Richmond Public Schools

Department of Curriculum and Instruction
Curriculum Pacing And Resource Guide – Unit Plan

Course Title/ Course #: Fifth Grade

Unit Title/ Marking Period # (MP): Scientific Investigation

Start day:1

Meetings (Length of Unit): Ongoing

Desired Results ~ What will students be learning?

Standards of Learning/ Standards

SOL: 5.1
The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
a) items such as rocks, minerals, and organisms are identified using various classification keys;
b) estimates are made and accurate measurements of length, mass, volume, and temperature are made in metric units using proper tools;
c) estimates are made and accurate measurements of elapsed time are made using proper tools;
d) hypotheses are formed from testable questions;
e) independent and dependent variables are identified;
f) constants in an experimental situation are identified;
g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements;
h) predictions are made using patterns from data collected, and simple graphical data are generated;
i) inferences are made and conclusions are drawn;
j) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and
k) current applications are used to reinforce science concepts.

Essential Understandings/ Big Ideas

Scientific investigations enhance the search for knowledge and understanding in science.
Scientists make observations.
Scientists make connections (infer) one scientific investigation to another.

There are differences between observation and interpretation.
Scientists communicate observations and data.
Scientists make predictions.
Scientists use different units to measure length, volume, mass, time and temperature.

Key Essential Skills and Knowledge

The nature of science refers to the basis of concepts that regulate the way scientist states explanations about the natural world. The nature of science includes the following concepts:

A. The natural world is understandable;
B. Science is based on evidence, both observational and experimental;
C. Science is a blend of logic and innovation;
D. Scientific ideas are durable yet subject to change as new data are collected

Vocabulary

Analyze
Balance
Classification
Data
Dependent
Experiment
Graph
Hardiness
Hypothesis
Independent
Inference
Investigation
Length
Luster
Manipulated
Mass

Measurement
Metric
Observation
Organize
Prediction
Properties
Qualitative
Quantitative
Record
Responding
Results
Size
Temperature
Texture
Thermometer
Variable
Volume

Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?

Assessment/ Evidence

Observation Skills
An understanding of measurement (mass, volume, and length) and appropriate tools
Develop and formulate hypothesis
Gather, chart, and graph data
Predictions are made based on results
Tests/assessments

Learning Plan ~ What are the strategies and activities you plan to use

Learning Experiences/ Best Practice

• Given a specific set of materials, students work with in collaborative groups to design their own experiment and identify the dependent, independent and control variables. After the teacher has reviewed their experimental design, the follow their design to complete the experiment, record results, create graphs/tables to communicate their findings, draw conclusions, and share their results and conclusions with the class.
• Review with students how to use the basic science-related tools that they will use during the course of the year (balance scales,

thermometers, meter sticks, graduated cylinders, stopwatches, microscopes, etc.).
• Conduct a teacher-designed, controlled experiment with the class (volcano erupting, balloon rocket, etc.) and challenge the students to improve the experiment by modifying the variables. Review with students that they should only change one variable at a time (independent) and all other variables should be controlled.

Technology Integrations

Web Sites:
Websites:

- Brainpop Scientific Inquiry
- VDOE Strand Overview
- Reeko's Mad Scientist
- Brainpop-Scientific Method
- Study Jam- Scientific Method

Resources

Trade books:
Citizen Scientists: Be a Part of Scientific Discovery from Your Own Backyard, by Loree Griffin Burns (see Science Literacy for lessons)

Discovery Education:
• Everyday Science: Discovering the Scientific Method. (Gr. 3-5). Run time: 20:51
• The Scientific Method – cuny_pisa.mpg (an interactive PowerPoint)

Cross Curricular Connection

Have students make a sketch of the outdoor classroom or nearby outdoor place you like to visit. Have them make a key and then select an area to look at carefully. From the close up observation, have students make up a classification system for that area. Students should then compare results.