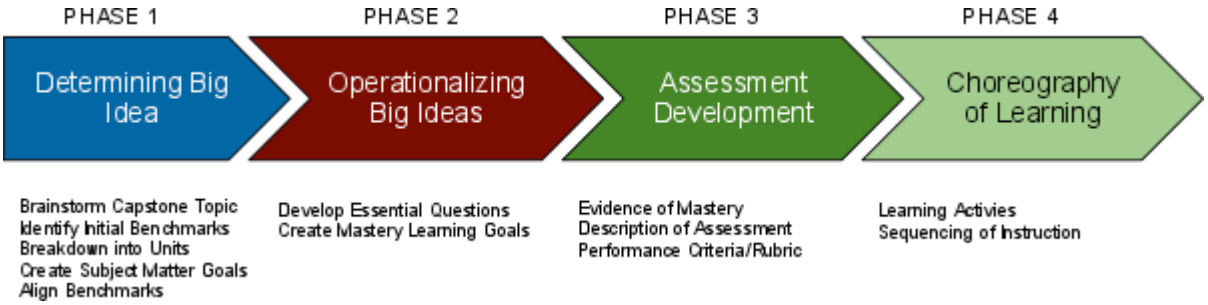
MC² STEM Instructional Design Process



CAPTSONE:

PHASE 1:
DETERMINING THE BIG IDEA

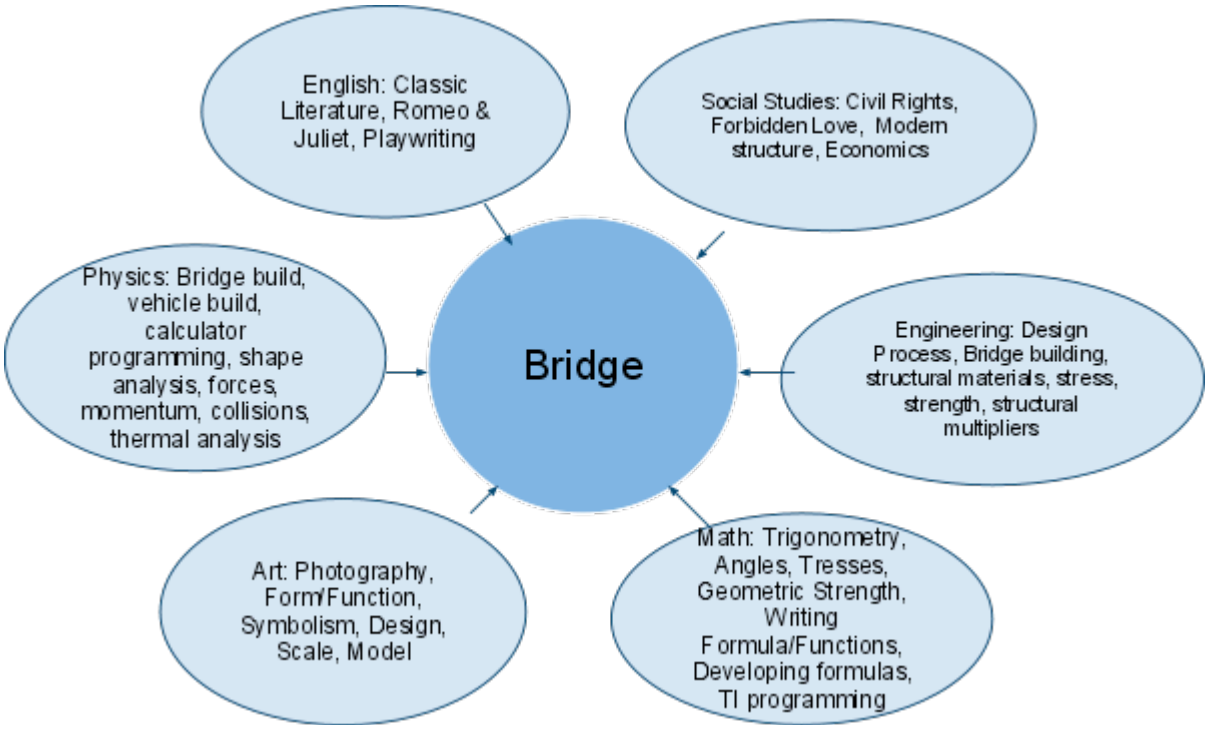
Capstone Big Idea: Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate.

Summary Bridges represent the physical connection of locations, ideas, and people. Though there are many different types of bridges, all must be built structurally sound. Students will explore the mathematical faculties and engineering components needed to maximize the reliability of a bridge structure, while gaining an understanding of force and thermal analyses to determine the soundness of the structure.

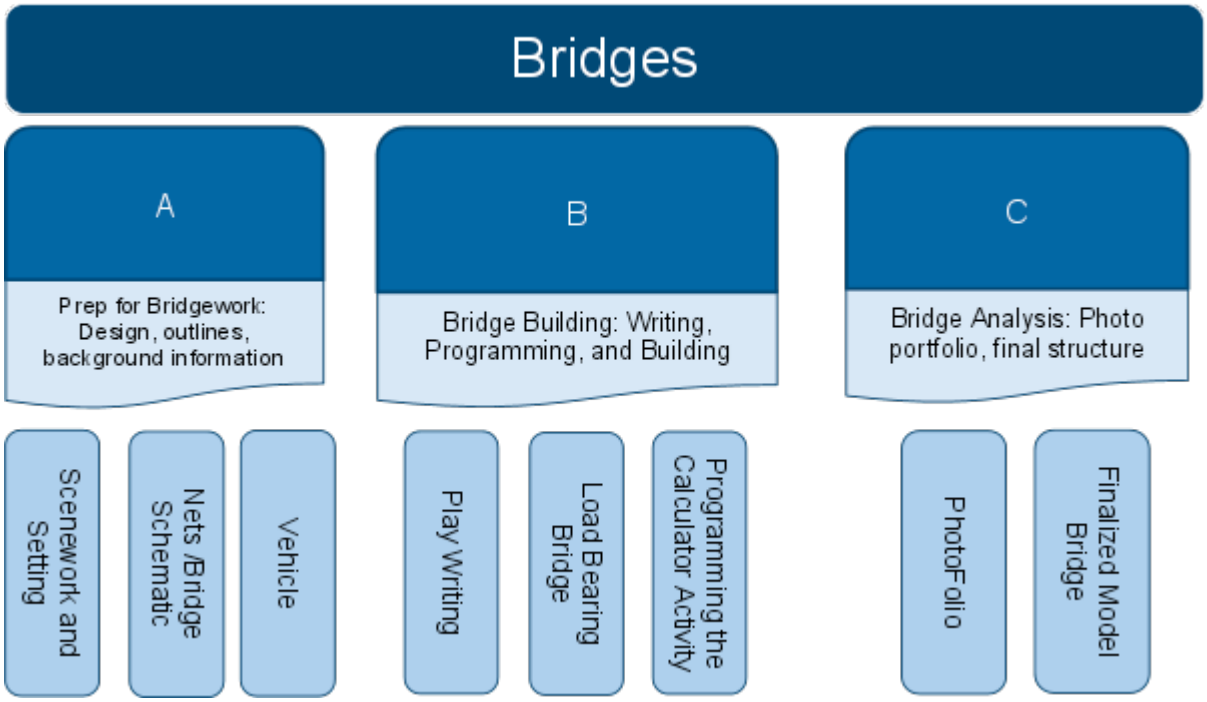
Bridges also represent metaphorical connections, and in English language arts, students will explore the connection of character relationships through literature analysis of different dramas. In Romeo & Juliet, the families are separate, but their love is a bridge between two families. Where else in history have opposite points of view clashed? In history bridges are often the undercurrent of multiracial family relationships. America has a long history of “forbidden love” in race relationships, starting with Pocahontas and ending in the multiracial heritage of our current President. Students will experience the lives of extraordinary mixed-race Americans, and explore race and racial identities that have prevailed in this country. Bridges represent a social connection, and in Social Studies, students will delve into different social constructions and societal norms that have lead to a bridging of societal gaps. In the creation of dramas, students will recreate those character relationships while they analyze the bridge between actor and audience.

Transdiscplinary Curriculum:

Identify the team members that will participate on the creation of the Capstone / Big Idea. This should consist of building level disciplines but may extend other grade level courses. (Ex. Government, American History and Government)



Capstone Breakdown



Subject Matter Unit Goals:

Develop subject matter goals for each unit and end product

English Language Arts: Students will be studying the elements of reading and writing through drama. Students will read and understand romeo and Juliet. Students will write one act plays. Students will write scenes from different time periods.

Students will understand that love can be the bridge between enemies. Students will explore the role of fate, the effects of hate, and the many facets of love. Students will employ strategies to analyze plot in literature. Students will demonstrate their understanding of text on four levels: factual, interpretive, critical and personal.

Math Goals: Students will understand structure and stability as it is related to bridges through a study of Trigonometry, Angles, Tresses, Geometric Strength. Students will also explore the deep level mathematics involved in Writing Formula/Functions, Developing formulas, and TI programming, and how it is related to real world usage. Students will learn how to plan, design, calculate, and construct a model of a bridge. Find out how mathematical concepts of ratio, proportion, and scale are implemented in the bridge building process.

Physics Goals: Students will use force and thermal analyses to determine the soundness of a structure. Students will learn how to use TI-84 calculators to program simple functions. Students will analyze the linear motion of objects on the bridge and in other situations.

Engineering Goals: Students will create a bridge that can support weight, using the engineering design process. Students will be able to understand structural multipliers, strength, and stress and how it relates to load bearing design.Student groups of engineers will design and construct a bridge that will hold the most weight for a given span. Students will build different structures; investigate properties of triangles and rectangles; take a bridge field trip to learn about various types of bridges and examine famous bridges from around the world; and conduct several design and strength tests.

Social Studies Goals: Students will explore the real and metaphorical effects of bridges. Students know the chronology and location of major events in the civil rights movement. Students know the significant people associated with the movement and their philosophies. Students are able to create a piece of writing and photojournal communicates the intricacies of mixed-raced relationships in the context of American history.

Art Goals: Students will explore Art: Form/Function, Symbolism, Design, Scale, Modeling, and landscape through the creation of a digital photography portfolio. Students will develop skills through exploring the concept of “Bridges.” “How do we define the word bridge? Is it a structure? A location? The relationship of the people close to us? Bridges can be both a physical and a psychological place filled with the complexities of relationships, identity, and culture.

Benchmark Alignment/ Transdisciplinary Project Based Units

Content Standards and Benchmarks that were identified for the CAPSTONE that have natural disciplinary connections and are overlapping in theme, ideas, topics, etc.

Unit A		
Student Play - Setting and Scene Work		
Benchmark & Mastery Learning Goal	Mastery	Incomplete
SS HIST 11.-12. B., SS ECON 11.-12. B., and SS PEPL 11.-12. B. Students will be able to use historical interpretations to explain current issues, Identify the causes of political, economic and social oppression and analyze ways individuals, organizations and countries respond to resulting conflicts, and Identify factors which inhibit or spur economic growth and cause expansions or recessions through the creation of a one page setting and at rise for their play. The setting should be historically based. The setting must describe the time period in detail. The setting must include a description of the area, the style of clothing, the socio-economic status of the characters, and a justification for each.	All historical information appeared to be accurate and in chronological order. Student included all information that was required. Can clearly explain several ways in which his character "saw" things differently than other characters. Point-of-view, arguments, and solutions proposed were often in character.	Most of the historical information was accurate and in chronological order. Student included most information that was required. Can clearly explain one way in which his character "saw" things differently than other characters. Point-of-view, arguments, and solutions proposed were sometimes in character.
9-10 W 3.d, 9-10 W 4, Students will be able to use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters, and produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience that is directly related to the theme of bridges in the creation of a creative, interesting, and succinct play setting.	Many vivid, descriptive words are used to tell when and where the story took place. All facts presented in the story are accurate. The entire setting is related to the assigned topic and allows the reader to understand much more about the topic. It is very easy for the reader to understand the problem the main characters face and why it is a problem and how it relates to the overall theme of Bridges.	The reader can figure out when and where the story took place, but the author didn't supply much detail. 70% or less of the facts presented in the setting are accurate. Some of the story is related to the assigned topic, but a reader does not learn much about the topic. It is fairly easy for the reader to understand the problem the main characters face but it is not clear why it is a problem and how it relates to the overall theme of Bridges.
Schematic Drawing		
Benchmark & Mastery Learning Goal	Mastery	Incomplete

SCI PHYS 11-12 D Use the laws and principals of forces and motion to analyze net force effects.	Student can correctly analyze the soundness of a structure (bridge) by using force diagrams and intermediate trigonometric skills.	Student can not use scientific laws of force and trigonometric analyses to determine the soundness of a structure (bridge).
G.GMD.1,2 G-MG.1,2,3 Explain volume formulas and use them to solve problems. Apply geometric concepts in modeling situations.	Student can build model from four-view plan and determine perimeter, surface area, volume and number of vertices. Student can draw four-view plan from model and determine perimeter, surface area, volume. Student can make an isometric drawing from a model and determine base perimeter, surface area, volume. Student can draw an exploded isometric view from a model and determine base perimeter, surface area, volume.	Student construction is incorrect or calculations are incorrect. Student four-view plan is incorrect or calculations are incorrect. Student isometric drawing is incorrect or calculations are incorrect. Student exploded isometric drawing is incorrect or calculations are incorrect.
EGR 3.1 Write and utilize coherent, persuasive and ficused technical communications that support a defined perspective for engineering and science.	Using correct vocabulary and esoteric vernacular, student succinctly and successfully conveys technical information in journals reports and presentations.	Student does not have a clear command of the vocabuary necessary to communicate ideas and data. Student's writing not coherent or focused and contains grammar, spelling, pucntuation (etc.) errors.
EGR 8.6 Interpret data that has been collected using statistical methods.	Working grasp of the statistical methods. Successful interpretation of data, demonstrated application of data in product.	Student lacks skill necessary to collect data and suceesfully interpret data using accepted statistical methods.
EGR 11.1 Apply the steps of the design process to solve a variety of design problems.	Student suceessfully and completely applies the steps of the design process in the design and build of a bridge. Solid evidence of brainstorming step in egr notebook.	Student haphazardly applies steps if the design process out of order or not at all. Steps missing; little evidence in egr notebook.
EGR 13.1, 18.2 Utilize sketching and visualization techniques; Demonstrate appropriate dimensioning rules and practices.	Design, drafting and dimensioning rules adhered to in drawings and CAD renderings. Successful transfer from the conceptualized visualiztion point to the applied deliverable.	Student fails to adhere to accepted, industry standardized rules pertaining to design, drafting and dimensioning. Inability to produce deliverable from the conceptual stage.
EGR 14.2, 15.4 Describe geometric constraints; Critique design solutions using mathematical applications.	Student possesses thorough understanding of geometric constraints applied to the failure of a bridge given load. Ability to communicate design solutionsusing mathematical applications.	Lack of understanding why a bridge failed on the virtual or real level. Lack of ability to use mathematical calculations to predict bridge failure.

EGR 15.2 Analyze and develop graphical representation of given data.	Student sucessfull represents data in graphical form. Appications in stress/strength, structural multiplies, compression/load calculations present.	Student lacking skills necessary to correctly represent data in graphical form. Poor data gathering, faulty data or poor execution evident.
EGR 18.1 Translate a three dimensional drawing or model into corresponding orthographic drawing views.	Student possesses working knowledge of orthographic projection. Ability to correctly transfer an object or 3D drawing into a three view rendering according to industry standards.	Student lacks the skill to produce a multiview rendering of a 3D drawing or object due to incorrect application of standardized rules or lack of understanding of engineering principles.
EGR 40.1 Demonstrate the fundamentals of computer modeling.	Student is skilled on the Inventor CAD program. Ability to accurately represent objects in 3D CAD using correct dimensioning. Thorough understanding of various protocols in the inventor program.	Student lacks skill executing the inventor program due to misunderstanding protocol, terminology, dimensioning.
Vehicle		
Benchmark & Mastery Learning Goal	Mastery	Incomplete
SCI PHYS 9-10 D Use the laws and principals of forces and motion to analyze motion.	Student can correctly analyze linear motion using Newtons Laws and basic trigonometric skills.	Student's analysis of an objects motion lacks accuracy.
Unit B		
Calculator		
SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge.	Student can synthesize and troubleshoot a program that solves physics and engineering equations.	Student designs a calculator program that does not properly compute variables defined by physics and engineering equations.
N.Q.1,2,3 Reason quantitatively and use units to solve problems.	Student will choose and interpret units consistently in formulas, convert units correctly and choose appropriate level of accuracy.	Student errors in conversion between units of measure or uses inconsistent levels of accuracy.
A.CED.3,4 A.REI.11 Create equations that describe relationships. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Student will collect data relating side length of regular polygon to perimeter. Student will build a table, graph, write a linear equation to describe the rate of change. Student duplicates activity using program on calculator.	Students calculates incorrectly or describes the linear relationship incorrectly or does not generate correct linear equation with calculator.

A.CED.3,4 A.REI.11 Create equations that describe relationships. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Student will collect data relating side length of regular polygon to area. Student will build a table, graph and write a quadratic equation from the data. Student duplicates activity using program on calculator.	Students calculates incorrectly or describes the area relationship incorrectly or does not generate correct quadratic equation with calculator.
F.BF.1a,b Determine steps for calculation from a context.	Student will apply order-of-operations in evaluating formulas and explain the process. Student will duplicate process on calculator.	Student misinterprets formula or makes programming errors.
Bridge 1: Load bearing Bridge		
Benchmark & Mastery Learning Goal	Mastery	Incomplete
SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge.	Student can create, analyze, and develop a structurally sound bridge design using scientific methods.	Student designs a bridge that does not meet minimum criteria for structural variables and/or does not appropriately apply the scientific method in analyze the soundness of their design.
SCI PHYS 9-10 A SCI PHYS 9-10 C SCI PHYS 11-12 A Explain the process of physical change and tie it into the behavior of materials at an atomic level and the structure of atoms.	Student can utilize thermal analysis skills to determine the stability and long term soundness of a structure (bridge) for different materials.	Student incorrectly applies thermal analysis skills, does not perform thermal tests accurately, or is unable to explain the underlying reasons that certain materials are better than others for use in building structures.
EGR 3.2 Deliver formal and informal presentations that demonstrate organization and delivery skill.	Students demonstrates accepted levels of presentational skils including organization of material, use of visual aids, clarity in speech, preparation and poise.	Student delivers poorly due to lack of preparation, weak material, disinterest or poor organization.
EGR 7.3,8 Explain mechanical properties and reactivity; analyze the various heat treatment processes that alter the properties of steel.	Working understanding of heat treatment processes and how they alter the properties of steel and other metals on a molecular level. Rudimentary skill with heat treating tools.	Lack of understanding of the heat treatment process and of metal's reactivity to heat. Unable or not allowed to use heat treating instruments.
EGR 15.3 Select the appropriate modeling materials to complete a three-dimensional prototype or mockup.	Student successfully builds a prototype, then a final product of a bridge. Srength of bridge directly related to type of material chosen and understanding of engineering principles such as "span and sag".	Bridge failure due to lack of understanding of engineering principles and poor choice of building material. Lack of knowledge of types of building material.

EGR 17.1 Interpret and use correct tolerancing techniques when dimensioning solid models.	Student posses full knowledge of, and ability to use a dial caliper. Full understanding of all terms, parts and application of the dial caliper.	Inablility to use a dial caliper. Lack of understanding of terms parts and apllications of a precision measuring device.
EGR 58.2,3 Explain the fatigue and fracture properfties of materials.	Student has working understanding of characteristics of building materials and can communicate why materials fail through fatigue and fracture fundamentals.	Student lacks understanding of fatigue and fracture characteristics of materials.
EGR 66.2, 78.1 Describe architectural styles for various structures.	Student can correctly identify various bridge types. Ability to explain why different building styles were used in each application. Ability to identify common building techniques used in bridges and other structures.	Student lacks understanding of building styles. Inability to identify different types of bridges and how they share common structural characteristics with other applications.
EGR 79.2 Determine the live and dead loads of a structure using load tables and appropriate mathematics.	Student is able to calculate load limits of a structure, especially bridges, using load table calculations and structural multipliers. Ability to predict success or failure of a bridge in competion according to those tables.	Lack of understanding the difference between a live and a dead load. Inability to use load tables and applied mathematics.
Unit C		
Photo Portfolio		
ART HIST 9-12 A: Create a photography portfolio that explains how and why specific pieces of art from different times in history - what are the historical ramifications of the art through the Design of a photo portfolio that compares and contrasts two bridges from Cleveland and two bridges from around the world. Include aspects of Design, Aesthetics (culture/resources) and Construction (materials) of each bridge.	Student identifies multiple significant characteristics that distinguish this artist's work or school/period from others and uses these to recognize other works by this artist. Student is able to give several detailed examples of how the time period(s) in which an artist lived influenced his/her work.	Student identifies multiple significant characteristics that distinguish this artist's work or this school/period from others. Student is able to give a couple of examples of how the time period(s) in which an artist lived influenced his/her work.

ART AEST 9-12 B: Evaluate bridges from around the world in terms of Discovery and highlight a unique bridge bringing to light aesthetic controversies (issues and themes) and defend your personal point of view in photo captions.	Accurately describes several dominant elements or principles used by the artist and accurately relates how they are used by the artist to reinforce the theme, meaning, mood, or feeling of the artwork. Makes a complete and detailed description of the subject matter and/or elements seen in a work. Uses multiple criteria to judge the artwork, such as composition, expression, creativity, design, communication of ideas.	Accurately describes a couple of dominant elements and principles used by the artist and accurately relates how these are used by the artist to reinforce the theme, meaning, mood, or feeling of the artwork. Makes a detailed description of most of the subject matter and/or elements seen in a work. Uses 1-2 criteria to judge the artwork.
ART EXPR 9.-12. A. Demonstrate mastery of materials, concepts and personal concentration when creating original artworks in the creation of a photoportfolio.	Student applies design principles (such as unity, contrast, balance, movement, direction, emphasis, and center of interest) with great skill. Student can accurately name 5 characteristics of the technique being studied and describe how these 5 characteristics are used in his/her own compositions. Class time was used wisely. Much time and effort went into the planning and design of the mask. It is clear the student worked at home as well as at school.	Student applies design principles (such as unity, contrast, balance, movement, direction, emphasis, and center of interest) with fair skill. Student can accurately name 4 characteristics of the technique being studied and describe how these 4 characteristics are used in his/her own compositions. Class time was used wisely. Student could have put in more time and effort at home.
SS GEOG 11.-12. A. Students can explain how the character and meaning of a place reflect a society's economics, politics, social values, ideology and culture through the captions of a bridge photography portfolio. Social Bridges in history-Identify, analyze, and interpret the societal significance of bridges. Correctly identifies, analyzes, and interprets the significance of four bridges in terms of politics, discrimination, community, economics and makes a connection to iconographic bridges.	Student is able to give several detailed examples of how the time period(s) in which an artist lived influenced his/her work. Student identifies multiple significant characteristics that distinguish this artist's work or school/period from others and uses these to recognize other works by this artist. Information clearly relates to the main topic. It includes several supporting details and/or examples. Diagrams and illustrations are neat, accurate and add to the reader's understanding of the topic.	Student is able to give one example of how the time period(s) in which an artist lived influenced his/her work. Student identifies 1 or 2 significant characteristics that distinguish this artist's work or this school/period from others. Information clearly relates to the main topic. No details and/or examples are given. Diagrams and illustrations are neat and accurate and sometimes add to the reader's understanding of the topic.
Bridge 2: Finalized Bridge Model		
Benchmark & Mastery Learning Goal	Mastery	Incomplete

SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge.	Student can create, analyze, and develop a structurally sound bridge design using scientific methods.	Student designs a bridge that does not meet minimum criteria for structural variables and/or does not appropriately apply the scientific method in analyze the soundness of their design.
SCI PHYS 9-10 A SCI PHYS 9-10 C SCI PHYS 11-12 A Explain the process of physical change and tie it into the behavior of materials at an atomic level and the structure of atoms.	Student can utilize thermal analysis skills to determine the stability and long term soundness of a structure (bridge) for different materials.	Student incorrectly applies thermal analysis skills, does not perform thermal tests accurately, or is unable to explain the underlying reasons that certain materials are better than others for use in building structures.
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EGR 7.3,8 Explain mechanical properties and reactivity; analyze the various heat treatment processes that alter the properties of steel.	Working understanding of heat treatment processes and how they alter the properties of steel and other metals on a molecular level. Rudimentary skill with heat treating tools.	Lack of understanding of the heat treatment process and of metal's reactivity to heat. Unable or not allowed to use heat treating instruments.
EGR 15.3 Select the appropriate modeling materials to complete a three-dimensional prototype or mockup.	Student successfully builds a prototype, then a final product of a bridge. Srength of bridge directly related to type of material chosen and understanding of engineering principles such as "span and sag".	Bridge failure due to lack of understanding of engineering principles and poor choice of building material. Lack of knowledge of types of building material.
EGR 17.1 Interpret and use correct tolerancing techniques when dimensioning solid models.	Student posses full knowledge of, and ability to use a dial caliper. Full understanding of all terms, parts and application of the dial caliper.	Inablility to use a dial caliper. Lack of understanding of terms parts and apllications of a precision measuring device.
EGR 58.2,3 Explain the fatigue and fracture properfties of materials.	Student has working understanding of characteristics of building materials and can communicate why materials fail through fatigue and fracture fundamentals.	Student lacks understanding of fatigue and fracture characteristics of materials.
EGR 66.2, 78.1 Describe architectural styles for various structures.	Student can correctly identify various bridge types. Ability to explain why different building styles were used in each application. Ability to identify common building techniques used in bridges and other structures.	Student lacks understanding of building styles. Inability to identify different types of bridges and how they share common structural characteristics with other applications.

EGR 79.2 Determine the live and dead loads of a structure using load tables and appropriate mathematics.	Student is able to calculate load limits of a structure, especially bridges, using load table calculations and structural multipliers. Ability to predict success or failure of a bridge in competion according to those tables.	Lack of understanding the difference between a live and a dead load. Inability to use load tables and applied mathematics.

PHASE 2:Operationalizing

Capstone - Essential Questions

Why do Bridges Fail? Why don't some bridges ever get crossed? Should some bridges NEVER be crossed? Can people be bridges?

Creation of Mastery Learning Goals - Unit

The identified capstone benchmarks should be operationalized as capstone Mastery Learning Goals that describe clearly the expected student performance aligned to the benchmarks. These Mastery Learning Goals will be plugged into the units'project rubrics.

Learning Goals = What does it look like when students demonstrate mastery of the benchmarks?

Place Mastery Learning Goals in **Performance Criteria (Unit Rubrics)** here: CAPSTONE RUBRIC

Benchmark(s) (Code)	Mastery Learning Goals	Exceeding 4	Mastery 3	Reaching 2	Basic 1
		Phase 3	Phase 3	Phase 3	Phase 3

PHASE 3:
Assessment Development
Evidence of Learning

Unit - Performance Criteria (Rubrics):

You can use a holistic rubric or a criterion rubric to measure your performance assessment. Insert your rubric below the samples provided. The scale is an example, but you can design the scale and criteria that best fits your intended outcomes.The capstone's mastery learning goals are deconstructed and represented in a rubric that describes clear, scaffolded performance criteria for the demo of mastery learning, as well as, learning that goes beyond mastery, approaches mastery, or is basic to mastery.

Follow the below template.

Place in LINK: CAPSTONE RUBRIC

Benchmark(s) (Code)	Mastery Learning Goals	Exceeding 4	Mastery 3	Reaching 2	Basic 1
	This is completed at end of Phase 2.				

Unit – Assessments & Reflection

Formative assessments of student performance on learning activities are designed into the capstone and units to provide data that determines learning activities and their pacing, as well as, the provision of remediation/extension opportunities - to insure successful performance of the mastery learning goals

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Formative (During project) Checklists, flowcharts, concept maps, mock/practice, quizzes/tests, Journal, outlines,			**Summative (End of Project)** Conference, Gallery Walk, Presentation of Work,		
Unit Title	**Unit Projects** What	**Group Assessments** **(deliverables)** **Who & How**	**Individual Assessments** (deliverables) Who & How	**Product / Performance Assessment** (Exhibition of Work) How & Where	**Reflection Methods:** Journal,discussion, survey, portfolio, focus group Why
A	1. Romeo & Juliet 2. Nets/ Bridge Schematic 3. Vehicle	1. N/A (individual) 2. Rubric Assessment 3. Rubric Assessment (does the car work)	1. Individual Understanding Projects 2. Individual Understanding Projects 3. N/A (group)	1. Gallery Walks 2. Engineering Portfolio 3. Race	(All) Discussion, Portfoliio, Journaling
B	1. Student Play 2. Disposable Bridge 3. Calculator Programming	1. Completed Play 2. Completed Bridge & bridge destruction 3. Correct Programming Assessment	1. Completed Scene 2. N/A (group) 3. Individual Assessments	1. Table Read 2. Bridge competition 3. Formula Test	(All) Reflective Journal, Discussion, Taskstream portfolio
C	1. Photo Portfolio 2. Bridge	1. N/A Individual 2. Completed bridge	1. Photo Portfolio 2. Bridge Understanding Reflection	1. Gallery Exhibit	(All) Reflective Journal, Discussion, Taskstream portfolio

PHASE 4:
Choreography of Learning

Unit – Learning Activities

The learning activities within the capstone (as well as their sequence and pacing) provide adequate scaffolding / differentiation to facilitate successful performance of the mastery learning goals in both project time and class time.

Entry Event: Launch inquiry, kick-off event, "the hook"

Egg Drop: Students will participate in an egg-dropping challenge where they must use a limited amount of materials to create a structure that keeps an egg safe as it falls roughly 30 ft. Students will need to budget their resources in order to use a few materials as possible to keep the egg safe and win the competition.

Community Resources and Partnerships: Mentors, speakers, authentic assessment

GLSC Speaker (October 7th, 2011)
Kent State Speaker (October 24th, 2011)
CSU College of Engineering Bridge testing
City of Cleveland Bridge Tour

Resources Needed:

Facilities / Venues	Equipment	Materials	Purchased Supplies
GLSC Cleveland Bridge Tour Cleveland State University	Bridge compression machine (CSU)	Balsa Wood Sheets Hot Glue Sticks Popsicle Sticks Tooth Picks Utility Knives Acrylic Wire (22 gauge) Paint Cans Markers (40) 1 x 1 square dowels (4" inch long) (40) 1/2" round dowels (4" inch long) Colored Pencils Poster Paper 25 Copies of No Fear Shakespeare Romeo and Juliet	

Calendar(s):

Project Time Calendar - Sequencing of Instruction

OCTOBER 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
							1
Capstone							
Physics							
Algebra II							
English							
Social Stu		Intro: FDR The New D	summarize the steps	2.Students will be abl 3.Students will be abl	4.Student will be able	1.Students will be abl	
Engineerir							
Art							
	2	3 ADM Week	4 ADM Week	5 ADM Week	6 ADM Week	7 ADM Week	8 Yom Kippur
Capstone		EGG DROP	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Scary Speech	
Physics		Newtons Laws	Velocity Acceleration	Velocity Acceleration	Velocity Acceleration	Force	
Algebra II							
English		Intro to Film Challenge	How to read a play	Background Shakespear Info	Romeo & Juliet	Romeo & Juliet	
Social Stu		2.Students will be abl 3.Students will be abl 4.Students will unders	2.Students will be abl 3.Students will be abl 4.Students will unders	2.Students will be abl 3.Students will be abl 4.Students will unders	1.Students will be abl 2.Students will be abl 3.Students will be abl	1.Students will be abl 2.Students will be abl 3.Students will be abl	
Engineerir		Reintro to Design Process	Applications in the Design Process	Applications in the Design Process	Review: Drafting and Orthographic Projection	Orthographic Projection: Multiview of Objects	
Art							
	9	10 Columbus Day	11	12 PSAT Test Administratio Day	13	14	15
Capstone		Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	Physics: Vehicle Engineering: Bridge Design Math: Shape Analysis English: Intro to Script	
Physics		Force (Friction)	Force (Friction)	Force (Diagramming)	Force (Diagramming)	Other Forces	
Algebra II		Perimeter and area composite shapes	Perimeter and area composite shapes	Perimeter and area composite shapes	Geometric probability using area	Geometric probability using area	
English		Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	

Social Stu		5.Students will be abl 6.Students will be abl 7.Students will be abl 8.Students will be abl 9.Students will be abl	5.Students will be abl 6.Students will be abl 7.Students will be abl 8.Students will be abl 9.Students will be abl	5.Students will be abl 6.Students will be abl 7.Students will be abl 8.Students will be abl 9.Students will be abl	1.Students will be abl 2.Students will be abl 3.Students will be abl 4.Students will be abl	1.Students will be abl 2.Students will be abl 3.Students will be abl 4.Students will be abl	
Engineerir		Statictical Methods	Applications in Statictiscs	Data Interpretation	Intro to Construction Technology and Civil Engineering	The Construction System	
Art							
	16	17	18	19 Two Hour Early Release Professional Development	20	21	22
Capstone							
Physics		Momentum	Momentum	Conservation of Momentum	Conservation of Momentum	Trig and Motion	
Algebra II		Nets for solids	Nets for solids	Dimensions of similar polygons	Dimensions of similar polygons	Surface area and volume of prisms	
English		Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	
Social Stu		1. Students will s	1. Students will s	1. Students will s	1. Students will s	1. Students will s	
Engineerir		Types of Construction Projects	Types of Structures	Intro to Bridges; Types of Bridges	Bridges, continued	Bridge activity	
Art							
	23	24 OGT	25 OGT	26 OGT	27 OGT	28 OGT	29
Capstone							
Physics		Trig and Forces	Trig and Forces	Trig and Forces	Trig and Forces	Trig and Forces	
Algebra II		Surface area and volume of prisms	Surface area and volume of sphere	Surface area and volume of sphere	Surface area and volume of cylinder	Surface area and volume of cylinder	
English		Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	Romeo & Juliet	
Social Studies		When Disaster Strikes	When Disaster Strikes	Katrina Documentary	Katrina Documentary	Katrina Documentary	
Engineerir		Intro to Building Materials	Applications of Building Materials	Characteristics of Building Materials	Calculations in Building Materials	Materials and Structural Purpose	
Art							
	30	31 Halloween	Notes:				
Capstone		OGT Makeup					
Physics		Building Formulas					
Algebra II		Surface area and volume of cone					
English		Intro to Playwriting					
Social Studies							
Engineerir		Stress/Strength Fundamentals					
Art						Calendars by Vertex42.com	

NOVEMBER 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4	5
Capstone			OGT Makeup	OGT Makeup	OGT Makeup	OGT Makeup/ 2nd Quarter Progress Reports Due	
Physics			Building Formulas	Building Formulas	Building Formulas	Building Formulas	
Algebra II			Composite solids	Composite solids	Polygon properties	Interior and exterior angles of polygons	
English			Brainstorming	Personal Play	Personal Play	Personal Play	
Social Studies							
Engineerir			Stress/Strength Calculations	Compression/Strengt Fundamentals	Intro to structural and multipliers	Calculations in structural multipliers	
Art							
	6 Daylight Savings	7 Early Release PARENT TEACHER CONFERENCE	8 Election Day/Professio Day (No Students)	9	10	11 Veterans Day	12
Capstone						NO SCHOOL	
Physics		Building Formulas		Building Formulas	Building Formulas		
Algebra II		Interior and exterior angles of polygons		Interior and exterior angles of polygons	Polygons in coordinate plane		
English		Personal Play		Personal Play	Personal Play		
Social Studies							
Engineerir		Intro to ACAD		Orthographic projection to ACAD	Orthographic Projection to ACAD		
Art							
	13	14	15	16	17	18	19
Capstone							
Physics		Thermal Energy	Thermal Energy	Thermal Energy	Thermal Energy	Thermal Energy	
Algebra II		Similarity: solve problems using proportions	Similarity: solve problems using proportions	Similar polygon characteristics	Similar polygon characteristics	Similar figures and proportions	
English		Personal Play	Personal Play	Personal Play	Personal Play	Personal Play	
Social Studies							
Engineerir		Applications in ACAD	Inventor	Inventor	Inventor	Inventor	
Art							
	20	21	22	23 Thanksgiving Break	24 Thanksgiving	25 Thanksgiving Break	26
Capstone				NO SCHOOL	NO SCHOOL	NO SCHOOL	

Physics		Thermal Energy	Thermal Energy				
Algebra II		Similar figures and proportions	Similar figures and proportions				
English		Personal Play	Personal Play				
Social Studies							
Engineerin							
Art							
	27 Muharram	28	29	30			
Capstone							
Physics		Materials (Atomic Structure)	Materials (Atomic Structure)	Materials (Atomic Structure)			
Algebra II		Side-Splitter Theorem	Triangle-angle bisector theorem	Circles: Central and inscribed angles and arcs	Circles: Central and inscribed angles and arcs	Circles: Inscribed quadrilaterals	
English		Bridge Scene	Bridge Scene	Bridge Scene			
Social Studies							
Engineerin		Sructures on an Atomic Level	Stuctures on an Atomic Level	Structures on an Atomic Level			
Art							
			Notes:				
Capstone							
Physics							
Algebra II							
English							
Social Studies							
Engineerin							
Art							Calendars by Vertex42.com

DECEMBER 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2	3
Capstone							
Physics					Materials (Atomic Structure)	Materials (Atomic Structure)	
Algebra II					Circles: Inscribed quadrilaterals	Circles: Chords and intercepted arcs	
English					Bridge Scene	Bridge Scene	
Social Studies							
Engineerir					Forces on an Atomic Level	Forces on an Atomic Level	
Art							
	4	5	6	7 Two Hour Early Release Professional Development	8	9	10
Capstone							
Physics		Bridge Design	Bridge Design	Bridge Design	Bridge Design	Bridge Design	
Algebra II		Circles: Angles and arcs formed by tangents, secants and chords	Circles: Angles and arcs formed by tangents, secants and chords	Circles: Angles and arcs formed by tangents, secants and chords	Circles: Special segments in a circle	Circles: Central angles for pie charts	
English		PhotoBook	PhotoBook	PhotoBook	PhotoBook	PhotoBook	
Social Studies							
Engineerir		Bridge Design on Sketchup	Bridge Design on Sketchup	Bridge Design on Sketchup and Prototype Start	Parts File on Inventor	Parts Inventory on Inventor	
Art							
	11	12	13	14	15	16	17
Capstone							
Physics		Bridge Design	Bridge Design	Bridge Design	Bridge Design	Bridge Design	
Algebra II		Solve problems using circle angles and segments	Circles: Equations of circles	Circles: Equations of circles	Circles: Equations of circles	Circles: Equations of circles	
English							
Social Studies							
Engineerir		Build	Build	Build	Build	Build	
Art							
	18	19	20	21 Hanukkah begins	22 Dec. Solstice	23	24 Christmas Eve

Classroom unit plan(s):

Art

Subject:	Capstone:	Time Frame:
9th Grade Art	Bridges	10/3/2011- 12/17/2011

Unit Big Idea:

Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate. Art will bridge the gap between the physically understanding of bridges, and the architectural aesthetics of design, with the metaphorical exploration of people as bridges in a historical and fictional concept.

Capstone to Classroom Connection

Students will look at bridges from an aesthetic perspective, gaining an understanding of the artist who designed each bridge, and further exploring the connection between arts and sciences (design & physics). Students will learn about photography through different assignments steeped in the theme of bridges.

During project time, the role of the Art teacher will be to have students apply the skills they learned in both architecture and photography by having students work on bridge design and structure as well as providing the appropriate time for photography explorations.

Readings	Materials
Forbidden Love: The Secret History of Mixed-Race America (Profiles) Primary source photography (architecture and profile photographs).	Pens/Pencils Notebook Computer Microsoft Office Chart Paper Scissors Markers/ Colored Pencils Glue Photography Editing Software Digital Camera

Unit Objectives

Students will be able to design and construct a structurally sound and aesthetically pleasing load-bearing bridge.

Students will be able to Explain how and why bridges developed in the contexts (e.g., cultural, social, historical and political) in which they were made and Compare works of art to one another in terms of the historical, cultural, social and political influences evident in the works.

Students will be able to demonstrate and understanding of basic and advanced photography skills.

Students will be able to make connections between physical bridges and the conceptual idea of a bridge.

Essential Questions

Can art be a bridge?
Can bridges be art?
What is composition and depth in a photograph?
How is photography a visual language?
How is photography used to communicate in our society?
What significance do historical photographs play in the present?
Why is it important to understand the context of a photograph?

Standards

ART HIST 9.-12. A. Explain how and why visual art forms develop in the contexts (e.g., cultural, social, historical and political) in which they were made.
ART HIST 9.-12. B. Compare works of art to one another in terms of the historical, cultural, social and political influences evident in the works.
ART HIST 9.-12. D. Select a culture and create an original work of art that demonstrates understanding of a historical, social or political issue of the culture.
ART EXPR 9.-12. A. Demonstrate mastery of materials, concepts and personal concentration when creating original artworks.
ART EXPR 9.-12. B.Create expressive artworks that demonstrate a sense of purpose and understanding of the relationship among form, materials, techniques and subject matter.

Assessments

Students will create a piece of writing and photo journal that communicates the intricacies of mixed-raced relationships in the context of American history.

Students will take photographs of bridges structures and architecture they want to emulate in their bridge designs.

Students will create digital sketch designs for aesthetically pleasing bridges.

Students will construct bridges from designs.

Quizzes and Tests will be included throughout this unit, but they will only be used as checkpoints to manage the advancement of reading skills and study habits.

Students will photograph settings throughout Cleveland that follow the rules of photography.

Math:

Subject:	Capstone:	Time Frame:
9th Grade Math	Bridges	10/3/2011- 12/17/2011

Unit Big Idea:

Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate. In Math, students will explore the mathematical faculties and engineering components needed to maximize the reliability of a bridge structure, while gaining an understanding of force and thermal analyses to determine the soundness of the structure.

Capstone to Classroom Connection

Students will work on the design and construction of a load-bearing bridge that can with stand large amounts of weight and pressure.

During project time, the role of the math teacher will teach skills based activities to assist with the design of the most structurally sound bridge. Additionally, the math teacher will lead students through the steps involved in creating and programming a working calculator which will be used as a tool throughout the capstone.

Readings	Materials
Forbidden Love: The Secret History of Mixed-Race America	Pens/Pencils Notebook Computer Microsoft Office Chart Paper Scissors Markers/ Colored Pencils Glue Calculators Graph Paper

Unit Objectives

Students will be able to make an informed decision as to which type of truss bridge to design and build.
Students will be able to use knowledge of polygons to design a truss bridge.
Students will be able to use mathematics to design and construct a load-bearing bridge using basic materials.
Students will be able to write algebraic expressions involving one operations, and program those formulas into a calculator.
Students will be able to write and use function rules.
Students will be able to define and write ratios, proportions, and rates.

Essential Questions

What does it mean to create a bridge that best meets the needs of the situation?
What factors affect the strength and stability of a bridge?
What is more important, knowing how the tools work, or knowing how to use the tools?
What is strength? What is stability? What is the difference?

Standards

G.GMD.1,2 G-MG.1,2,3 Explain volume formulas and use them to solve problems. Apply geometric concepts in modeling situations
A.CED.3,4 A.REI.11 Create equations that describe relationships. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
A.CED.3,4 A.REI.11 Create equations that describe relationships. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
F.BF.1a,b Determine steps for calculation from a context.

Assessments

Students will participate in a discussion following the strength testing of the bridges.

Students will then have to answer some reflection questions that cause them to look back on the experience of creating and building a bridge. The questions will challenge students to look back on the experience of using a budgeted amount of supplies, creating a bridge that could withstand weight, and working as a team.

Students will create a mathematically accurate schematic drawing.

Students will construct a load-bearing bridge that follows the schematic design.

Quizzes and Tests will be included throughout this unit, but they will only be used as checkpoints to manage the advancement of skills and study habits.

Students will create and program a working calculator.

Students will turn in work skills assessment sheets periodically throughout the capstone.

English

Subject:	Capstone:	Time Frame:
9th Grade English	Bridges	10/3/2011- 12/17/2011

Unit Big Idea:

Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate. In English language arts, students will explore the connection of character relationships through literature analysis of different dramas. In Romeo & Juliet, the families are separate, but their love is a bridge between two families. Throughout history, this has been both a reality and tragedy.

Capstone to Classroom Connection

Using “bridges” as the theme throughout the quarter will allow students to delve deep into the significance of relationships both in fiction and non-fiction. Students will read the classic, Romeo & Juliet, through the lens of forbidden love, and formulate opinions on the concept of “love” as a bridge.

During project time, the role of the English teacher will be to assist with writing tasks related to the photo journal project, as well as student one act plays, character profiles, and a short compare contrast essay on race relations in history and in Romeo and Juliet.

Readings	Materials
Forbidden Love: The Secret History of Mixed-Race America (Profiles) Romeo & Juliet Rome & Juliet: No Fear Shakespeare	Pens/Pencils Notebook Computer Microsoft Office Chart Paper Scissors Markers/ Colored Pencils Glue

Unit Objectives

Students will be able to identify the elements of reading and writing through drama.

Students will be able to understand Romeo and Juliet and the social significance of “forbidden” relationships throughout history.

Students will be able to make personal connections to both fiction and non-fiction works. Students will be able to judge and support the power they have over their own lives and the lives of others by the decisions they make and the actions they take.

Students will create one act plays that explore the concept of love as bridges and express the students opinion of that concept.

Students will understand that love can be the bridge between enemies. Students will explore the role of fate, the effects of hate, and the many facets of love. Students will employ strategies to analyze plot in literature. Students will demonstrate their understanding of text on four levels: factual, interpretive, critical and personal.

Students will compare and contrast historically significant “forbidden” relationships with the relationships that occurred in fictional plays, specifically, Romeo and Juliet.

Assessments

Students will create a piece of writing and photo journal that communicates the intricacies of mixed-raced relationships in the context of American history.

Students will compose Autobiographical Narratives on their Identities to connect the themes in Romeo & Juliet, and the Profiles in Forbidden Love to personal understanding.

Students will be writing one act plays with that explores the theme of love as a bridge and expresses an opinion on the topic.

Quizzes and Tests will be included throughout this unit, but they will only be used as checkpoints to manage the advancement of reading skills and study habits.

Students will write a short essay that compares and contrasts historically significant “forbidden” relationships with the Romeo and Juliet.

Student will write Character Profiles of characters in Romeo and Juliet using the writing process and technique exhibited in Forbidden Love.

Template Tasks (Literacy Design Collaborative, August 2011)

Can love ever really serve as a bridge? After reading Romeo & Juliet, write a one act play that addresses the question and support your position with evidence from the text(s). L2 Be sure to acknowledge competing views. L3 Give examples from past or current events or issues to illustrate and clarify your position.

Can anything bridge the gap between conflicting ideas, races, and cultures? After reading Romeo & Juliet and Forbidden Love, write an essay that compares the relationship of the fictional characters to the the relationship of the people profiled in Forbidden Love and argues whether or not love is enough to overcome the conflicting ideas, races, and cultures present in each text. Be sure to support your position with evidence from the text(s).

After researching primary source documents from the late 50’s and early 60’s on The Civil Rights movement write a historically accurate journal that defines the civil rights movement and explains the various societal and economic developments that resulted from the era. Support your discussion with evidence from your research. L2 What implications can you draw?

After researching Forbidden Love & Romeo and Juliet on mixed-race/mixed-socio economic class relationships write a profile that describes a person struggling with a decision to enter into a difficult relationships. L2 Use stylistic devices (e.g. imagery, tone, humor, suspense) to develop a narrative.

Essential Questions

Can anything bridge the gap between conflicting ideas, races, and cultures?
Can love ever really serve as a bridge?
How is an individual’s life affected by outside events, family situations, or cultural, political, and social

trends?
What are the various causes of tragedy? Can wisdom and knowledge be gained from a “tragic” experience?
How does learning about others teach us about ourselves

Standards

9-10 R.L 2 CC.9-10.R.L.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
9-10 R .L 3 CC.9-10.R.L.3 Key Ideas and Details: Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.
9-10 R.L 4 CC.9-10.R.L.4 Craft and Structure: Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).
9-10 R.L 9 CC.9-10.R.L.9 Integration of Knowledge and Ideas: Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).
9-10 W 1.e CC.9-10.W.1.e Text Types and Purposes: Provide a concluding statement or section that follows from and supports the argument presented.
9-10 W 3 CC.9-10.W.3 Text Types and Purposes: Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
9-10 W 3.b CC.9-10.W.3.b Text Types and Purposes: Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
9-10 W 3.c CC.9-10.W.3.c Text Types and Purposes: Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.
9-10 W 3.e CC.9-10.W.3.e Text Types and Purposes: Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Physics:

Subject:	Capstone:	Time Frame:
9th Grade Physics	Bridges	10/3/2011- 12/17/2011

Unit Big Idea:

Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate. In Math, students will explore the mathematical faculties and engineering components needed to maximize the reliability of a bridge structure, while gaining an understanding of force and thermal analyses to determine the soundness of the structure. In this unit that will explain how scientists and engineers utilize physical science concepts when building a bridge. These concepts include Newton's Third Law of Motion (action-reaction forces), forces acting in tension or compression, stresses a material experiences when equal and opposite tension and/or compression forces are exerted on a structure, stress-strain curves, static equilibrium, vibration, and resonance.

Capstone to Classroom Connection

Students will work on the design and construction of a load-bearing bridge that can with stand large amounts of weight and pressure.

During project time, the role of the physics teacher will teach skills based activities to assist with the design of the most structurally sound bridge. Additionally, the Physics teacher will lead students through the steps of designing and building a bridge.

Readings	Materials
Forbidden Love: The Secret History of Mixed-Race America Primary sources on bridges Video NOVA - "Super Bridge". This movie tracks the work of engineers, construction crews, contractors, and surveyors. Students will be able to observe the construction of a bridge from the concept including engineering surveys to opening day of the newly constructed bridge.	Balsa Wood Sheets Hot Glue Sticks Popsicle Sticks Tooth Picks Utility Knives Acrylic Wire (22 gauge) Paint Cans Markers (40) 1 x 1 square dowels (4" inch long) (40) 1/2" round dowels (4" inch long) Colored Pencils Poster Paper

Unit Objectives

Students will be able to define tension and compression and explain how materials react to these types of forces
Students will be able to define the three types of stresses a material experiences when forces are applied to the material
Students will be able to understand how scientists test materials to obtain a stress-strain curve
Students will be able to understand why Newton's Third Law of Motion should be a concern to engineers when designing a bridge and be able to explain an action and reaction pair of forces
Students will be able to grasp the concepts of equilibrium, static and dynamic loads, vibrations, and resonance while studying the different types of bridges
Students will be able to be able to identify the following types of bridges: truss, arch, and suspension.

Essential Questions

What is the significance of a bridge in science?
What are the steps taken in building a bridge from conception to final construction?
What problems can occur before and during construction, and how might you learn from these problems?
How can engineers avoid problems of this kind in the future?
What types of materials were used for the various parts of the bridge and why might this be?
Are there advantages to the cable-stayed bridge versus the suspension bridges of the past?
Which type of bridge is the most structurally sound?

Standards

SCI PHYS 11-12 D Use the laws and principals of forces and motion to analyze net force effects.
SCI PHYS 9-10 D Use the laws and principals of forces and motion to analyze motion.
SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge.
SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge
SCI PHYS 9-10 A SCI PHYS 9-10 C SCI PHYS 11-12 A Explain the process of physical change and tie it into the behavior of materials at an atomic level and the structure of atoms
SCI KNWG 9-10 A, B SCI KNWG 11-12 A Explain/exemplify the scientific method in developing knowledge.
SCI PHYS 9-10 A SCI PHYS 9-10 C SCI PHYS 11-12 A Explain the process of physical change and tie it into the behavior of materials at an atomic level and the structure of atoms.

Assessments

Each group of students will be expected to present their bridge to the class and discuss the following topics:

Students will participate in a discussion following the strength testing of the bridges.

Students will then have to answer some reflection questions that cause them to look back on the experience of creating and building a bridge. The questions will challenge students to look back on the experience of using a budgeted amount of supplies, creating a bridge that could withstand weight, and working as a team.

Students will create a physics bases, engineering, mathematically accurate schematic drawing.

Students will build a prototype bridge and use to make adjustments to final bridge design.

Students will construct a load-bearing bridge that follows the schematic design.

Quizzes and Tests will be included throughout this unit, but they will only be used as checkpoints to manage the advancement of skills and study habits.

Students will create and program a working calculator.

Students will turn in work skills assessment sheets periodically throughout the capstone.

Social Studies

Subject:	Capstone:	Time Frame:
9th Grade Social Studies	Bridges	10/3/2011- 12/17/2011

Unit Big Idea:

Bridges are a physical structure between two locations. Bridges are ideas that connect two sides of a debate. Bridges are relationships between people. Bridges unite that which is separate. In history bridges are often the undercurrent of multiracial family relationships. America has a long history of "forbidden love" in race relationships, starting with Pocahontas and ending in the multiracial heritage of our current President. Students will experience the lives of extraordinary mixed-race Americans, and explore race and racial identities that have prevailed in this country. Bridges represent a social connection, and in Social Studies, students will delve into different social constructions and societal norms that have lead to a bridging of societal gaps.

Capstone to Classroom Connection

Because this capstone uses bridges as a focal point, it is important to often come back to the metaphorical ideas of bridges throughout the quarter. Students will use their historical knowledge of "bridges" as a reference point in the creation of a final photojournal.

During project time, the role of the social studies teacher will be to assist with writing tasks related to the photo journal project as well as student one act plays and, if time allows, the short essay on race relations.

Readings	Materials
Forbidden Love: The Secret History of Mixed-Race America (selected chapters) America: Pathways to the Present * Chapter 12, Sections 1-5 * Chapter 12, Sections 1, 2, 3 * Chapter 19, Sections 1, 2, 3, 4	Pens/Pencils Notebook Computer Microsoft Office Chart Paper Scissors Markers/ Colored Pencils Glue

Unit Objectives

Students will be able to explain the infrastructure of real bridges, and the cultural and societal implications of the metaphorical bridge.

Students will be able to evaluate the chronology and location of major events in the civil rights movement.

Students will understand the significant people associated with the civil rights movement and their philosophies.

Students will be able to construct meaning from the American history of race relations and analyze the relation between historical practice and modern day society.

Students will analyze the societal impact of Civilian Conservation Corps, a New Deal recovery and relief program provided more than a quarter of a million young black men with jobs during the Depression.

Students will compare and contrast historically significant "forbidden" relationships with the relationships that occurred in fictional plays, specifically, Romeo and Juliet.

Essential Questions

Can anything bridge the gap between conflicting ideas, races, and cultures?
What choices do people make in the face of injustice?
How have ideas about race been used to decide who is included and who is excluded?
How have African Americans and other racial/ethnic minorities used race relations to advance socially, politically, and economically in the United States in the last half century?
How are race relations continuing to evolve in America?
If love is a bridge, how do others travel across it?

Assessments

Students will create a piece of writing and photo journal that communicates the intricacies of mixed-raced relationships in the context of American history.

Students will compose Autobiographical Reflections on their Identities to connect historical exploration to personal understanding.

Students will work to develop timelines of race relations in America.

Students will be writing one act plays with the setting description to be assessed in social studies class. Setting must explain time period in American history in a realistic, historically accurate fashion.

Quizzes and Tests will be included throughout this unit, but they will only be used as checkpoints to manage the advancement of reading skills and study habits.

Reading for Understanding. By examining primary source documents students analyze the impact of this program on race relations in America and assess the role played by the New Deal in changing them.

Students will write a short essay that compares and contrasts historically significant "forbidden" relationships with the Romeo and Juliet.

Template Tasks (Literacy Design Collaborative, August 2011)

Can anything bridge the gap between conflicting ideas, races, and cultures? After reading Forbidden Love: The Secret of Mixed-Race America write a profile that discusses the gap between conflicting ideas, races, and cultures and evaluates the metaphorical bridge that closes that gap. Be sure to support your position with evidence from the text.

After researching America: Pathways to the Present and Forbidden Love: The Secret of Mixed-Race America on The Civil Rights Movement write a journal (featuring photographs) that discusses the conflict between races in America and evaluates a solution to racial injustice. Be sure to support your position with evidence from your research.

After researching America: Pathways to the Present and Forbidden Love: The Secret of Mixed-Race America on The Civil Rights Movement write a timeline that relates how bridges were formed to overcome social injustice during civil rights era America. Support your discussion with evidence from your research.

How have African Americans and other racial/ethnic minorities used race relations to advance socially, politically, and economically in the United States in the last half century? After reading America: Pathways to the Present and Forbidden Love: The Secret of Mixed-Race America write a setting that explains the social, political, and economic advancement of minorities in the United States. What conclusions or

implications can you draw? Cite at least three sources, pointing out key elements from each source. **L2** In your discussion, address the credibility and origin of sources in view of your research topic. **L3** Identify any gaps or unanswered questions.

Standards

SS HIST 9.-10. B. Explain the social, political and economic effects of industrialization.
SS HIST 11.-12. B. Use historical interpretations to explain current issues.
SS PEPL 11.-12. A. Analyze how issues may be viewed differently by various cultural groups.
SS PEPL 11.-12. B. Identify the causes of political, economic and social oppression and analyze ways individuals, organizations and countries respond to resulting conflicts.
SS PEPL 11.-12. C. Explain the role of diverse cultural institutions in shaping American society.
SS GEOG 11.-12. A. Explain how the character and meaning of a place reflect a society's economics, politics, social values, ideology and culture.
SS ECON 11.-12. B. Identify factors which inhibit or spur economic growth and cause expansions or recessions.
SS CITZ 11.-12. A. Evaluate various means for citizens to take action on a particular issue.
SS CITZ 11.-12. B. Explain how the exercise of a citizen's rights and responsibilities helps to strengthen a democracy.

Resources and Links

Forbidden Love: The Secret History of Mixed-Race America
America: Pathways to the Present
Romeo & Juliet
Rome & Juliet: No Fear Shakespeare

http://www.csuohio.edu/engineering/
http://tv.nytimes.com/learning/teachers/lessons/20000717monday.html
http://americanhistory.mrdonn.org/AP.html
http://bridgecontest.usma.edu/
http://www.pltw.org/
http://www.authenticeducation.org/ubd/ubd.lasso
http://knowledgeworks.org/