AMP UP YOUR EARTH SCIENCE CURRICULUM WITH INTEGRATED PRACTICES

CENTER FOR EDUCATION INTEGRATING SCIENCE, MATHEMATICS AND COMPUTING (CEISMC) & GRIFFIN-SPALDING COUNTY SCHOOLS

CREATING THE NEXT®

Award # 1238089
AMP-IT-UP

• A National Science Foundation Math and Science Partnership to *promote* workforce development and *cultivate* the next generation of creative STEM innovators.

• Partnership with the Griffin Spalding County School System
  • 2 High Schools, 4 Middle Schools
  • Professional Development for over 50 teachers

• Impact: > 11,000 students over 5 years
PROGRAM COMPONENTS

• Middle school STEM Innovation and Design (STEM-ID) exploratory courses that enable students to explore their creativity using robotics and rapid prototyping (semester long course)

• Middle school math and science modules that promote inquiry and connect with Georgia Tech

• Extracurricular enrichment for students and teachers

• Research on how AMP-IT-UP affects academic engagement, content understanding, knowledge transfer and student persistence in STEM
AMP-IT-UP INTEGRATED THEMES

1. Experimental Design
   • Planning and Carrying Out Investigations (NGSS Practice 3)
   • Make Sense of Problems (SMP #1); Use Appropriate Tools Strategically (SMP #5)

2. Data Visualization
   • Analyzing and Interpreting Data (NGSS Practice 4)
   • Make Sense of Problems (SMP #1); Model with Mathematics (SMP #4)

3. Data Driven Decision Making
   • Constructing Explanations and Designing Solutions (NGSS Practice 6)
   • Engaging in Argument from Evidence (NGSS Practice 7)
   • Make Sense of Problems (SMP #1); Construct Viable Arguments (SMP #3)
WINTER WEATHER CHALLENGE

SNOW DAY

- Data Driven Decision Making
- Students analyze weather forecasts and make decisions regarding school closures
- 5 Class Periods
WINTER WEATHER CHALLENGE
SNOW DAY

- Read and analyze National Weather Service Forecasts
- Look for trends and prioritize content to drive decision about closing school
- Learn forecasting basics, trends and about probability
EARTHQUAKE CHALLENGE
SHAKE AND BREAK

- Data Visualization Module

- Students analyze spatial and temporal earthquake data to determine where to build a manufacturing plant

- 3-4 Class Periods
Students map 10 and 40 year earthquake data showing location and intensity of each event.

Students combine their map sections together to see “the big picture.”

Analysis of temporal and spatial data leads to a recommendation of where to build the plant.
LAVA FLOW CHALLENGE
MOLTEN MADNESS

Experimental Design Module

Students investigate and model lava flow to aid a town with their evacuation plans

4-5 Class Periods
LAVA FLOW CHALLENGE
MOLTEN MADNESS

Students develop procedures to determine how long it takes lava to flow.

Data is presented and analyzed on Histograms.

Analysis of data drives the need for a uniform procedure that controls variables, reduces error.
Experience the Lava Challenge
LAVA CHALLENGE – ENGAGE

- Students are introduced to the challenge
- Reasons for using a model with the investigation
LAVA CHALLENGE - EXPLORE

Procedure:

1. Spend 5-6 minutes discussing and creating a procedure for measuring the time it takes for lava to flow with your group.
   a. You can use the materials listed to design and follow a procedure to determine how much time it takes the lava (soap) to flow across the surface of the plate.
   b. Additionally, you must complete at least six trials during your investigation, and record the data after each trial.

2. Write your procedure on your Investigation Sheet 1.

3. You will have 10 minutes to conduct your investigation and collect data.

Materials

- Plastic Plate
- Model Lava (dish soap)
- Small Paper Cup (lava flow)
- Sharpie marker
- Stopwatch or timer
- Ruler
- Paper Towels
- Investigation Sheet 1
LAVA CHALLENGE – EXPLORE & EXPLAIN

Students:

• Plan their investigation & write a procedure for carrying it out
• Follow their procedure and record data
• Share their data with the class and record all data on a histogram
• Analyze the histogram data and observe the distribution of data
• Discuss procedural differences between groups & the importance of controlling variables to collect consistent data
Students write a letter to a neighboring town council explaining what they have learned about the need for writing/following good procedures.
## AMP-IT-UP: SCIENCE AND MATH MODULES

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**AMP Crosscutting Integrated Theme**

- **Science:** Activities focusing on scientific concepts and experiments.
- **Math:** Activities involving mathematical concepts and problem-solving.

**AMP Crosscutting Integrated Themes**

- **Experimental Design:** Focuses on designing experiments to test hypotheses.
- **Data Visualization:** Involves interpreting and analyzing data through graphical representations.
- **Data Driven Decision Making:** Emphasizes making decisions based on data analysis.

**AMP IT UP**

This program aims to integrate science and math modules into educational curricula, providing students with hands-on, engaging experiences in both subjects.
AMP-IT-UP CURRICULUM SUPPORT MATERIALS

Module Curriculum Includes:

- Student texts
- Student pages
- Annotated Teachers Edition
- Teacher Prep Guide
- Videos
- Material List
- Supplemental Materials
QUESTIONS?

Download the Curriculum: http://ampitup.gatech.edu

Curriculum contact information: ampitup@ceismc.gatech.edu
ADDITIONAL AMP-IT-UP NSTA PRESENTATIONS

- **Life Science Modules:**
  - Saturday 12:30-1:30
  - Georgia World Congress Center, C207

- **Physical Science Modules:**
  - Saturday 11-12
  - Georgia World Congress Center, C302

- **STEM-ID Course:**
  - Saturday 11-12
  - Georgia World Congress Center, C213
THANK YOU!