (call on non-volunteer to restate instructions, ask students to define key points in their own definitions, ask student to reteach their neighbor) to assess progress. **Independent Practice:** TW put a 5 short essay questions on the Mimeo board. SW choose two to answer with short responses about the cardiovascular system. **Assessment**: SW complete a multiple choice quiz about the cardiovascular system.	own words. SW actively listen and note the key points from last lesson and review work from prior lessons. SW actively listen while the teacher explains each key point. SW reflect on what is happening within their own bodies. SW engage in the centers activity, answer all teacher questions, and make reference the key points in their answers. . SW participate in the independent practice activity and justify answers while referencing the key points. SW complete the quiz and turn their papers over once complete.
5	TW instruct students to complete the summative assessment.	SW complete the summative assessment.

Summative Assessment Items: *Attach here.* For each summative assessment item, include an answer key or scoring rubric describing how points are to be awarded.

<u>*Two points each</u>

1. What is homeostasis?
2. What do unicellular organisms do to maintain homeostasis?
3. Vacuoles pump out liquid that accumulates in unicellular organisms via osmosis. Explain how this process helps unicellular organisms maintain homeostasis.

4. What does it mean to say that a membrane is selectively permeable?
5. Does the movement of molecules stop when the concentration of a solute is equal on both sides of a membrane? Explain.
6. What is the main difference between passive transport and active transport?

7. Describe three consequences to the endocrine system if homeostasis is unmaintained.
8. Describe a scenario that can cause a multicellular organism to lose homeostasis maintenance.

9. What happens to proteins when homeostasis is unmaintained and why is this especially problematic for cells?

10. What is the relationship between the cardiovascular system, kidney function, and homeostasis?
11. How does the cardiovascular system influence tissues like your skin?
12. To regulate the nervous system, what two compounds does the cardiovascular supply to maintain homeostasis?
13. Can an organism maintain a stable internal environment even with a changing external environment? If so, what is this process called?

Answer Key

1. Homeostasis is the maintenance of stable internal physical and chemical conditions by an organism.
2. They maintain homeostasis by physical growth, responding to changes in their environment, transforming energy, and reproduction.
3. The vacuole helps maintain homeostasis by expelling excess liquid that would otherwise accumulate and burst the cell.

4. Some substances can pass through the membrane while other substances cannot pass through the membrane.
5. The movement does not stop, but an equal number of molecules move in each direction to maintain equilibrium.
6. The movement of substances through passive transport does not require energy; the movement of substances through active transport requires energy.

7. Depending on the hormone you can have weight gain, loss of muscle, increase in inflammation, fatigue, poor sleep.
8. Trauma, illness, diet, or weight loss can and will often disrupt homeostasis.
9. When homeostasis is unmaintained, proteins begin to change shape. Proteins (or more specifically enzymes) carry out the chemical reactions in the cells and the changed shaped causes the cell to respond to the enzyme inversely, which can result in a mutation.

10. The cardiovascular system and the kidneys work together to maintain blood volume and composition. The cardiovascular system provides the blood pressure that the kidneys use to filter wastes out of the body, maintaining a stable internal environment.
11. The cardiovascular system and the skin help maintain homeostasis by regulating body temperature. When the body overheats, the blood vessels that serve the skin dilate. The cardiovascular system rushes warm blood to the superficial capillaries of the skin. Heat from the blood radiates off of the skin's surface, cooling the body. When body temperature drops too low, skin capillaries constrict. This prevents warm blood from reaching the surface of the skin. The heart pumps extra blood to the deeper vital organs.
12. Oxygen and glucose.
13. Yes; this process is called homeostasis.

Total: _____/26; Grading Scale: 0-18=Incomplete; 19-21=C; 22-23=B; 24-26=A. 80%=Mastery.