

INSPIRE GK12 Lesson Plan



Lesson Title	Measurement: Stream Flow & Stadium Capacity
Length of Lesson	Two (50 minute) class periods
Created By	Will McBryde, Rob Thornton
Subject	General Science
Grade Level	8 th grade
State Standards	8 th : 1b, c, d (Inquiry); 2c (Physical Science)
DOK Level	DOK 3
DOK Application	Measure, Tabulate, Graph, Assess
National Standards	5-8: A (Inquiry); B (Physical Science); D (Earth/Space)
Graduate Research Element	Techniques presented in the classroom are used in present day scientific field work in regards to environmental site assessments and reservoir proposals.

Student Learning Goal:

MS 8th Grade:

- 1(a)(d) Form explanations and analyze conclusions from an investigation (b) make inferences based on observations (c) Proper use of measurement technology (meter sticks, stopwatches)
2(c) Distinguish the motion of an object by its position, direction of motion, and speed.

National Science Education Standards of Content 5-8:

A: inquiry: use appropriate tools and techniques to gather, analyze, and interpret data; think critically and logically to make the relationships between evidence and explanations.

B: Physical Science: motion of an object can be described by its position, direction of motion, and speed. It can be represented on a graph.

D: Earth/Space: the water cycle does relate to stream discharge.

Materials Needed (supplies, hand-outs, resources):

PowerPoint file (INSPIRE_McBryde_07.21.10_PP);
Excel file (INSPIRE_McBryde_07.21.10_Excel);
Word file (INSPIRE_McBryde_07.21.10_Handout);
(laptop; projector; tennis ball (3/class); rope (6/class); meter stick (3/class); stopwatch (3/class); calculators (1/student); ruler (1/student)



Lesson Performance Task/Assessment:

Instructions:

See Handout (INSPIRE_McBryde_07.21.10_Handout)

Formative:

Check data table for design and completion, observe student participation in stream flow activity.

Summative:

Completed data table with mathematical calculations and conclusions, general classroom discussion of graphed data

Lesson Relevance to Performance Task and Students:

The lessons and performance tasks will increase student's interests in scientific field work through the use of the hands on activity. Students will recognize that observations in the field can be monitored, quantified, recorded into a table, and analyzed (i.e. graphed). Water quantity is measured for a variety of reasons including flood control, reservoir maintenance, construction of lakes, and drinking water supply levels.

Anticipatory Set/Capture Interest:

The instructor will display, via a PowerPoint slideshow, a basic introduction to the lesson. As the PowerPoint slideshow is being taught students will be creating their very own data table at their desk. The instructor can walk around and assist students while lecturing.

Guided Practice:

Day One: Lecture presentation based on the PowerPoint. The instructor will assist in the creation of the students' tables for recording of data during the PowerPoint slideshow. After the slideshow is complete, the Students will get into teams (max number of 8 students per team). Teams will then collect the tools necessary to complete the lab from the instructor. The students will then go into the hallway and perform the lab (Handout).

Day Two: Instructor will display PowerPoint and design an example problem on the board to demonstrate the calculations the students will need to perform. Instructor will assist students with calculations. Instructor will then graph and show students data in excel format.



Independent Practice:

Day One: Students will collect measurement data and compile the data into a table.

Day Two: Transfer “recorders” data to fellow students’ data tables. Students will review data from previous day and calculate averages in order to determine total stream discharge rates. Students will draw conclusions in regards to the relationship between discharge rates and volume increases in order to fill an area with water.

Remediation and/or Enrichment:

Remediation: Individual IEP; Make PowerPoint presentation available to resource teacher

Enrichment: Introduce a more dynamic environment / more complex system into the equation with more variables (i.e. an imaginary flooding stream where stream width changes and stream height changes to introduce more data into the tables); Accelerated classes can graph their own data.

Check(s) for Understanding:

Observation of student activity; Summative assessment

Closure:

Day One:

Allow opportunity for students to ask questions. Express importance of students to retain data tables for use in Day Two.

Day Two:

Answer student questions; Ask students questions; take up data tables and handout sheet from students that have completed assignments; Allow students to take data tables and handouts for homework if needed.

Question 1: Decide how these measurement techniques can be used in the real world?

Question 2: Summarize why taking water measurements is important?

Possible Alternate Subject Integrations:

Math, Hydrology, Physics

Teacher Notes:

See PowerPoint and handout for supplemental information.

The idea of this project is for students to practice measurement techniques, simple mathematical calculations, and how they apply in the “real world”.

<http://ga.water.usgs.gov/edu/streamflow2.html>