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eCurriculum System eMAP

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COURSE: Biology 400      CODE:

UNIT: Unit 2 Scientific Inquiry, Literacy, and Numeracy      MAP LEVEL:

CONTACT: Doug Winters      GRADE: 10

TIME FRAME: 1 week and throughout the year

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#### PERFORMANCE STANDARDS

##### 27.1 SCIENCE - SCIENTIFIC INQUIRY (I)

27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.

27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.

27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.

27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.

27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.

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#### ESS/FOCUS QUESTIONS

Essential Questions:

How is scientific inquiry used to solve problems in Biology?

Focus Questions:

What is the Scientific Method?

What are the components of a well-designed experiment?

What laboratory equipment will be appropriate to use in data collection?

How is data organized and presented?

How is data analyzed and interpreted in order to formulate a conclusion?

Which system of measurement is used universally by scientists?

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## CONTENT

1. A valid scientific investigation begins with a question that can be answered through controlled experimentation and data collection.
2. In a valid experiment there is only one independent variable (the variable that is manipulated and changed) and a measurable dependent variable (the variable that changes due to the change in the independent variable).
3. Creating a Problem Statement, designing and conducting an experiment (Experimental Design), collecting and presenting data (Data Presentation), and formulating and analyzing a Conclusion are the four components necessary to complete a scientific investigation.
4. Appropriate tables and graphs are necessary to collect, present and analyze data obtained during a scientific investigation.
5. Observations may be qualitative or quantitative.

6. Validity must be determined by evaluating findings collected through repetition, multiple trials, and with respect to accepted scientific principles.

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## SKILLS

Students should be able to:

1. Recognize examples of questions that can be scientifically investigated..
  2. Design and conduct appropriate scientific investigations.
  3. Identify independent and dependent variables as well as constant variables.
  4. Distinguish between a control set-up and an experimental set-up.
  5. Use appropriate laboratory equipment and techniques to make observations and gather data.
  6. Identify various methods for data presentation.
  7. Articulate conclusions based on research data, and assess results based on the design of the investigation.
  8. Assess the reliability of data gathered in an investigation.
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## ASSURED EXPERIENCES

Scientific Method scenarios JO/DW

Identify the variables activity KG

Lab Report Construction DW

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## ASSESSMENTS

Quiz

Lab Report

Test

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## OPTIONAL ACTIVITIES

Power of observation-KG

Group scientific method

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## RESOURCES

BSCS Blue textbook

Standard lab report rubric

Sample lab reports

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## ADDITIONAL NOTES