This S.T.E.A.M. program (science, technology, engineering, art, math) integrates science, art and math. The focus of the program is heat and the effects of this energy form on different art media, materials and processes. Addressing WV CSOs and 21st Century Learning Skills, the program will take place both in your classroom and at the Museum. In your classroom students will have the opportunity to make something out of clay and learn about the effects of heat on clay when it's fired. At the museum students will learn about the effects of heat on glass, metal work and clay while they tour the galleries. Also, while at the museum, students will enjoy watching artist in residence, Kathleen Kneafsey, demonstrate a clay firing technique called raku.

<u>West Virginia Content Standards & Objectives Addressed by *Turn Up The HEAT*</u>

<u>Science</u>

SC.O.7.1.05 cooperate and collaborate to ask questions, design and conduct investigations to find answers and solve problems.

SC.O.7.1.06 formulate conclusions through close observations, logical reasoning, objectivity, perseverance and integrity in data collection.

SC.O.7.1.12 use inferential reasoning to make logical conclusions from collected data.

SC.PD.7.2 design a device that uses energy and demonstrate its possible applications in society;

SC.O.7.3.02 construct a variety of useful models of an object, event, or process

SC.O.7.3.03 compare and contrast changes that occur in an object or a system to its original state

S.7.PS.3 apply scientific principles to design, construct and test a device that will either minimize or maximize thermal energy transfer

S.6-8.ETS.1 define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts no people and the natural environment that may limit possible solutions.

<u>Social Studies:</u>

SS.O.07.03.01 examine how competition among buyers of a product results in higher prices, and illustrate the relationship between supply, demand and the price of that product.

SS.O.07.04.03 Identify and locate on a variety of maps and give examples of the following:
- seven continents
- bodies of water
- landforms
- countries
- cities
- climate regions
- transportation routes

SS.O.07.04.15 explain culture in a geographic context (e.g., isolation, core area, movement).

Visual Arts:

VA.O.7.1.01 select a media, technique, technology, or process to communicate a personal experience or   an idea, e.g., chalk, acrylic, printmaking, painting, digital alteration, animation and sculpture

 VA.O.7.1.02 experiment and refine use of selected media, techniques, technologies, and processes in the communication of a personal experience or an idea.

VA.O.7.1.03 evaluate the effectiveness of their choice of media, techniques, technologies, or processes used in the communication of a personal experience or idea

VA.O.7.1.04 demonstrate the safe and effective use of materials, tools, and technology.

VA.O.7.2.09 create three-dimensional forms using symmetrical or asymmetrical balance.

VA.O.7.4.01 analyze the characteristics of artworks and artists from different periods of time, styles, and cultures.

VA.O.7.4.02 compare and contrast artwork from different cultures in a selected time frame, e.g., oral, written, or technological presentations.

VA.O.7.4.03 discuss how time and place influence meaning and value in a work of art.

Mathematics:

M.PD.7.EE create scale models of three-dimensional geometric figures found in nature and present in the context of a read world problem

M.PD.7.EE make connections between surface area and volume in real-life situations

M.7.G.1 solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

M.7.G.2 draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions, focus on constructing

M.7.G.4 know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between circumference and area of a circle

21st Century Learning Skills addressed by *Turn Up The HEAT*

Critical thinking and problem solving
Communication and collaboration
Creativity and innovation

Pre-Tour Lesson Plan

SUBJECT/CONCEPT: Understanding spheres with radius, diameter, circumference, and volume
LESSON TITLE: "From Pom Poms to Pinch Pots: Math in The Creative Process"

Outline:
1. Introduction of Diameter
     a. instruction on definition of diameter.
     b. calculate diameter with pencil and paper various circles in classroom
     c. verbalize student constructed definition of diameter
     d. identify need for ability to determine diameter in relation to radius, circumference
     e. measure yarn for creating pom poms with math knowledge relating to diameter
     f. create the pom pom utilizing math knowledge relating to diameter
     g. sites for instructions in creating pom poms
https://www.youtube.com/watch?v=fjxJFcm16r0
http://www.ehow.com/how_2105188_make-yarn-pom-poms.html

2. Introduction of Radius (r=1/2d)
     a. instruction on definition of radius
     b. calculate radius with pencil and paper same various circles in classroom
     c. verbalize student constructed definition of radius
     d. identify need for ability to determine radius in relation to diameter, circumference
     e. measure yarn for creation of pom pom with math knowledge of radius
     f. create pom pom utilizing math knowledge of radius

3. Introduction of Circumference ($c=\pi R^2$)
     a. instruction on definition of circumference
     b. calculate circumference with pencil and paper same various circles in classroom
     c. verbalize student constructed definition of circumference
     d. identify need for ability to determine radius in relation to diameter, radius
     e. measure yarn for creating pom pom with math knowledge of circumference
     f. create pom pom utilizing math knowledge of circumference

4. Relating to Volume and Constructing Pom Poms ($V + 4/3\pi^3$)
     a. instruction on formula for volume of a sphere
     b. use diameter, radius and circumference to determine size of pom poms to construct
     c. verbalize student constructed understanding/definition of volume
     d. create pom pom
     e. verbalize process using newly acquired math vocabulary
     f. measure newly made pom poms for volume

Post-Tour Lesson Plan

SUBJECT/CONCEPT: Integrating concepts and information learned
LESSON TITLE: Pots are Tops: Functionality of Math and Pinch Pots"
STANDARDS:

Outline:
1. Evaluation of Pinch Pot
        a. best feature/execution of technique
        b. constructive criticism for second attempt
        c. functionality in everyday life – "How will I use this?"
        d. brainstorming with partner/group other uses in other cultures
        e. comparisons of initial drafts, renderings to actual measurements of constructed pot
        f. discussion of similarities/differences in drafts/renders and constructed pot

2. Evaluation of knowledge gained
        a. favorite thing learned
        b. connection between math and pinch pot
        c. use for math in everyday life
        d. other possible connections between math and pinch pot
        e. brainstorming with partner/group ways to integrate new knowledge into everyday life

3. Evaluation of Experience
        a. What did I learn about myself?
        b. What did I learn that was new?
        c. Brainstorming with partner/group about new ways of thinking.
        d. What will I do with this new knowledge/skill?