WOOD BISON CURRICULUM

Overview

Photo: Doug Lindstrand

This wood bison curriculum includes the following:

- A short video that introduces the wood bison conservation project and the corresponding 3 lessons in this curriculum
- 2. A STEM lesson, "Where Will the Wood Bison Roam?" where students become the biologists to determine where wood bison could be restored on in the Alaska wild. This STEM lesson also includes 2 additional, optional extension STEM lessons: Creature Feature (collect data along a habitat transect in the school yard) and Calculate it! (calculate the amount of forage a herd of wood bison require annually)
- 3. A Wood Bison Behavior lesson, where students watch video clips of wood bison and learn to identify behaviors
- 4. A game, "Tracks and Trails", where students learn about natural history of wood bison, as well as that of four other Alaskan ungulate species

WHY did we develop a wood bison curriculum? Very soon, wood bison will be restored back into the Alaskan wild. To celebrate this historic event, we wanted to find ways to include Alaskan youth in the restoration process. The lessons in the wood bison curriculum are designed to help youth develop ownership of their natural resources, hone skills in science and math, and raise conservation awareness.

Next Generation Science Standards: Middle School

Performance Expectations:

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems

MS-LS2-4: Construct an argument supported by empirical evidence that changes in the physical or biological components of an ecosystem affects populations

Foundations:

Analyzing and interpreting data

Constructing Explanations and designing solutions

Engaging in argument from evidence

Connections to Nature of Science:

Scientific knowledge is based on empirical evidence

Common Core State Standard Connections: Literacy

RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts

RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually

RST.6-8.8: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text

RI.8.8: Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.

WHST.6-8.1: Write arguments to support claims with clear reasons and relevant evidence

SL.8.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues building on others' ideas and expressing their own clearly

SL.8.4: Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well -chosen details

Common Core State Standards Connections: Math

MP. 4: Model with mathematics

6.SP.B.5: Summarize numerical data sets in relation to their context

NSES National Science Standards

 Standard A: Science as Inquiry 1-6

1. Identify questions and concepts that guide scientific investigations (STEM)
2. Design and conduct scientific investigations (STEM)
3. Use technology and mathematics to improve investigations and communications (STEM)
4. Formulate and revise scientific explanations and models using logic and evidence (STEM)
5. Recognize and analyze alternative explanations and models (STEM)
6. Communicate and defend a scientific argument (STEM)

Standard C: Life Science 6; Students will understand the behavior of organisms (STEM)

Standard G: History and Nature of Science 3; Students will understand connection to historical perspectives (STEM)

National Technology Standards ITEA

Standard 2: Students will develop an understanding of the core concepts of technology

a. Systems thinking applies logic and creativity with appropriate compromises in complex real-life problems (benchmark W and STEM)
b. Management is the process of planning organizing and controlling work (benchmark EE and STEM)

Standard 8: Students will develop an understanding of the attributes of design (STEM)

a. The design process includes defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach d, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communication processes and results. (benchmark H)

National Engineering Standards ABET

1. Students will have an ability to design and conduct experiments as well as interpret data (STEM)
2. Students will have an ability to function on multi-disciplinary teams (STEM)
3. Students will have an ability to communicate effectively (STEM)

National Math Standards NCTM

Standard 4: Measurement (STEM)

a. Understand measurable attributes of objects and the units, systems and the processes of measurement (STEM)

Standard 6: Problem Solving

a. Build new mathematical knowledge through problem solving (STEM)
b. Solve problems that arise in mathematics and in other contexts (STEM)
c. Apply and adapt a variety of appropriate strategies to solve problems (STEM)
d. Monitor and reflect on the process of mathematical problem solving (STEM)

Standard 8: Communications

a. Communicate their mathematical thinking coherently and clearly to peers, teachers and others (STEM)

Standard 10: Representation

a. Create and use representations to organize record, and communicate mathematical ideas (STEM)
b. Select, apply, and translate among mathematical representations to solve problems (STEM)