CIS: ***Animal CSI or from Science lab to crime lab***

Benchmarks: Carefully select text that aligns with State Standards/Benchmarks

Title of Text/Article:	***Animal CSI or from Science lab to crime lab***
NGSSS for Science Benchmarks:	**Comprehensive Science 2 (200207001)** **SC.7.L.16.1** Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another. (Also assesses SC.7.L.16.2 and SC.7.L.16.3.) **SC.7.N.1.5** Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics. (Also assesses SC.7.N.3.2, SC.8.N.1.5, and SC.8.E.5.10.)
Content Integration	**Comprehensive Science 2 (200207001)** The student will be able to • Describe and/or explain that every organism requires a set of instructions that specifies its traits • Students will identify and/or explain that hereditary information (DNA) contains genes located in the chromosomes of each cell and/or that heredity is the passage of these instructions from one generation to another. • Students will compare and/or contrast general processes of sexual and asexual reproduction that result in the passage of hereditary information from one generation to another. • Describe and/or analyze common methods used in different fields of study.
CCSS ELA & Literacy in History/Social Studies, Science, and Technical Subjects	**LACC.68.RST.1.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **LACC.68.WHST.3.9** Draw evidence from informational texts to support analysis, reflection, and research.
Mathematical Practices	**MACC.K12.MP.1:** Make sense of problems and persevere in solving them. **MACC.K12.MP.2**: Reason abstractly and quantitatively. **MACC.K12.MP.3**: Construct viable arguments and critique the reasoning of others. **MACC.K12.MP.7:** Look for and make use of structure. **MACC.K12.MP.8:** Look for and express regularity in repeated reasoning.

Teacher Notes:

- Materials:
  - Text or article (of sufficient complexity to promote high-level thinking)

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- o Sticky notes (for opening "hook question, question generation, written responses, etc.)
- o Markers, rubrics (for Text-Based Discussion, Student Written Responses, Question Generation, etc.)
- o Student copies of worksheets (for Written Responses, Direct Note-Taking, and Question Generation).

- Preparations:
  - o Number paragraphs of selected text/article for ease of locating text evidence during discussions.
  - o Develop and display Final/Complex Text-Based Question at the beginning of the lesson to communicate upfront for students the lesson's final question and learning outcome.
  - o Text-marking: Develop and display a code system appropriate for the CIS text to use in text-marking. Select a small text segment and preplan corresponding coding example(s) to model the text-marking process for students.
  - o Directed Note-taking: Develop a graphic organizer with headings appropriate for the CIS text. Select a small text segment and preplan corresponding note(s) to model the note-taking process.
  - o Question Generation: Select a small text segment and preplan a corresponding question(s) to model the Question Generation process for students.
  - o Any audio visuals, specimens, and/or samples to enhance lesson.

- Guidelines:
  - o Add additional efferent discussion sessions, as needed.
  - o The C.I.S. Model can last 3 days or longer. (Short texts can take less time; long texts, more time)
  - o Schedule a C.I.S .lesson periodically (approximately every 3-4 weeks).

* * * CIS Step 1 * * *

Tasks: Teacher asks hook question to launch opening discussion, reads aloud to students while students mark text, students read the text and participate in directed note-taking.

Purpose: To bring world relevance to text reading, establish a purpose for reading, model fluent reading, provide opportunities for students to become interactive with the text, and think critically about information in the text.

Visual Hook: ***Animal CSI or from science lab to crime lab*** By Emily Sohn/ March 26, 2008 (http://www.sciencenewsforkids.org/?s=DNA) and ***DNA and Traits*** by Pearson Interactive Science, Florida

Hook Question: How can the science of DNA analysis affect society?

Individual responses

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Predictive Written Response to Complex Text-Based Question **What are some positive and negative consequences of using the science of DNA analysis to solve crimes?**
Positive – DNA evidence can be taken from samples of meat, bone or even fish fin to see if it belongs to an animal that is endangered and can even tell which country or where it came from
Positive – "DNA can really help us stop the [ivory] trade at its source…we can get information about where the ivory comes from." Wasser says.
"Shark DNA differs between species", so when the fin is removed and the rest of the animal is thrown back into the sea, the only way to identify
Positive – In 2 days shark fins can be identified as belonging to a specific geography and 50 different species
Negative – maybe some countries will be labeled as poachers because there can be errors in DNA analysis

Vocabulary Instruction

Para-graph #	Academic or Discipline Specific Vocabulary	Word Part or Context	Para-graph #	Academic or Discipline Specific Vocabulary	Word Part or Context
2	Poaching "taking animals from the wild that are protected by law"	context	1	DNA – "chemical that stores the information for making an organism; molecule found in chromosomes	Context
4	Unfortunate Un – not fortunate	Word part	1 & 2	Chromosome - -made up of genes and DNA; each species has a certain number	Context
6	DNA – "unique to every person…found in blood, saliva, hair - - can identify criminals and victims"	Word part	4	Trait – "the way a species looks or acts"	Context
14	Squelch "poaching is hard to squelch" –stop	Context	6 & 8	Sexual reproduction – when sex cells (egg and sperm) from two parents from opposite sex come together to make an offspring	Context
16	Analyzed – broke apart	Context	7	Zygote – formed when sperm and egg come together in sexual reproduction	Context
24	Geneticist person who studies genes	Word part			
31 and 32	Species - same kind of shark or organism	Context			

- Direct students to locate words introduced in the text by paragraph number.
- Model for students how to derive word meaning(s) from word parts (prefix, root, suffix) and/or context. Record meanings of word parts and words on chart paper.

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- Variations for Vocabulary Instruction:
  - o record meanings of word parts and words in word study guide, journal writing, graphic organizers, etc.
  - o post word parts, words, and their meanings on a vocabulary word wall; refer to word wall during reading, discussions, and writing throughout CIS lesson and subsequent lessons.

Reading #1

Text-marking

\+ – this section of text shows a positive impact of the science of DNA analysis on society or the individual

– – this section of text shows a negative impact of the science of DNA analysis on society or the individual

P – this section of text shows a problem

S – this section of text shows a solution

- Model for students by reading the text aloud and coding a portion of the text. Students follow along and mark their copy. Students proceed to code the rest of the text independently. Students share text markings with table group or partner.

Reading #2

Directed Note-Taking - Record notes containing the most important information relevant to the guiding question

Visual Hook: DNA Evidence video segment – Discovery Education

Directed Note-Taking

Guiding Question: ***Using evidence from the text and video clip, why is it important to consider positive and negative impacts on society and/or individuals, when using DNA as evidence of a crime?***					
Para-graph #	**Para-graph #**	**Para-graph #**			
		+ Impact Society or Individual	**- Impact Society or Individual**	**Problem**	**Solution**
3	**Poaching can devastate even large wildlife populations**		**X**	**X**	
	Scientists can fight back and help prevent poaching	**X**			**X**
video	**film indicated that DNA evidence can clear someone of a crime if blood samples at the scene do not match the DNA of the accused**	**X**			**X**
video	**film indicated that DNA analysis is also tied to human error an people can make mistakes when analyzing the DNA and incorrectly free criminals or keep innocent people in jail**		**X**	**X**	

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- Present a guiding question to direct students thinking while taking notes. Teacher models note-taking using an example statement from the text, then selecting the category or categories that support the statement. Students complete note-taking collaboratively or independently.
- Conduct small- and whole-group efferent discussion. Ask groups to come to consensus on which category is the most impactful according to the support from the text.

First Draft Written Response to Essential Question ***Using evidence from the text, why is it important to consider positive and negative impacts on society and/or individuals, when using DNA as evidence of a crime?***

* * *

- Ask students to complete the second Written Response.
- Variations for this Written Response: Sticky notes quick writes, collaborative partners, written conversations

CIS Step 2 * * *

Tasks: Teacher models the generation of a complex question based on a section of text, relating to a broad perspective or issue. Students record the questions, and then students re-read the text to generate their own questions.

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Purpose: To provide students with a demonstration of question generation and the opportunity for them to interact with the text by generating questions to further deepen their comprehension.

Reading #3

Question Generation

Question Generation: *How DNA evidence can solve crimes*					
Para-graph #	**Questions**	**Check relevant categories below**			
		+ Impact Society/ Individual	**- Impact Society/ Individual**	**Problem**	**Solution**
5	**Is DNA analysis being used only for protected species?**		**X**	**X**	
video	**Have scientists ever found that an error was made in DNA analysis in a crime?**		**X**	**X**	

- Teacher models re-reading a portion of the text and generates one or two questions.
- Students continue to review/scan the text and use their recorded notes to generate questions about information in the text collaboratively or independently.
- To conclude question generation, the teacher has students:
  - share their questions with the related category whole class and discuss which questions they have in common, and which questions are most relevant or significant to their learning.
  - record/post common and relevant/significant questions to encourage:
    - extended efferent text discussion
    - students to seek/locate answers in text-reading throughout the remainder of the chapter/unit focusing on unanswered questions in collaborative inquiry.

* * * CIS Step 3 * * *

Task: Teacher posts a Complex Text-Based question, students discuss answers, and review/revise answers to the final/Complex Text-Based question based on discussion.

Purpose: To provide opportunities for students to interact with the text and with their peers to:

- identify text information most significant to the final/essential question.
- facilitate complex thinking and deep comprehension of text.

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Final Written Response to Complex Text-Based Question ***According to the text and extended text discussion, which factor, most likely, is the primary issue when using scientific evidence, such as DNA, to solve a problem?***

The Final Written Response will be used as an assessment for student learning.

- The Final Written Response can be used as an assessment for student learning, aligning to FCAT Item Specifications.