

5E Lesson Plan-Faust June, 2012

Topic: Life Science-Ecology, Deer population

Grade Level: 6th graders

Logistics Information:

- a. Iowa Core Essential Concepts:

Life Science

Understand and apply knowledge of interdependency of organisms, changes in environmental conditions, and survival of individuals and species

Use evidence to develop descriptions, explanations, predictions, and models.

Use critical thinking skills to conduct research, solve problems, and make informed decisions using appropriate technological tools and resources.

Inquiry

Essential Concept and/or Skill: *Design and conduct different kinds of scientific investigations.*

Students should develop general abilities such as making systematic observations, taking accurate measurements, and identifying and controlling variables.

Students should develop the ability to clarify ideas that are influencing and guiding their inquiry, and to understand how those ideas compare with current scientific knowledge.

Students formulate questions, design investigations, execute investigations, interpret data, use evidence to generate explanations, propose alternative explanations, and critique explanations and procedures.

Students use appropriate safety procedures when conducting investigations.

Essential Concept and/or Skill: *Understand that different kinds of questions suggest different kinds of scientific investigations.*

Some investigations involve observing and describing objects, organisms and events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.

Essential Concept and/or Skill: *Select and use appropriate tools and techniques to gather, analyze and interpret data.*

The use of tools and techniques, including computers, will be guided by the questions asked and the investigations students design. Students should be able to access, gather, store, retrieve, and organize data, using computer hardware and software designed for these purposes.

Essential Concept and/or Skill: *Incorporate mathematics in scientific inquiry.*

Mathematics is used to gather, organize and present data and to construct convincing explanations.

Essential Concept and/or Skill: *Use evidence to develop descriptions, explanations, predictions, and models.*

Students should base their explanations on observations and they should be able to differentiate between description and explanation.

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Developing explanations establishes connections between the content of science and the contexts in which students develop new knowledge.

Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or are too vast to be changed deliberately, or are potentially dangerous.

Essential Concept and/or Skill: *Recognize and analyze alternative explanations and predictions.*

Students should develop the ability to listen to and respect the explanations proposed by other students. They should remain open to and acknowledge different ideas and explanations, be able to accept the skepticism of others, and consider alternative explanations.

Essential Concept and/or Skill: *Communicate and defend procedures and explanations.*

Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods.

b. Skills: observations, collect data, measure, predict, analyze, compare, synthesize, list, describe, inform, cooperation, Characteristics of Effective Instruction are embedded in the learning cycle. (Student-centered Classroom; Teaching for Understanding; Assessment for Learning; Rigor and Relevance; Teaching for Learning Differences)

Background Information (What do observers need to know about our learners, classroom and school?):

6th grade is diverse, large groups (28 est. students), middle school is starting 2012-2013 with project-based learning in all subject areas for 6th graders

Materials Required:

Ticks? After freezing might be better time of year for this activity when ticks are less likely.

Outdoor area tree line

Rope or string

Stake/dowel rod/marker

Measuring tape for ea. Group

Clip boards for worksheet in the field

Recorder with a pencil

Modified worksheet *Dropping in on Deer Project WILD* page 420-425.

Google Map printout attached to modified worksheet

Pictures of deer droppings

dry dog food nuggets or something that imitates deer droppings for a practice run with students on how to conduct their survey

prep students to wear appropriate shoes and pants for day of survey in tree line

line up an adult helper/supervisor available to assist with watching students

computers

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Time Period:

Possibly 7 days

Name of the Unit: Deer population

Plan of the Unit

a. Goals of the unit:

Students can infer how populations and density of organisms impact an area's resources

Students can explain carrying capacity and list limiting factors for an organism such as deer in the treeline.

Students can demonstrate how we are using the treeline on the East and South side of the school as a learning lab or outdoor learning center.

b. How this unit related to the curriculum:

Ecology topics are part of our curriculum including biotic and abiotic factors, populations, habitat, community, and energy models

Previous Grade/Course	Current Grade/Course	Next Grade/Course
5 th grade some ecology	6 th grade	Highschool

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Lesson Plan: Phases in a 5E Learning Cycle (**in no particular order**) are Engage, Explore, Explain, Elaborate, and Evaluate. There may be multiple experiences in each phase. Note: headings are provided for informational purposes only, they can occur in any order; a phase may happen more than once (e.g., evaluation)

Phases of the lesson: learning activities and key questions (and time allocation)	Student activities/ anticipated student reactions or responses	Teacher's response to student reactions/ Things to remember	Evidence of Student Understanding
<p>ENGAGE: Are there deer walking through or near the trees in the back of school? Explain to table partners.</p> <p>Begin with picture of deer on the screen.</p>	<p>Students will discuss with table members this opening question posted on the screen with a photo of deer.</p> <p>Active discussion expected.</p>	<p>Encourage discussions</p>	<p>Students will be able to address their experiences that lead to if they think deer use the trees around the school.</p>
<p>ELICIT: List with a partner the things you think deer need to survive. Does our tree line have what deer need?</p>	<p>Students work together to form a list of abiotic and biotic factors needed to survive.</p> <p>Students will need reminders or explanations of abiotic and biotic factors.</p> <p>[reminder last year I had a student that thought deer ate mice]</p> <p>EXPLORE: Students will work cooperatively as biologists within their group of 3 or 4</p>	<p>Have a volunteer give an example of an abiotic and biotic factor.</p> <p>EXPLORE Ask students how they will label there area observed so that they and other biologists know that on this particular day the transect was observed.</p> <p>Ask students what else they could look for that might be a sign of deer in the circle (condition of vegetation, browsing on trees, foliage near ground condition).</p>	<p>The list of things students think deer need to survive.</p> <p>EXPLORE Teacher observes students to assess understanding.</p> <p>Teacher asks students to share whole group: 1) What went well with this activity?</p>
<p>EXPLORE: Day 1 practice run with imitation droppings such as dog food tossed into</p>			

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<p>members' circles.</p> <p><u>Use Dropping in on Deer Project WILD</u> page 420-425.</p> <p>Look at photos of buck and doe droppings compared to rabbit.</p> <p>Day 2 Give students a modified handout of the Dropping/Pellet Group Counter Worksheet. Include this question: <i>If we look for and count piles of deer droppings, what information might we learn about the population of deer in the tree line?</i></p> <p><u>Dropping in on Deer Project WILD</u> page 420-425.</p> <p>What can your group record if you don't see any droppings?</p>	<p>students to practice measuring out 11'9" from a stake/center point and then walk counter clockwise making observations, no touching of imitation deer droppings.</p> <p>Students compare droppings in photos.</p> <p>Expect some confusion and need for clarification of procedure.</p> <p>Students will work with partners to predict what they might learn about the population of deer in the tree line if they count droppings.</p> <p>Students will work with partners claiming an area to set up a transect as practiced with the dog</p>	<p>Teacher utilize Project WILD-An Iowa Supplement pages 22, 28, 29, 31, and 38 to share highlighted areas of information that biologists know when they survey populations.</p> <p>Some of this information could be on the worksheet in summary to guide students.</p> <p>The modified worksheet could also have reminders of safety issues and highlighted facts from the <i>Dropping on in Deer</i> activity pages.</p> <p>Remind/check students marked off their area as already checked. Idea to use Google map printout and they mark the spot.</p> <p>Other evidence in the fall might include deer trails, bedding areas, deer rubs on trees, browsing tree branch tips, scratching up the ground in territory.</p>	<ol style="list-style-type: none"> 2) What didn't go so well with this activity? 3) What can members in the group do to improve the way observations are made for gathering evidence deer were in the area? <p>Assess student understanding by looking for reasonable responses to <i>If we look for and count piles of deer droppings, what information might we learn about the population of deer in the tree line?</i></p> <p>Teacher walks to transects noting level of achievement with recording onto worksheet and cooperation among members.</p>
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	<p>food to look for signs of deer. Students will record observations in their transect.</p> <p>Managing student choices is a concern for safety and on task behavior. Most likely, groups won't all finish at the same time.</p> <p>Early finishers will need choices, such as a new transect or redo more slowly looking for missed signs.</p> <p>Early finishers could redo transect looking for other evidence (hoof prints). Early finishers can also look for evidence of other living things using the treeline.</p>		
<p>EXPLAIN: <i>Day 3</i> <i>If we look for and count piles of deer droppings, what information might we learn about the population of deer in the tree line?</i> Are there deer walking through or near the trees in the back of school?</p>	<p>Students use their record as evidence to share information they learned about the population of deer in the tree line and as evidence to make a statement about whether or not deer are walking through or near the trees in</p>	<p>After student groups present their findings to the class, teacher introduces / revisits vocabulary:</p> <ul style="list-style-type: none"> • <i>Habitat</i> • <i>Population</i> • <i>Community</i> • <i>Density</i> • <i>Populations</i> • <i>Carrying capacity(analogy picture on p. 29 of Project Wild Supplement)</i> • <i>Limiting factors</i> 	<p>Handout to students a pyramid organizer split into 6 blocks. Students choose 6 of the 7 words to write inside the blocks.</p> <p>Student A meets with student B. Student A gives</p>

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	<p>the back of school.</p>		<p>definition of one of the words and student B reports which word the definition matches while looking at Student A's pyramid.</p> <p>Teacher uses a student's pyramid as example to call on some students to check for understanding.</p>
<p>ELABORATE: Day 4, 5, and 6</p> <p>New questions and hypotheses to explore.</p> <p>Return the picture of deer on the screen.</p> <p>-A. Compare: If deer pellets are absent what else is in the woods to tell us about the quality of the habitat? If deer pellets are present, what else tells us about the quality of the habitat? Does the time of year affect our results? Why? Or why not? Hypothesize, then conduct research and field investigations. Include</p>	<p>Students will revisit the GoogleMap picture of the school grounds and the treeline.</p> <p>Students will select question A or B and the "everyone" question to plan how to research and prepare a report.</p> <p>Students will create their hypotheses.</p> <p>Students will create additional question(s) while investigating the given questions.</p> <p>Students will photograph or draw some part of the</p>	<p>Deer facts at http://www.iowadnr.gov/Hunting/DeerHunting/DeerInformation.aspx</p> <p>Report can be student choice on how to present including PowerPoint or other programs available on our school computer.</p> <p>Rubric is needed to share with students. Expand on terms introduced.</p> <ul style="list-style-type: none"> • <i>Habitat</i> • <i>Population</i> • <i>Community</i> • <i>Density</i> • <i>Populations</i> • <i>Carrying capacity(analogy picture on p. 29 of Project Wild Supplement)</i> • <i>Limiting factors</i> <p>Check students' plan including which section they</p>	<p>Teacher Q & A while walking the room, while students are guided outdoors into further investigating within or around the treeline.</p> <p>Well-thought out plan by students?</p>

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<p>evidence in report for persuasion. How can the terms introduced earlier be used?</p> <p>-B. How might deer (numbers of deer) be or become a threat to this urban stand of woods lining the school grounds? What is in the tree stand to support your ideas. Hypothesize, then conduct research and field investigations. Include evidence in report for persuasion. Include evidence. How can the terms introduced earlier be used?</p> <p>Everyone: How are we using the treeline on the East and South side of the school as a learning lab or outdoor learning center? Include evidence.</p>	<p>tree line that supports their research. Students might find evidence in the form of an object in their outdoor area.</p> <p>Students will address in their report ideas for responses to the questions with evidence.</p> <p>Students will refer back to pyramid of words.</p> <p>Students will need encouragement, support, check for understanding. Students will need an organizer as support to insert their ideas.</p> <p>Early finishers will continue with questions and research of their own approved by teacher related to project.</p>	<p>plan to use as evidence in the treeline. They can show with a mark on the GoogleMap printout of school grounds.</p> <p>Provide an organizer for students to insert plan, to show it is clear which they chose A or B and that the final question for everyone is addressed etc...</p> <p>Timeline?</p>	
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<p>EVALUATE: Day 7 Everyone: How are we using the treeline on the East and South side of the school as a learning lab or outdoor learning center?</p> <p>Rubric with criteria</p>	<p>Students will have a report to share with classmates.</p>	<p>Reminder of Iowa Core how tree line is being used:</p> <ul style="list-style-type: none"> -Understand and apply knowledge of interdependency of organisms, changes in environmental conditions, and survival of individuals and species -Use evidence to develop descriptions, explanations, predictions, and models. -Use critical thinking skills to conduct research, solve problems, and make informed decisions using appropriate technological tools and resources. 	<p>Students responses to questions as listed in a rubric.</p>
<p><u>Day 8+</u> EXTEND What ideas do you have for a way to share with staff and other students how we are using the treeline on the East and South side of the school as an outdoor learning center?</p>	<p>Students will brainstorm ideas. Teacher guide students when ideas need fine tuning.</p>	<p>List out their ideas so all can see. Students vote on “best idea”.</p>	<p>Audience, staff, other students select a rating on how informative the students’ idea is addressing this answer.</p>

Briefly note how the characteristics of effective instruction are incorporated in the learning cycle.

Student centered: providing opportunities for students to be metacognitive
 Time for students to learn collaboratively
 Meaningful and authentic assessment

Teaching for Understanding: instruction inducts students into the discipline
 Application of new learnings and understandings in new and novel situations

Assessment for Learning: learning goals will be clear posted in the room, focused on intended learning, communicated to lead to success
 Feedback for students

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Rigorous and Relevant: concepts and skills applied to world beyond school

Teaching for learner differences: monitoring students' progress, choice in questions and product