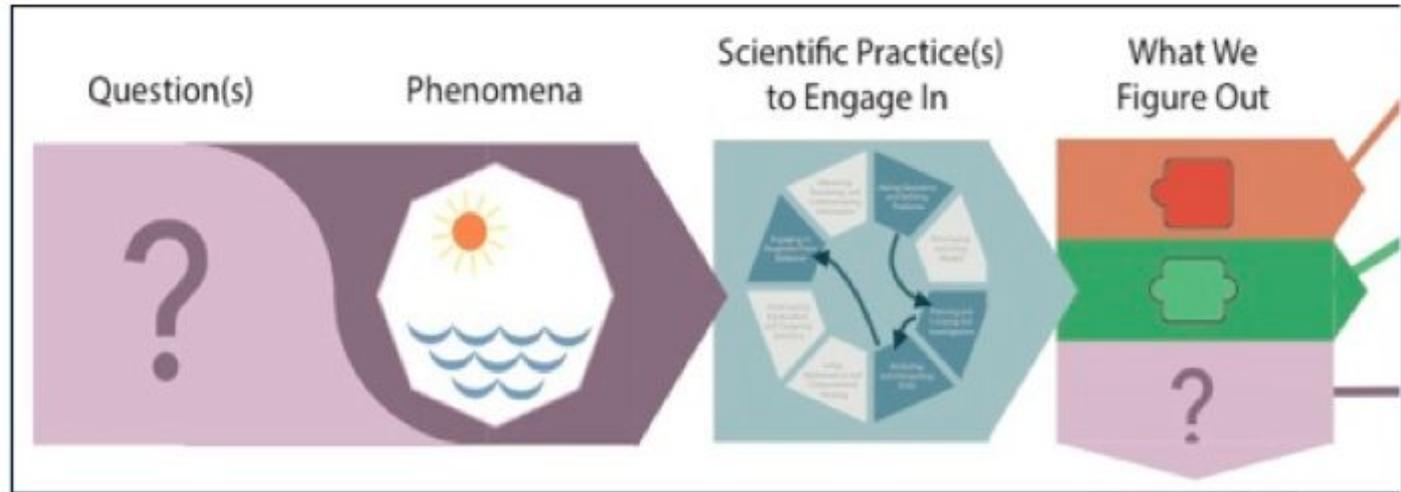


Standards Addressed: HS-LS2-2, HS-LS2-6, HS-LS2-7, HS-LS4-6, HS-ESS3-4, HS-ETS1-3
(Peggy Christensen, Kay Neumann, and Linette Bernard for ISTS Conference 2017 - 9/20/2017)

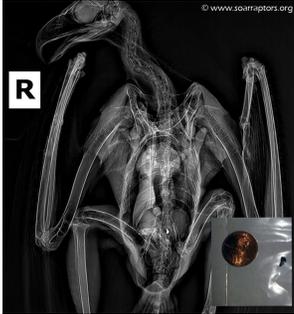
Anchor Phenomena:



Driving Question for Unit: What can be done to prevent so many eagles from dying in Iowa?



Lesson # with DCI or Big Idea	Phenomena-Driven Question / Ideas	Phenomena or Problem	Scientific Practices Making Sense of Phenomena using SEPs to investigate DCIs	What We Figured Out Incrementally Build Explanations, Models, or Designs
<p>Lesson 1 DCI: LS2.C: Moreover, <u>anthropogenic changes (induced by human activity) in the environment, can disrupt an ecosystem and threaten the survival of some species.</u> (HS-LS2-7)</p> <p>Big Idea: Human activity can have a negative impact on the environment</p>	<p>What is happening in Iowa that is causing so many eagles to die?</p>	<p>Eagles are dying on the Iowa landscape</p> 	<p>Students will analyze and interpret (and/or graph) 2.5 years (2015-2017) of real mortality and morbidity data of Iowa eagles looking for trends/patterns of what is causing so many eagles to die</p>	<p>Some die from natural causes (e.g. old age, flooded habitat, food shortage due to drought), disease, and accidents including electrocution from electrical wires, vehicles hitting them, traps, etc.</p> <p>However, about half the eagles admitted to rehabilitators in Iowa die from ingesting lead (ammunition) . . . human impact. (CCCs - cause and effect and patterns)</p>

<p>Lesson 2 DCI: LS2.C: Moreover, <u>anthropogenic changes (induced by human activity) in the environment, can disrupt an ecosystem and threaten the survival of some species.</u> (HS-LS2-7)</p> <p>Big Idea: Human activity can unintentionally impact organisms in the environment</p>	<p>How are eagles getting lead poisoning?</p>	<p>Many of the eagles admitted to SOAR have lead in their systems</p> 	<p>Students will analyze and interpret the deer gut pile, deer carcasses X-rays, and eagle X-rays information from SOAR to try to figure out what, if anything the gut piles have to do with the situation.</p> <p>(The lead articles from the SOAR website will provide the “Ask an Expert” information (from multiple sources) students may need to construct explanations for how they believe eagles are getting lead into their bodies.)</p>	<p>Eagles are eating deer gut piles and carcasses left by hunters. These gut piles can contain lead, if the deer have been shot with lead ammunition. Since eagles eat deer meat, that is one possible way lead is getting into their bodies. (CCCs - cause and effect)</p> <p>(Look at x-rays of gut piles, venison, and deer carcasses)</p>
<p>Lesson 3 DCI: LS4.D: <u>Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth.</u> (HS-LS4-6 and HS-LS2-7)</p> <p>Big Idea: Human activity can unintentionally impact (human) organisms in the environment</p>	<p>How did the baby get lead in his blood?</p>	<p>Jen’s baby had high levels of lead in his blood</p>  <p>(Photo of x-ray taken of two 1-pound packages of ground venison)</p>	<p>Students will analyze the information in the Jen Story to figure out why Jen’s baby had elevated levels of lead in his system. They will make a claim as to what caused the high levels of lead in the baby’s blood based on the evidence they have</p>	<p>When Jen and her husband took their deer to the locker for processing, even though they didn’t use lead ammunition to shoot their deer, the ground venison they got back had other’s deer meat in it. The ground venison they received must have included someone else’s meat that had been shot with lead ammunition. (CCCs - cause and effect)</p>

<p>Lesson 4 DCI: <u>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.</u> (HS-LS1-3)</p> <p>Big Idea: Human activity can unintentionally impact (human and wildlife) organisms in the environment</p>	<p>Why is lead such a problem?</p>	<p>Physiology and/or chemistry of lead (lead's effect on animals)</p> 	<p>Students analyze data of the effects of lead on the human body (e.g. bones, nervous system, high blood pressure, kidney damage, etc.)</p> <p>https://www.epa.gov/lead/learn-about-lead</p> <p>http://soarraptors.org/wp-content/uploads/ATSDR_PhysiologicalEffectsLead_CSEM.pdf</p>	<p>Students will learn that lead gets absorbed into the blood and stored in bones of animals - including people - similar to the way calcium does (The body is fooled into thinking it is absorbing calcium.). Animals and people naturally absorb small amounts of copper, knowing it is copper. (CCCs - structure and function, scale, proportion and quantity, cause and effect, and systems and system models)</p> <p>More information available on SOAR website: Lead in the Environment Impacts of lead Research articles and information Eagles and Lead Research</p>
<p>Lesson 5 DCI: ETS1.B: <u>When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts.</u> (HS-ETS1-3)</p> <p>Big Idea: Non-lead ammunition will be a safer alternative for hunting. . . providing lead-free food for wildlife and humans.</p>	<p>What can be done to alleviate this problem?</p>		<p>Students construct, present, and defend an argument or counter-argument based on data and evidence about why non-lead ammunition would be an environmentally safer alternative to lead ammunition. They can present this to a specific audience . . . e.g. hunters using a variety of presentation media (e.g. posters, videos, blogs, interview, etc.)</p>	<p>There are safer and just as effective alternatives to lead ammunition.</p> <p>More information available on SOAR website: Non-toxic Alternatives</p>