



## NSF Engineering Research Center

This lesson plan was created by a teacher participating in the Research Experiences for Teachers program from the Precision Microbiome Engineering Research Center. Are you interested in spending part of your summer in a lab getting paid to do microbiome research and create lesson plans?

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Lesson plan written by Eric Gaestel

North Carolina 6-Point Lesson Plan

<b>Subject:</b> ELA <b>Grade:</b> 8	<b>Topic:</b> Research Report Writing/Technical Writing
<b>Teacher:</b> Gaestel	<b>Date:</b> 6/30/2023

NC Standard Course of Study Essential Standard:

**RI.8.2** Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.

**RI.8.8** Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced

**W.8.1** Write arguments to support claims with clear reasons and relevant evidence

**W.8.6** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

**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; adapt speech to a variety of contexts and tasks.

NC Standard Course of Study Clarifying Objective:

Students will be able to conduct research in the field of genetics using print and digital sources in order to formulate a claim and support the validity of that claim using relevant, sufficient evidence, culminating in the creation of a research paper written using proper APA citation and style.

Activity	Description of Activities and Setting UDL	Materials and Time
I. Focus and Review (Establish prior knowledge)	Review articles read in previous lessons and student analysis  Students have read, annotated, and summarized articles, identifying	<a href="#">DNA Overview</a>  <a href="#">Bats NEWSELA</a>  <a href="#">Crocodile NEWSELA</a>

	central ideas, two-three pieces of evidence.	
II. Statement (Inform student of objectives)	Students will use teacher provided sources to conduct research on selected topic(s) related to genetics in order to state a claim and support the validity of that claim using relevant, sufficient evidence, culminating in the creation of a research paper written using proper APA citation and style.	** This lesson may work well as a group assignment or as an individual one. If grouping students, utilization of heterogeneous grouping is best practice
III. Teacher Input (Present tasks, information, and guidance)	Select topics: GMOs, DNA and evolution including natural and artificial selection in accordance to NCSCOS middle grades science standards  Introduce research resources	-Install <i>Paper Piles</i> Chrome Extension -One Access Link to CMS Public Library  - <a href="#">Digital Public Library for Students</a>  *DPIL can be used by all students, but will be particularly helpful for those who do not have current public library access
IV. Guided Practice (Elicit performance, provide assessment and feedback)	How to... -Select research topic -Write research question -Write a research statement -Outline research paper -Search terms	-Vetted student topics/categories -Sample research questions -Sample research paper outline

V. Independent Practice -- Seatwork and Homework (Retention and transfer)	<p>-Once students have selected a topic, they may write their research question.</p> <p>-Once their question has been formed, students will begin utilizing their resources in order to determine what their research statements will be</p>	<p>-1-5 resources both digital and print</p> <p>- A completed research project outline</p> <p>-1-2 paged, double spaced, research paper/project including resources page generated by <i>Paper Piles</i></p>
VI. Closure (Plan for maintenance)	-Once students have completed reading through their research articles, written their research statement, and completed their paper/project outline, they may begin writing their final report	UDL: Students may need to have their assignments geared up or down in order to accommodate their learning differences

The lesson plan which has been outlined above provides students with an authentic and engaging set of research based activities anchored in genetics including the selection of a research topic, analysis of resources, composition of a research statement, and subsequent research report. The skills needed to reach mastery level proficiency will be taught over the course of one unit of study or one quarter of study, depending upon the teacher's needs.

To begin, the instructor must introduce the research topics to the students through means of close reading strategies. The three articles linked in the Focus and Review section of this lesson plan are only suggestions, but they do cover a wide range of topics related to genetics. These readings are meant to provide general background knowledge of genetics and evolution, as well as introduce students to tier three or content specific vocabulary terms which will help the students in their understanding of the topics.

Once the students have gained background knowledge and practiced their close reading skills using the provided articles, the topic of GMO (genetically modified organisms) will be introduced and studied. The goal here is to provide students with general knowledge of GMOs and introduce the topic of controversy surrounding the inclusion of GMOs into our food system. Excerpts of Michael Pollan's "The Omnivore's Dilemma: The Young Reader's Edition" will be distributed and analyzed.

Taking their new found knowledge of GMOs and the controversy surrounding their inclusion in our food systems, students will use teacher vetted sites to conduct their own research about GMOs and determine whether or not they believe the benefits of GMOs outshine any negative effects they will read about. In the Teacher Input section of this plan, I have included reliable website links of sources for student-based research, however, teachers should feel free to utilize any digital resources they are aware of and trust. Please note that the Charlotte Mecklenburg Library site is only open to students who have a library card number for this library. Perhaps a part of this lesson could be helping students to register for their own county library. Public libraries provide students with a plethora of resources, both academic and recreational, which students can use and enjoy.

The final aspect of the lesson I wish to detail here is the inclusion of UDL or universal design for learners differentiation techniques. UDL is basic student focused differentiation which is included directly into the lesson plan. There is no need to create multiple plans for students of varying degrees of proficiency. Teachers should be familiar with all student IEP, 504 information and use these documents as a stepping stone for making revisions to any plans which will help create the least restrictive environment for student learning.

I hope that this plan proves to be useful to any teacher who stumbles upon it and decides to use any of its contents. Teachers should feel comfortable adding, deleting, or utilizing any and all aspects of this lesson plan as it is not a part of the public domain.

Thank you for this wonderful opportunity to work with PreMiEr, Duke University, and UNCC University. My time spent within the lab this summer is invaluable to me and I will be forever thankful for my experiences with this program.

Thank you,

Eric J. Gaestel