



International Wolf Center
Teaching the World about Wolves

Wolf Research Concepts Educational Alignment

MINNESOTA		Science Standards*				
Grade	Strand	Substrand	Standard	Benchmark	Curriculum	Assessment
9 10 11 12	1. The Nature of Science and Engineering	1. The Practice of Science	1. Science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	9.1.1.1.1 Explain the implications of the assumption that the rules of the universe are the same everywhere and these rules can be discovered by careful and systematic investigation.	Unit 3 – Defining Wolf Research Wolf Research in MN http://www.youtube.com/watch?v=J-MvI1i4IAq&feature=player_embedded NATURE The Wolf That Changed America Wolf Expert PBS http://www.youtube.com/watch?v=iyCZqkX-f_8&feature=player_embedded Dan McNulty “How do wolves select elk prey?” http://www.youtube.com/watch?v=jae2UeFw3yo&feature=related “Alpha” wolf? http://www.youtube.com/watch?v=tNtFgdwTsbU&feature=related Wolf Ethology Quiz IWC http://www.youtube.com/watch?v=hRcuFN6gHcg Wolf Dominance Behavior http://www.youtube.com/watch?v=wIRVpLaCDS0&feature=related Pack Dynamics at the IWC http://www.youtube.com/watch?v=eEkirxINn5s Trophic Cascade http://www.youtube.com/watch?v=O8BV0VCn1JU Dan Stark http://www.youtube.com/watch?v=OoKi-jPP3g&feature=related Dr. Dave Mech Why do people see wolves as good or bad? http://www.youtube.com/watch?v=rpBDlwaiGeQ Wyoming wolf wars: Debate over delisting wolves http://www.youtube.com/watch?	Unit 3 Assignment : Understanding Wolf Research

					v=Hd9wQm2LcH0 When emotion drives the wolf debate article http://www.newwest.net/topic/article/when_emotion_drives_the_wolf_debate_research_suffers/C41/L41/	
				9.1.1.2.2 Evaluate the explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the scientifically acceptable evidence, and suggesting alternative scientific explanations. 9.1.1.2.3 Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim. 9.1.1.2.4 Use primary sources or scientific writings to identify and explain how different types of questions and their associated methodologies are used by scientists for investigations in different disciplines.	Unit 4 – Research Methods Organizing a Research Project Structure of the Scientific Method http://teacher.pas.rochester.edu/phy_labs/appendix/appendix.html Scientific Method Thinking, How It Works http://www.suite101.com/content/scientific-method-thinking-how-it-works-a116812	
		3. Interactions Among Science, Technology, Engineering, Mathematics, and Society	1. Natural and designed systems are made up of components that act within a system and interact with other systems.	9.1.3.1.1 Describe a system, including specifications of boundaries and subsystems, relationships to other systems, and identification of inputs and	Unit 2 – Wolf 101 FAQs About Wolves http://www.wolf.org/wolves/learn/basic/faqs/faq.asp Wolf Predation on Ungulates http://www.wolf.org/wolves/learn/basic/biology/ungulate_dep.asp	Unit 2 Assignment : Wolf 101 Quiz Unit 3 Assignment : Understanding Wolf Research

				<p>expected outputs. <i>For example:</i> A power plant or ecosystem.</p> <p>9.1.3.1.2 Identify properties of a system that are different from those of its parts but appear because of the interaction of those parts.</p> <p>9.1.3.1.3 Describe how positive and/or negative feedback occur in systems.</p>	<p>Wolf Recovery with Dr. Dave Mech http://www.youtube.com/watch?v=JPDnz48BDqM&feature=related</p> <p>Unit 3 – Defining Wolf Research (see above)</p>	
			3. Science and engineering operate in the context of society and both influence and are influenced by this context.	9.1.3.3.1 Describe how values and constraints affect science and engineering.	<p>Unit 1 - Do Your Values Determine How You Think?</p> <p>Unit 4 – Research Methods</p> <p>Unit 6 - Reflection</p>	<p>Unit 1 Assignment : My Pre-Course Values Journal</p> <p>Unit 4 Assignment : Relevance of the Scientific Method</p> <p>Unit 6 Assignment : My Post-Course Values Journal</p>
				9.1.3.3.3 Describe how scientific investigations and engineering processes require multi-disciplinary contributions and efforts.	Unit 3 – Defining Wolf Research (see above)	Unit 3 Assignment : Understanding Wolf Research
			4. Science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	9.1.3.4.1 Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics and new technologies.	Unit 4 – Research Methods	Unit 4 Assignment : Relevance of the Scientific Method

	3. Earth and Space Science	4. Human Interactions with Earth Systems	1. People consider potential benefits, costs and risks to make decisions on how they interact with natural systems.	9.3.4.1.1 Analyze the benefits, costs, risks and tradeoffs associated with natural hazards, including the selection of land use and engineering mitigation.	Unit 3 – Defining Wolf Research Relationships with Humans: Dan Stark http://www.youtube.com/watch?v=OoKi-jPP3q&feature=related Dr. Dave Mech Why do people see wolves as good or bad? http://www.youtube.com/watch?v=rpBDlwaiGeQ Wyoming wolf wars: Debate over delisting wolves http://www.youtube.com/watch?v=Hd9wQm2LcH0 When emotion drives the wolf debate article http://www.newwest.net/topic/article/when_emotion_drives_the_wolf_debate_research_suffers/C41/L41/	Unit 3 Assignment : Understanding Wolf Research
	4. Life Science	2. Interdependence Among Living Systems	1. The interrelationships and interdependence of organisms generate dynamic biological communities in ecosystems.	9.4.2.1.2 Explain how ecosystems can change as a result of the introduction of one or more new species.	Unit 3 – Defining Wolf Research Biology & Ecology NATURE The Wolf That Changed America Wolf Expert PBS http://www.youtube.com/watch?v=iyCZqkX-f_8&feature=player_embedded Trophic Cascade http://www.youtube.com/watch?v=O8BV0VCn1JU	Unit 3 Assignment : Understanding Wolf Research Forum Posts
		4. Human Interactions with Living Systems	1. Human activity has consequences on living organisms and ecosystems.	9.4.4.1.2 Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.	Unit 3 – Defining Wolf Research Biology & Ecology NATURE The Wolf That Changed America Wolf Expert PBS http://www.youtube.com/watch?v=iyCZqkX-f_8&feature=player_embedded Trophic Cascade http://www.youtube.com/watch?v=O8BV0VCn1JU	Unit 3 Assignment : Understanding Wolf Research

*These standards meet or exceed requirements for respective national education standards.

ISTE Standards						
Grade	Strand	Substrand	Standard	Benchmark	Curriculum	Assessment
9 10 11 12	1. Creativity and Innovation	Students demonstrate creative thinking, construct knowledge, and develop		apply existing knowledge to generate new ideas, products, or processes. b. create original works as a means of personal or	Wolf Research Concepts News Forum Unit 5 – Develop A Proposal Wolf Research Project Requirements & Instructions	Forum Posts Unit 5 Assignment : Wolf Research Concepts Forum

		innovative products and processes using technology. Students:		group expression.		
	2. Communication and Collaboration	Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.		a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.	Wolf Research Concepts News Forum	Forum Posts
				b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.	Wolf Research Concepts News Forum Unit 5 – Develop A Proposal Wolf Research Project Requirements & Instructions	Forum Posts Unit 5 Assignment : Wolf Research Concepts Forum
	3. Research and Information Fluency	Students apply digital tools to gather, evaluate, and use information.		plan strategies to guide inquiry. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. evaluate and select information sources and digital tools based on the appropriateness to specific tasks. process data and report results.	Unit 5 – Develop A Proposal Wolf Research Project Requirements & Instructions	Unit 5 Assignment : Wolf Research Concepts Forum
	4. Critical Thinking, Problem Solving, and Decision	Students use critical thinking skills to plan and conduct		identify and define authentic problems and significant questions for investigation. b. plan and	Unit 5 – Develop A Proposal Wolf Research Project Requirements & Instructions	Unit 5 Assignment : Wolf Research Concepts Forum

	Making	research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.		manage activities to develop a solution or complete a project.		
	6. Technology Operations and Concepts	Students demonstrate a sound understanding of technology concepts, systems, and operations	a. understand and use technology systems.	b. select and use applications effectively and productively.	Unit 5 – Develop A Proposal Wolf Research Project Requirements & Instructions	Unit 5 Assignment : Wolf Research Concepts Forum