**Curriculum Sample Template**
Max.8Pages

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| **Grade Level** | 8 | **Content Area** | Science |
| **Course Title** (grades9-12Only) | Science | | |
| **Expected Prior Knowledge**<br>*The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.* | Students are expected to be knowledgeable in the definition of an organism and how they can survive in environments that are unfavorable. | | |
| **Alignment to Program of Instruction**<br>*Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.* | As project based learning is a key feature in the school's mission, students will apply knowledge gained in science to complete projects and solve real world issues, and some may even be cross curricular. Lessons are aligned to both the program of instruction and common core standards by scaffolding knowledge, engaging students and requiring them to use higher depths of knowledge to demonstrate mastery and solve real world problems. | | |
| **Standard Number and Description**<br>*List the Number* and full description for the required Standard.* | G8.S4.C4.PO2<br>Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment. | | |
| **Materials/Resources Needed** | All required class worksheets and tests | | |

****StandardNumber**:ForEnglishLanguageArts(ReadingandWriting),useGrade,Strand,Standard(e.g.,3.RI.2).ForK-8Math,useGrade,Domain,Standard(e.g.,6.EE.7).ForHSMath,useConceptualCategory-Domain,Standard(e.g.,A-REI.6).ForScience,useGrade,Strand,Concept,PO(e.g.,4.1.3.1).*

| **Lesson** (add as needed | **Instruction** | **Student Activities** |
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| **1** | **Objective: SWBAT Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.**<br>Teacher introduces the standard and vocabulary of techniques organisms use to maintain a stable environment. Teacher gives examples of organisms that utilize forms of homeostasis and thermoregulation and instructs students to take notes in their Science notebooks. Teacher distributes vocabulary terms and instructs students to complete vocabulary worksheet. | Students will learn and take notes on the topic of organisms that can maintain a stable internal environment while living in a constantly changing external environment. Students take notes on examples of organisms that have this capability. Students then complete a vocabulary worksheet. |
| **2** | **Objective: SWBAT Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.**<br>Teacher will assign first summative assessment in which Teacher will instruct students to choose an organism that is able to maintain its internal environment while living in a changing environment. Students must write a five paragraph report on the organism, along with creating a poster for presentation. The topic will be how that organism is able to survive by maintaining a stable internal environment, with changing external environments, and a description of possible external environments this organism may or has encountered. Teacher will allow class time for the research process, and provide a five paragraph graphic organizer. Students will be responsible researching actual facts about their organisms and ensuring they meet the requirements and that satisfy the topic. Teacher will allow for 3 class periods to complete the writing process, self-editing, and the final daft and poster will be assigned as homework. | Students will complete their first summative assessment with a 3 day period, in which they will choose an organism that can maintain stable internal environment and will research and write a five paragraph report on the organism. Students must ensure the research they are completing contains the actual facts required by the rubric. Students will clearly demonstrate how their chosen organism maintains the stable internal environment. Students will complete the writing process, including graphic organizer, rough draft, self-editing and final draft. Students will then create a poster that illustrates and summarizes the information they learned about their organism. Students will include a description of the ways the organism is able to maintain their internal environment, possible external environments, and at least two images of their organism. Students will follow instructions and meet rubric of at least 70% to consider mastery. |

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| **3** | **Objective: SWBAT Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.**<br>Teacher teaches additional vocabulary: ectotherm, endotherm, behavioral adaptation, and structural adaptation. Teacher introduces second summative assessment in which students independently design an animal and its adaptation features to maintain a stable internal environment while living in a futuristic world of a changing environment. Teacher allows students pick from a list of environments, and students must design structures within that animal that would allow it to survive in a changing external environment. Teacher will also instruct students to create an illustration of the animal they design. | Students write and learn examples of new vocabulary words: endotherm, ectothern, behavioral adaptation, structural adaptation. Students will complete their second summative assessment in which students independently will pick a futuristic changing environment and then design an animal able to survive by maintaining its internal environment. Students will follow instructions and meet rubric of at least 70% to consider mastery. |
| **4** | **Objective: SWBAT Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.** Teacher will instruct students to complete a comprehensive written assessment. | Students will complete a written comprehensive summative assessment during the entire class period. |

***Paste Summative Assessment Here: Research Report and Poster***

Summative Assessment 1: Research report and Poster. Directions: Choose one organism that can maintain its internal environment while living in a changing external environment. Research this organism using at least 3 sources. Your topic is to describe how an organism is able to maintain a stable internal environment while living in a changing external environment. Use of the writing process is required, including using a graphic organizer, writing a rough draft, use of self editing, and a final draft. You will then create a poster that summarizes your report and contains images of your organism. Poster must contain a 2-3 sentence summary of each of your 3 main points and at least 2 images of your organism.

| Category | Level 4:<br>Achieves Standards at a<br>High Level | Level 3:<br>Performance at Standard | Level 2:<br>Performance below<br>Standard | Level 1:<br>Demonstrates<br>Minimal Success |
|---|---|---|---|---|
| Quality of Information | Information clearly relates to the main topic. It includes several supporting details and/or examples. 10 points. | Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples. 8 points. | Information clearly relates to the main topic. No details and/or examples are given. 6 points. | Information has little or nothing to do with the main topic. 4 points. |
| Writing Process | Graphic organizer or outline has been completed and shows clear, logical relationships between all topics and subtopics. Rough draft is complete and perfection is attempted. Detailed final draft is neatly presented and includes all required information with minimal errors. 10 points. | Graphic organizer or outline has been completed and shows relationships between all topics and subtopics. Rough draft is complete and quality is attempted. Detailed final draft is neatly presented and includes most required information with some errors. 8 points. | Graphic organizer or outline has been completed but does not show clear, logical relationships between all topics and subtopics. Rough draft is complete with little effort. Detailed final draft is includes some required information with some/many errors. 6 points. | Graphic organizer or outline is incomplete or missing. Rough draft is incomplete or missing. Final draft is missing much required information with many errors. 4 points. |
| Mastery of Standard | Clear description of how the designed animal can maintain a stable environment while living in a changing external environment. Student describes how specific characteristics allow the animal to survive. 70 points. | Vague description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 60 points. | Illogical description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 50 points. | Little to no description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 40 points. |
| Poster Required Elements | The poster includes all required elements as well as additional information. 10 points. | All required elements are included on the poster. 8 points. | All but 1 of the required elements are included on the poster. 6 points. | Several required elements were missing. 4 points. |

***2. Designer Animal Adaptation Project***

Animals gain and adapt their physical features over millions of years, but our task today is going to cut down that time just a little - you are going to design vertebrate animal which is perfectly suited to its environment.

Background Information: It is the future, the year 3000, and it is now possible for humans to build planets, and genetically engineer or create plants and animals to live on that planet. You are one of the scientists working on the animals, and it is your job to design and create an animal which will be perfectly suited to its environment on this new planet.

Task: You need to pick one of the following environments of already created planets and create a vertebrate animal which is going to be strong and resilient enough to survive in that environment. You must clearly describe how your animal will maintain an internal environment which allows it to survive changing external environments.

**Designing your animal**

You need to consider how this animal is going to stay warm or cool, what it is going to eat, how it is going to get its food and water, how it defends itself, and how it is going to care for its young to make sure they survive. Your animal must be a vertebrate animal. You must also create a unique name for your animal. When you are designing your animal consider the following: size, what does it eat?, how will it catch/get food and water? how will it keep warm/cool, where will it shelter? how will it protect/defend itself from attackers?, Which type of behavior(s) would help this animal survive?

Drawing/illustration must include:

- name of animal and environment it is from (1,2,3,or 4)
- a list of structural adaptations visible in drawing (beak, feathers, scales, claws, etc.)
- a list of behavioral adaptation(s) it has (migration, hibernation, travels in schools, etc.)
- Endothermic or ectothermic, with supporting details (example: blubber to keep warm, lays on sandy surface to warm up in morning.)

**ENVIRONMENTS**

Select 1 of the following:

1: This planet is dark and cold most of the time, but planet rotation causes this planet to become bright and hot once every 45 days. It is very mountainous. It rains almost all day. Because of the wet, dark conditions, the only plants that grow well are small mosses and funguses. Animals on this planet include a type of mouse, a nocturnal hunting large cat, fish, and a variety of insects.

2. This planet is dry and hot. Most of the planet is flat. Water is found in underground streams but there is little water on the surface of the planet. Most of the planet's surface is covered in sand, although there are patches of dry grass. When plants can get their roots down into the water table, they grow into tall trees with leaves at the top but not along the trunk. Plants which are not connected to the water table are small and dry, but they are edible. Animals on this planet include insects, a species of birds which roost in the high trees, a sand-colored lizard and a type of rat.

3. This planet is tropical: wet and hot. Most of the planet is covered by rainforest. The planet is very flat. Water collects in large pools and lakes which have

water in them all year 'round. A species of poisonous plant grows thickly on the ground. The spines of this plant are poisonous, and any animal which steps on one is sure to die. The vegetation is plentiful, and includes leaves, fruits and nuts. Animals include carnivorous snakes, varieties of insects, monkeys, fish and birds.

4. This planet has a moderate climate. It never gets very hot or very cold, but stays mild all year 'round. However, the humidity and precipitation fluxuate rapidly. It rains for part of the year and the water forms pools and lakes which dry up towards the end of the year and then the planet is very dry. The planet is partly mountainous and partly flat. Vegetation includes tall trees with high leaves and fruit, and a smaller plant which bears nuts. However, these nuts are inside hard shells which need to be removed before the nut can be eaten. Animals include rats and mice which live underground, insects, birds that nest in the tall trees, slow moving mammals which also live in the trees and a species of carnivorous nocturnal wolf.

**Summary:**

You will write a 3 paragraph summary of your animal. Your summary will be on a separate piece of paper than your animal design. Summaries will be written in class.

Paragraph 1:If it is an endotherm or ectotherm and specific structural adaptations that support this. Description of behavioral and structural adaptations.

Paragraph 2: A clear description how exactly how your animal is able to maintain its internal environment.

Paragraph 3: Add additional details about your animal that demonstrates how it is specifically adapted to the planet's environment.

| Category | Level 4:<br>Achieves Standards at a<br>High Level | Level 3:<br>Performance at Standard | Level 2:<br>Performance below<br>Standard | Level 1:<br>Demonstrates<br>Minimal Success |
|---|---|---|---|---|
| Structural Adaptations | Animal is vertebrate. Structural adaptations make sense and allow it to successfully exist in environment whether it is endothermic or ectothermic with 100% accuracy. 10 points. | Animal is vertebrate. Structural adaptations make sense and allow it to successfully exist in environment and whether it is endothermic or ectothermic with 75% accuracy. 8 points. | Animal is vertebrate. Structural adaptations make sense and allow it to successfully exist in environment and whether it is endothermic or ectothermic with 50% or less accuracy. 6 points. | Animal is not vertebrate and structural adaptations do not support adaptation to environment and whether animal is ectothermic, endothermic. 4 points. |
| Behavioral Adaptations | Animal has at least one behavioral adaptations that makes sense and supports structural adaptations and whether animal is endothermic or ectothermic with 100% accuracy. 10 points. | Animal has at least one behavioral adaptation that makes sense and supports structural adaptations and whether animal is endothermic or ectothermic with 75% accuracy. 8 points. | Animal has at least one behavioral adaptations that makes sense and supports structural adaptations and whether animal is endothermic or ectothermic with 50% or less accuracy. 6 points. | Animal does not have behavioral adaptation. 2 points. |
| Illustration | Drawing is in color, neat, detailed and supports written components with 100% accuracy. 10 points. | Drawing is in color, neat, detailed and supports written components with 75% accuracy. 8 points. | Drawing is in not in color, neat, detailed and supports written components with less than 50% accuracy. 6 points. | Drawing is in not in color, neat, detailed and does not support written components. 4 points. |
| Mastery of Standard | Clear description of how the designed animal can maintain a stable environment while living in a changing external environment. Student describes how specific characteristics allow the animal to survive. 70 points. | Vague description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 60 points. | Illogical description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 50 points. | Little to no description of how the designed animal can maintain a stable environment while living in a changing external environment. Student does not include how the specific characteristics allow animal to survive. 40 points. |

3. Written Assessment

**Directions: Read each question and write the letter of the correct answer on the line to the left.**

1. Any living thing is called an _____.
   A. Plant
   B. Species
   C. Organism
   D. Hybrid
2. A living organism's ability to maintain a stable internal environment no matter what is going on outside the organism is called _____.
   A. Traits
   B. Homeostasis
   C. Chromosomes
   D. Reproduction
3. In order to survive all living things need two things raw materials and a_____.
   A. Place to live
   B. Place to reproduce
   C. Place to run
   B. Place to develop

**Directions: Using complete sentences, write an answer to each question on the lines below.**

4. Give two examples of homeostasis within your own body.
5. What is a structural adaptation?
6. What is a behavioral adaptation?
7. What is the difference between an endotherm and ectotherm?
8. As humans, can we maintain a stable internal environment while living in a constantly changing external environment? Make two arguments: one stating that humans can, and one stating that humans cannot maintain a stable internal environment. Write one paragraph for each argument.

Key:

1. C (5 points)
2. B (5 points)
3. B (5 points)
4. Answers may vary and may include: Sweat and dilation of blood vessels near the skin (5 points)
5. Structural adaptations are physical features of an organism such as their shape, body, or any other structure in relation to the body. For example the polar bears big feet allow them to swim in the water and hunt for food. (10 points)
6. Behavioral adaptation is characterized as being how an animal acts and behaves in order to stay alive due to its climate. These behaviors can be distinctive or used for protection. (10 points)
7. Ectotherms are animals like snakes and lizards that change their body temp with the ambient temperature and endotherms are humans and other mammals like birds keep their body temperature the same no matter what the climate is like. (10 points)
8. Answers will vary, argument for will support the examples of how humans are able to adapt and achieve homeostasis. Arguments against will state that humans lack special characteristics found in many animals to survive intense environments without the use of technology or other aids. (50 points)