Curriculum Sample Template

Max. 8 Pages

Grade Level	8th grade	**Content Area**	Science
Course Title (grades 9-12 Only)	N/A		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	• Students understand how to work in precision partnerships effectively. • Students have had extensive practice in completing and sharing sentence frames. • Students know how to use their science logs effectively.		
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.*	This unit is built on the framework of the SIOP Model and incorporates all 8 of the SIOP Model components. Sentence framing and precision partnering are instructional strategies, which promote the use and mastery of academic language. Instructional technology is incorporated by teacher and students.		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	Grade: 8 Strand: 4-Life Science Concept: 4-Diversity, Adaptation and Behavior PO: #2-Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.		
Materials/Resources Needed	Osmosis Lab materials (10 potatoes, 30 beakers, salt water, distilled water, tap water, scales, paper towels, lab sheets), Pearson's Interactive Science textbooks, student notebooks, homeostasis teacher presentation, Socrative formative quiz, iPads,		

* ***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	Instructional Strategies	Student Activities

1	**1. <u>Essential Vocabulary:</u>** homeostasis, balance, imbalance, receptor, control center, effector, conformer, regulator, endothermic, ectothermic **,** osmosis, diffusion, hypertonic, hypotonic, qualitative, quantitative Teacher will prompt students to enter the essential vocabulary terms with definitions and pictures into their science notebooks. **2.** Teacher will assign students to cooperative groups and give instructions for Day #1 of the Osmosis Lab. **3.** Teacher will distribute materials for the lab and allow students to explore this concept hands-on to provide a sticky context for the homeostasis lesson. **4.** Teacher will remind students to have an overall hypothesis and predication for each of their three beakers. Teacher will check the materials for each group to ensure they are properly positioned for Day #2. **NGSS Science & Engineering Practices:** 1. Asking questions (for science) 2. Planning and carrying out investigations	1. Students will enter the essential vocabulary terms (with pictures and definitions) into their science notebooks. 2. With cooperative group, students will assign themselves roles for individual accountability and listen to Osmosis Lab instructions. 3. Students will collect their Osmosis Lab materials and complete their setup. 4. Students will develop an overall hypothesis as well as individual predictions for each of the three beakers. Students will check out with the teacher and ensure that their materials are properly labeled and set in the lab for Day #2.
2	1. Teacher will direct students to take out their Osmosis lab materials from Day #1. 2. When students are ready with their materials, the teacher will guide them to work collaboratively to collect qualitative and quantitative 'before' and 'after' data about their potato slices. 3. After data has been recorded, the teacher will support students in completing their mathematical calculations to quantify % change. 4. Teacher will provide 10 reflection questions for students to complete, and will have students revisit their hypothesis and predictions to evaluate them and juxtapose them against their findings. 5. EXIT SLIP: Teacher will prompt students to write a complete paragraph that explains what they think happened to the potato in each of the three beakers and WHY. **NGSS Science & Engineering Practices:**	1. Students will take out their Osmosis lab materials from Day #2. 2. Students will work collaboratively to collect qualitative and quantitative 'before' and 'after' data about their potato slices. 3. Students will mathematically compute % change in their samples. 4. Students will work collaboratively to answer 10 reflection questions about the activity, revisit their hypothesis/predictions, evaluate them, then juxtapose them against their findings. 5. EXIT SLIP: Independently, students will write a complete paragraph that attempts to explain what happened to the potato in each of the three beakers and WHY.

	2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) 8. Obtaining, evaluating, and communicating information	
3	1. Teacher will use the class document camera to share three students' exit slips from the prior day. For each, the teacher will prompt students pairs to evaluate and critique the conjectures of their peers and share their findings with the whole-group. 2. Teacher will present information to students about homeostasis and use the lab experience to illustrate key concepts. This will include: *What homeostasis is and how it relates to cells *Conformers vs. regulators and advantages/disadvantages of each *The receptor, control center, effector mechanism *Passive vs. active transport *Diffusion vs. osmosis *Hypotonic and hypertonic environments *Relate cell structure to homeostasis *Relate plan structure to homeostasis 3. Teacher will use provide several real-world examples of organisms that are able to maintain a stable internal environment despite the dynamism of their external environment and clearly explain the mechanisms each organism uses to achieve balance. 3. Teacher will give formative assessment quiz via Soctrative to assess re-teaching needs for Day #4 4. Teacher will assign continued chapter reading and section questions about homeostasis from Pearson's Interactive Science textbook as homework. **NGSS Science & Engineering Practices:** 1. Asking questions 6. Constructing explanations (for science) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	1. In pairs, students will read and evaluate the prior day's conjectures from their peers and critique them in a whole-group. 2. Students will take Cornell Notes on homeostasis in their science notebooks. 3. Students will explore several real-world examples of organisms that are able to maintain a stable internal environment despite the dynamism of their external environment and clearly explain the mechanisms each organism uses to achieve balance. Students will enter these examples with clear explanations into their science notebooks. 4. Students will take formative Socrative quiz with their iPads or SMART phones about key homeostasis concepts 5. Students will complete continued reading and section questions from the text as homework.

4	1. Teacher will share Socrative results from Day #3 and address common conceptual struggles. 2. Teacher will divide students into cooperative groups to flow through the 'Homeostasis Circuit' and answer questions about each of the 8 stations. Teacher has pre-planned situation descriptions and visuals for each station along with questions that ask students to apply their knowledge of homeostasis to the real world, evaluate situations, draw conclusions, and clearly explain how each of the 8 organisms maintains a stable internal environment while living in a dynamic external environment. 3. For stations with conflicting student responses, the teacher will identify two groups (with different beliefs about how the organisms maintain their homeostasis) and have them present their reasoning to the whole-class. **NGSS Science & Engineering Practices:** 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 6. Constructing explanations 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	1. Students will review Socrative data reports and write corrected, new responses for missed items with reflections on why they answered incorrectly and how they will prevent that in the future. 2. Students will complete the 'Homeostasis Circuit' with their cooperative groups to apply their knowledge to the real world, evaluate situations, draw conclusions, clearly explain how each of the 8 organisms maintains a stable internal environment while living in a dynamic external environment. 3. With their cooperative groups, designated students will present their findings to the whole class. The class will listen to different ideas, evaluate them, and come to consensus about the best response.
5	1. Teacher will facilitate the summative assessment.	1. Students will complete their summative assessments independently.

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

Homeostasis Quiz

Grade: 8
Strand: 4-Life Science
Concept: 4-Diversity, Adaptation and Behavior
PO: #2-Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.

Circle the letter of the correct response for each question. Each question is worth 1 point.

1. Why might Arizona hikers see snakes (that are cold-blooded conformers) lie flat across rocks that have been exposed to direct sun or huddle together in groups in the months of January and February?
   a. These activities would allow snakes to increase their body temperature when the external weather is chilly.
   b. These activities would allow snakes to hunt more effectively during winter months.
   c. These activities would allow snakes to attract desirable mates so that offspring will be born in warmer weather.
   d. These activities would allow snakes to enjoy contact comfort to feel more secure.

2. If a desert snake cannot find a viable way to connect with warmth externally, what other option would help it maintain homeostasis?
   a. It could pull energy from its fat sources to heat it up.
   b. It could pull energy by shedding its skin.
   c. It could hibernate to drastically slow down its metabolism
   d. It could slither faster to increase its body heat.

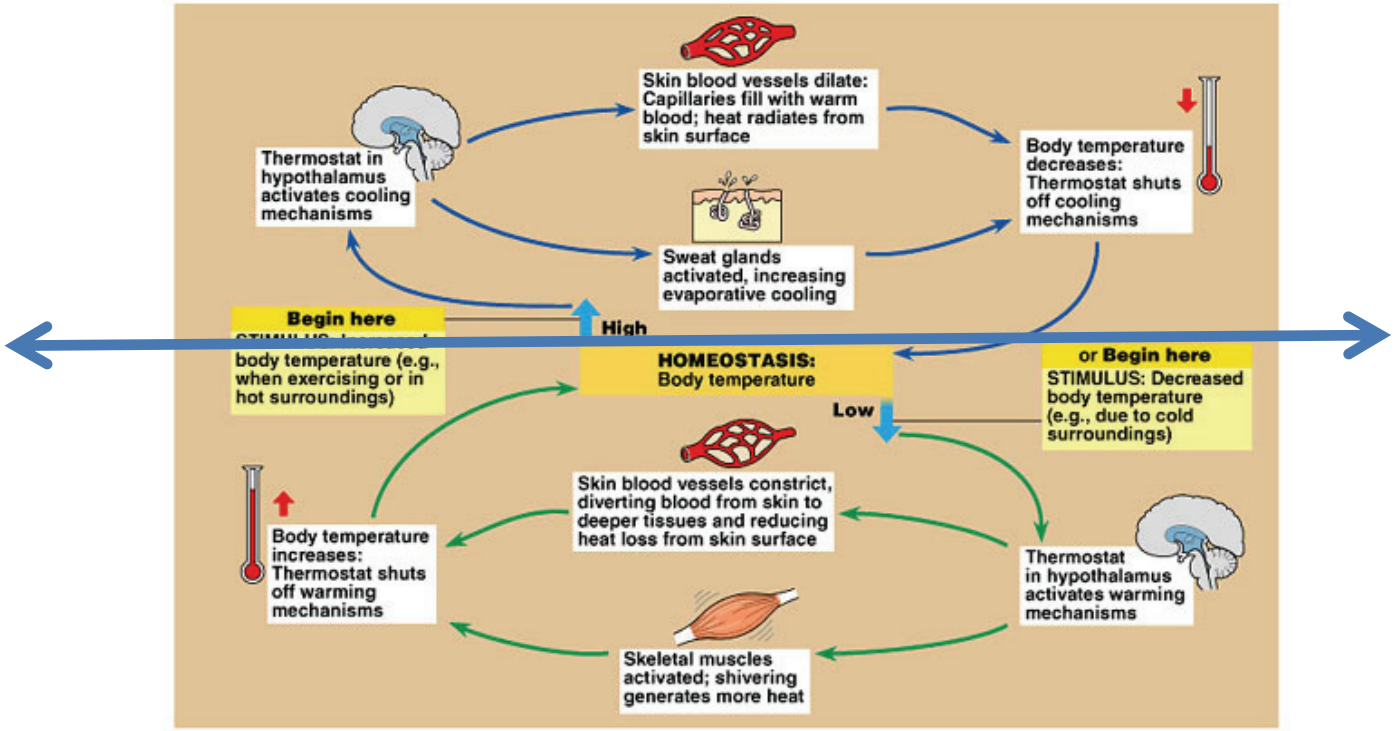
3. How can people increase their body temperature to maintain a livable environment on the North Pole?
   a. They can release sweat that is evaporated off of the skin to cool the body temperature.
   b. Their muscles can shiver, creating heat internally to increase their temperature.
   c. They can consume alcohol to decrease the pereception of cold.
   d. Their heart can beat more quickly to boost body temperature.

4. A child is in the hospital with a fever of 105 degrees in July. Nurses are keeping his body submerged in an ice bath to reduce his temperature and prevent permanent damage to his brain and body. Humans are regulators, not conformers. What can you deduce about the boy's condition, since he is receiving a treatment more applicable to a conformer?
   a. His receptor, processing center, or effectors are not functioning correctly, causing his body to fail to regulate its own temperature.
   b. His excessively high temperature is being caused by the excessive heat of the summer month.
   c. His consistent temperature indicates that he may become a cold-blooded organism.
   d. His body temperature elevation is being caused by massive dehydration.

5. In the infrared picture to the right, black designates the coolest temperature: the temperature of the air. Red and orange indicate higher temperatures. Why might Arizona exterminators get the most calls for scorpion removal during the months of July and August?
   a. Scorpions are more active during the warmest daylight hours because of the warmth.
   b. Scorpions are falling into swimming pools in attempts to hydrate.
   c. Scorpions are entering air conditioned homes to cool their body temperature.
   d. Scorpions are basking on outdoor pool surfaces to increase their temperature.

6. What best describes what happens in a healthy person whose glucose levels are high to balance out bloodsugar?
   a. The pancreas releases insulin to counter the glucose levels and restore balance to the body.
   b. The pituitary releases hormones that increase the glucose levels in the pancreas.
   c. The hypothyroid suppresses the release of insulin from the Islets of Langerhans
   d The live relases sugar to reduce the glucose levels in the body.

Review the chart below to answer the questions that follow it:



7. The physical responses desribed about the horizontal blue line describe what types of regulatory responses?
   a.Things that glands, vessels, and the brain do in response to reduce a body's high temperature.
   b.Things that glands and organs of the body does to increase a body's high temperature.
   c. Things that glands, vessels, and the brain do in response to reduce a body's low temperature.
   d Things that glands and organs of the body does to increase a body's low temperature.

8. What can you determine about vessels and brain centers having a presence both above and below the horizontal blue line?
   a. That these mechanisms can have either a positive or negative impact to produce a desired state in the body.
   b. That these mechanisms have neither a positive or negative impact on the body – they are just always present.
   c. That these systems work against each other and make achieving homeostasis nearly-impossible.
   d. That these systems struggle to communicate with eachother, causing constant imbalance in body temperature.

9. Why is diffusion and example of homeostasis?
   a. Liquids are naturally unable to simultaneously maintain areas of high and low concentration.
   b. The movement of molecules from high concentration to low is caused by the cells' need to create balance within and outside itself.
   c. The push of molecules from low concentration to high is caused by the cells' need to design a balanced environment.
   d. The pH level of water forces molecules of high acidity into areas of low acidity to reach a balanced pH

10. The human body fights to maintain a balanced pH level, but drinking carbonated soda leads to high acidic levels in the body. Consuming large quantities of carbonated soda has been linked to the onset of osteoporosis – characterized by the severe weakening of the bones. What might the body be doing to achieve pH balance but is causing osteoporosis?
    a. The acid of the soda may be eating away at the bone tissue causing osteoporosis.
    b. The body must be releasing insulin to counter the high sugar content of the soda but is somehow damaging the bones.
    c. The carbonation of the body must be pulling fat cells from tissue that make bones more vulnerable to impact.
    d. Pulling calcium from the bones because the mineral has a strong alkaline property that balances out acidity.

Adaptations Quiz Answer key:

1. A 2. C 3. B 4. A 5. C 6. A 7. A 8. A 9. B 10. D

Scoring summary for summative assessment: **10 questions weighted at 1 point each= 10 points total x 10 = _____/100 points.**	The 12 points possible assessment will reflect the school's grading scale: 90 -100 = A – Mastery 80 – 89 = B - Mastery 70 – 79 = C – Needs Screening for Remediation 60 – 69 = D – Needs Remediation 0 – 59 = F – Needs Intensive Remediation