

## Adapted *Understanding By Design* -- One-Page Template

**Thematic Unit Title: Animals of the Arctic & Antarctic**

**Grade Level Being Addressed: 5<sup>th</sup> grade**

### **Standards & Benchmarks to be Addressed:**

#### **Standards for Technological Literacy**

Standard 9. Students will develop an understanding of engineering design.

- The engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating it, and presenting the results.
- When designing an object, it is important to be creative and consider all ideas.
- Models are used to communicate and test design ideas and processes.

Standard 4. Students will develop an understanding of the cultural, social, economic, and political effects of technology.

- When using technology, results can be good or bad.
- The use of technology can have unintended consequences.

Standard 5. Students will develop an understanding of the effects of technology on the

- Waste must be appropriately recycled or disposed of to prevent unnecessary harm to the environment.
- The use of technology affects the environment in good and bad ways.

#### **Next Generation Science Standards**

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

#### **Common Core Math Standards**

5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

5.OA.A.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

5.NBT.B.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used

#### **Common Core ELA Standards**

CCSS.ELA-LITERACY.RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

CCSS.ELA-LITERACY.RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on

specific information in the text.

## Stage 1: Desired Results

### Understandings

What will students understand (about what big ideas) as a result of the unit? "Students will understand....

How to apply the Engineering Design Process to create a technological product

How to use testing and feedback to improve a product

How technology affects the environment

### Essential Questions

- ◆ What is the Engineering Design Process?
- ◆ How do I apply the Engineering Design Process?
- ◆ How has technology affected the habitats of arctic and Antarctic animals?
- ◆ How can we make enough profits to fund a pizza party for our class?

### Knowledge & Skill

- ◆ Each step of the Engineering Design process
- ◆ Acts to take in each step of the Engineering Design process
- ◆ Using video tutorials to create technological product
- ◆ Using sources to research information
- ◆ Using expressions in real-life situations
- ◆ Quoting accurately from the text
- ◆ Explain relationships between animals & the environments using textual information

## Stage 2: Assessment Evidence

What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met? [Anchor the work in performance tasks that involve application, supplemented as needed by prompted work, quizzes, observations, etc.]

### Performance Task Summary

### Rubric Titles

- ◆ Create a Video Game using the Engineering Design Process

Arctic & Antarctic Animals Video Game Rubric

### Self-Assessments

Peer Feedback – Video Games

### Other Evidence, Summarized

Create your Character Activity  
Plan your game Activity  
Research your game Activity  
Pizza Expressions

## Stage 3: Learning Activities

- ◆ What sequence of learning activities and teaching will enable students to perform well at the understandings in Stage 2 and thus display evidence of the desired results in stage one? Use the WHERETO acronym to consider key design elements.

Where

Day 1: Introduce the Engineering Design process

- Discuss the Presentation
- Take Notes on each step for reference

Hook

Day 2: Introduce the Design Challenge

- Discuss the Presentation
- Split into groups of two
- Each partner research 2 different Arctic & Antarctic Animals

Equipped, Experience, Explore

Day 3: Plan out the Video Game

- Decide on an animal as the main character from the research
- Find Graphics (sprites) for your character, enemy, environment, and food source

Day 4 – 5: Create your Character

- Use the Video Tutorials to create your character and basic game environment

Day 6 – 7: Create the Enemy & Food Source for your game

- Use the Video Tutorials to create your enemy & food source

Day 9: Pizza Expressions

-Discuss the Presentation

-Complete Presentation Activities on the board as students complete student assignment

Rethink & Evaluate

Day 10: Improve

- Rate four of your peers on their first level
- Use the feedback from your peers to evaluate your first level
- Make improvements and changes before moving on to creating the final two levels

Tailored

Day 11: Improve & Create

- Make improvements to your first level
- Create your own unique second & third level

Organization

Day 1 – Introduce the Engineering Design Process

Day 2 – Introduce the Design Challenge

Day 2 & 3 – Research & Plan out the game

Day 4 –7 Create a basic one-level game

Day 8 – Evaluate the level and make improvements

Day 9 – Pizza Expressions

Day 10 – 11 Complete your video game

Day 12 – Discuss the unit, summary, and pizza party

Document adapted from the following original 1-page template developed by Grant Wiggins and Jay McTighe for *Understanding by Design* (2005). Retrieved from <http://webkelley.com/DOE/MESPA/curriculum/Resource/152UbDtemplate.doc>