Bridges: An Integrated Thematic Unit

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Bridges

Brooklyn Bridge: from wikipedia.org

Introduction: This unit explores a number of themes from an interdisciplinary perspective that touch on the idea of bridges. The unit is particularly effective in a situation where a school or school community is dealing with some negative issues surrounding diversity. The lesson sequence which follows features a school where groups stick to their own ethnic group in most social situations. In particular, the teachers at this school noticed that cafeteria sitting is almost exclusively by ethnic group. Other schools teaching this unit can modify the initial lesson to meet their individual needs.

"Bridges" is a three-week 7th Grade unit with daily lessons in Science, Mathematics, Social Studies, and Language Arts, plus additional lessons in Art and in Physical Education. The majority of the lessons are kept in separate disciplines, but many of the assigned projects involve two or more disciplines. In fact, one of the guiding ideas behind the unit is to demonstrate to students the bridges between disciplines. Four of the fifteen days comprising the unit include two or more subject teachers presenting the material together. See the "Major Assignments" section of this Introduction for more detail on the material involving multiple disciplines.

Themes/Essential Questions: "Bridges" explores the responsibility of an individual and a community to make connections with other cultures. The separate groups at the cafeteria tables can give the impression that they are perfectly content to remain separate. "Bridges" asks students to think about why this may be so, and what if anything they should do to reach out and change the situation. What is my responsibility as an individual to seek bridges, or better yet act as a bridge, between cultures?

The unit progresses from the concrete to the metaphorical, to the interpersonal:

- **Concrete:** In Science and Social Studies, students learn about specific bridges, both in terms of the construction challenges encountered and the effects, both positive and negative, they had on the surrounding population. Students integrate both scientific and historical thinking in a research paper about a specific bridge, with Language Arts providing lessons in support of the particular skills required to create an interdisciplinary research paper. In Science, with supporting lessons in Mathematics, students learn how to build a bridge and then construct a model bridge. In Language Arts, students study poems about actual bridges.
- **Metaphorical:** In Social Studies, lessons focus on the Greek and Roman empires and how the conquerors changed and were changed by the cultures they encountered. Students look at the actions of Alexander the Great and Roman emperor Augustus as the equivalent of bridges between peoples. Specific multicultural metaphors such as the melting pot and the patchwork quilt are illustrated with examples. Students begin to apply their thinking about both actual bridges and historical cultural bridges through the use of Language Arts journal prompts that address their own world. Also in Language Arts, students

learn specifically about metaphor, explore various poems treating the idea of "bridge" metaphorically, and then compose a metaphorical poem relating to the same bridge they are addressing in their research paper. Students are expected to draw upon what they have learned in their bridge building exercises in Science and Math to enrich the depth of their metaphorical thinking. In Art, students take it one step further, creating artworks that address an actual bridge, their metaphorical poem, and cultural interpretations of bridges.

- **Interpersonal:** In Physical Education classes, students engage in a variety of team building activities, including one involving bridge building. Many of the activities involve developing trust in team members. As a culminating activity for the entire unit, students participate in a ropes course activity, where once again trust and teamwork are paramount. Students use debriefing activities to reflect back on the bridges they have built throughout the unit, including those between students, and then address again the essential questions that launched the unit.

Major Assignments: Students complete a number of projects during the unit, many of which touch on multiple elements of the thematic ideas:

- A research paper about a particular bridge, written for Language Arts, but with guiding questions and support from the Science and Social Studies faculty.
- A bridge poem for Language Arts, using the same bridge students tackled for their research paper.
- A project in Art where students create a visual representation of the bridge from their research paper and poem.

- A metaphorical bridge poem for Language Arts, following a lesson co-taught by Science and Social Studies, where students compose a poem depicting themselves metaphorically as a type of bridge.
- A comprehensive project for Art, with cooperation from Language Arts, where students represent visually one of their poems, with a concentration on how they bridge their individuality with their cultural identity.
- A model bridge building activity, led by Science with supporting strategies supplied by the Mathematics curriculum.
- An inquiry-based project for Social Studies where students research the Greek and Roman empires from the perspective of the cultural bridges and clashes between conqueror and conquered.
- A journal for Language Arts, where students make connections among the various dimensions of "bridges" and reflect back upon the issues of cultural diversity which launched the unit. Students will complete this journal as they also complete a series of activities in Physical Education concerning trust, team bridge building, and the culminating ropes course.

Habits of Mind

"Bridges" is a unit that calls upon interdisciplinary teaching and learning as well as inquiry-based exercises. As a result, it supports the development of virtually all of the habits of mind that Martinello and Cook (1994) discuss in their work *Interdisciplinary Inquiry in Teaching and Learning*. Each major section of this document will touch on the habits of mind associated with particular activities and lessons.

Here are those particular habits of mind that have positions of prominence in "Bridges":

Cooperating and Collaborating: This unit begins with a consideration of the ethnic and cultural divisions that separate us. Over the course of the three weeks of the unit, students work together in a variety of group configurations while reflecting on ways of bridging those divisions. In the culminating activity, students use what they have learned about cooperation to complete the ropes course.

Taking Risks: This unit asks students to take a risk in closing the gap that separate them from those students who differ from them. Almost as importantly, it asks students to think about those situations where it makes sense to leave some separation. Knowing when and when not to take risks is an essential aspect of this habit of mind.

Thinking Fluently and Flexibly and **Seeking Anomalies:** Like the question of building or not building bridges to others, this unit requires the students to grapple with issues that have compelling arguments on both sides. These range from whether Alexander the

Great is a hero or a villain (Social Studies) to whether our identity veers toward the individual or the group (Language Arts). Students can expect to find anomalies throughout their research and their personal reflection that will alter their first impressions. As a result, they need to be flexible in considering the questions.

Forming Hunches/Designing Tests and Experiments/Finding Elegant Solutions: The heart of both the Science and the Mathematics curriculum is a model bridge building activity that brings to the fore these habits of mind associated with the scientific method. As students proceed, they need to ask: How can we use the materials at hand to build our bridge? How can we test our hunch before committing to building our bridge? How can we overcome the problems along the way in designing a bride that can handle the necessary weight?

Using Models and Metaphors; Thinking by Analogy: This unit is practically an object lesson in using models and metaphors. Students build model bridges that serve to replicate the problems encountered in building famous real-world bridges. Students study metaphor, and then apply it in terms of "themselves as bridge" and "cultural bridges". By the conclusion of the unit, students can make analogies among the various core subjects and unified arts as they see how each sheds its own light on the multifarious theme of "Bridges".

Reference: Martinello, G. & Cook, G (1994). *Interdisciplinary Inquiry in Teaching and Learning*. Upper Saddle River, New Jersey and Columbus, Ohio: Prentice-Hall.

Engaging Activity

This interdisciplinary unit is designed to incorporate mutual respect, negotiation, and intercultural dialogues throughout all academic disciplines. Interdisciplinary concepts, when applied effectively, are coherent, complete, and serve as the foundation for future units. The engaging activity will take one day. The teacher team and students will meet during the core curriculum periods. Since there are four periods, of about an hour each, the engaging activity has been broken into four sections.

The first section of this unit begins in the cafeteria with all seventh graders. They will be instructed to sit where they usually sit during lunch. At this point, one of the team teachers will ask the students to look around the cafeteria at the other tables and to recognize how the class has divided themselves. In response to guided, open-ended questions students and teachers will engage in a discussion about the cafeteria seating – namely, recognizing the split of cliques, often based on racial differences. One of the team teachers will be recording the list of differences on a sheet at the front of the room.

During the second hour, as a whole team activity, the students will engage in the Diversity Deck activity (Kreidler, 235). During this activity students explore the characteristics of diversity, and the roles that culture and clout play in society. The group activity asks students to get up from their tables and move to one side of the room or the other depending on the group that they are a part of (e.g., males to the left side, females to the right side). There will be questions such as: African American/Not African American, Religious/Not Religious, etc. As well as lighter and more random questions such as: Prefer Coke/Prefer Pepsi, etc. After each question a team teacher will lead a

reflective discussion regarding what suit the characteristic fits into: was the category something the student was born with, given, or chose. Within each group the students will be asked to answer more specific questions regarding favorite subjects, bands, etc. Does everyone in the same group like the same subject? Probably not. Having a chance to see that they can have both similarities and differences will help the students begin to break down the constructs that keep them separated. It will also help them find less obvious similarities with people who they had previously not knows. This activity promotes discussion about diversity and gets students thinking about different kinds of similarities and differences.

In the third hour team teachers will discuss the beginning of the integrated unit. The unit's theme of bridges will be introduced along with the essential question: "What responsibility do we have to make cultural bridges?" Each teacher will talk for a moment about how the theme relates to his/her subject and will give the students and over view of what they will be doing.

In closing, students will return to their homerooms with a team teacher. Although the students will be breaking down into smaller groups in order to facilitate discussions, each homeroom will be discussing the same questions. As homeroom teams the student and teacher will engage in a conversation about the day, how we recognize similarities and differences, what our responsibilities are, and if there are ever times when we do not think it is appropriate to make bridges. Students will have an opportunity to share how they felt during the day: is talking about this ever uncomfortable? Have they talked about it before? Why is it important to them? Finally, students will also relate the issue back to themselves and the cafeteria.

English

Overview:

The English unit will start with the research paper. The content of the research paper will incorporate Social Studies and Science, whereas the writing support will come from the English classroom. During the first week, students will learn how to research, make an outline, move their outline into paragraphs, and revise. Students will also learn the unit vocabulary in order to use it throughout the different content areas and varied projects.

During the second week, the English class will introduce poetry. Students will first read poems about literal bridges. At that time they will cover figurative language like personification. Students will also write their own poem about the bridge they researched the week before. After that, students will read metaphorical bridge poems that explore questions such as: when must I be a bridge in my community? What does it mean to be a bridge? Are there times when it is okay not to be a bridge? At that time they will cover figurative language like metaphor and simile. Students will also write their own metaphorical bridge poem.

During the third week in English students will make connections, or “bridges”, between the poems they have been writing and their experience on the first day of the unit in the engaging activity. They will spend class time compiling their work from the unit into a compilation. This compilation will include a responsive paper that stems from the journal entries they have been keeping throughout the unit.

Standards:
Massachusetts English Curriculum Framework:

1: Discussion

1.3: Apply understanding of agreed-upon rules and individual roles in order to make decisions.

4: Vocabulary and Concept development

4.22: Determine pronunciation, meanings, alternate word choices, and parts of speech of words using dictionaries and thesauruses.

8: Understanding a text

8.19: Identify and analyze sensory details and figurative language.

9: Making connections

9.5: Relate a literary work to artifacts, artistic creations, or historical sites of the period of its setting.

11: Theme

11.4: Analyze and evaluate similar themes across a variety of selections, distinguishing theme from topic.

15: Style and Language

15.5: Identify and analyze imagery and figurative language.

15.6: Identify and analyze how an author's use of words creates tone and mood.

19: Writing

19.20: Write poetry using poetic techniques, figurative language, and graphic elements.

19.21: Write reports based on research that includes quotations, footnotes or endnotes, and a bibliography.

19.23: Write multi-paragraph compositions that have clear topic development, logical organization, effective use of detail, and variety in sentence length.

24: Research

24.4: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research individual projects.

Habits of Mind (Martinello and Cook)**:**

Finding and Keeping Focus: The focus of the unit is bridges. Throughout the unit in English students will be encouraged to find that focus and relate it to themselves.

Being Attentive: In the research paper students will be required to pay attention to detail. They will also be required to connect their individual observations to the whole community.

Seeing Anomalies: The whole unit is focused on discovering pathways between the theme and themselves. Specifically, the journal prompts will develop this habit of mind.

Thinking Fluently and Flexibly: Through reading different metaphorical poems students will be expected to look at problems from different perspectives.

Searching for Patterns: The research paper will require students to search for patterns about their bridge. This will continue as we move into poetry because the students will be asked to observe patterns about their bridge and then make connections to themselves.

Using Models and Metaphors: Thinking by Analogy: The section on metaphor explicitly teaches this habit of mind. Students will continually be finding how they are bridges.

Finding Elegant Solutions: As an integrated lesson students will be making artistic representation of their poems.

Taking Risks: Starting with the cafeteria exercise students will continually be taking risks.

Cooperating and Collaborating: In this unit students will be doing group work. The image explosion exercise will explicitly incorporate collaboration.

Persevering and Having Self-Discipline: With their research project students will need to monitor their own work.

Outline:

Day	Class	Homework
1	Engaging Activity	None
2	Integrated Lesson: Introduce Bridge Research Project (Science, Social Studies, English)	Make vocabulary flashcards.
3	Unit Vocabulary	Choose a bridge for your research paper; Begin initial not taking on 3X5 cards.
4	Research Day	Create an outline.
5	Research Day	Complete a rough draft for Monday.
6	Peer Editing	Research Paper due Day 7.
7	Literal Bridge Poems	Write your own literal bridge poem.
8	Integrated Lesson: Metaphor (Science, Social Studies, English)	Read poetry packet.
9	Metaphorical Bridge Poems	Write a paragraph about yourself as a bridge.
10	Metaphorical Bridge Poems	Begin writing your own metaphorical bridge poem.
11	Metaphorical Bridge Poems	Metaphorical bridge poem due.
12	Metaphorical Bridge Poems	Responsive paper.
13	Integrated Lesson: Prepare for Gallery Walk	Cumulative project due for the Gallery Walk.
14	Gallery Walk	None
15	Culminating Activity	None

Week One: Integrated Bridge Research Project

Day One: Engaging Activity

Day Two: Integrated Lesson: Introduce Bridge Research Project (Science, Social Studies, English)

Lesson Overview: Bridge Research Project

This lesson will be taught by three core teachers (Science, Social Studies, and English). Because it will be during those three core subjects,

there will be three hours available for this lesson. The science teacher will introduce the main focus of their unit. Students will watch the film *Building Big – Bridges*, which introduces many of the more concrete concepts about bridges that will be the focus of the Science and Mathematics curriculum as well as the Social Studies emphasis for the first week. Then the social studies teacher will introduce the main focus of their unit. Together the students will brainstorm with the science teacher and the social studies teacher to come up with the focus questions for their research paper. They will fill out a KWL to activate their prior knowledge and figure out what more they need to know. At the end of the time together the English teacher will introduce note-taking strategies. With the remaining time, the students will begin brainstorming about what bridges they want.

Research Paper Requirements:

1) Name the bridge. Where is it located (or was it located)? How long did it take to build? When was it built? Does it still exist?

2) What type of bridge is it (beam, cable-stayed, cantilever, truss, arch, or suspension)?

3) What forces act on that specific type of bridge (tension, compression, torsion, bending and shear)?

4) Give statistics on the bridge (cost, length, purpose, longest span, engineer who build it).

5) What is the bridge's historical importance? What was its cultural impact?

6) You must show an appropriate use of unit the vocabulary.

Rubric: Bridge Research Paper

Teacher Name:

Student Name: _____

CATEGORY	4	3	2	1
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Amount of Information	All topics are addressed and all questions answered with at least 2 sentences about each.	All topics are addressed and most questions answered with at least 2 sentences about each.	All topics are addressed, and most questions answered with 1 sentence about each.	One or more topics were not addressed.
Organization	Information is very organized with well-constructed paragraphs and subheadings.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not well constructed.	The information appears to be disorganized. 8)
Sources	All sources (information and graphics) are accurately documented in the desired format.	All sources (information and graphics) are accurately documented, but a few are not in the desired format.	All sources (information and graphics) are accurately documented, but many are not in the desired format.	Some sources are not accurately documented.
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.

Assignment: Make flashcards including the part of speech and definition for the following words: arch, beam, cable-stayed, cantilever, span, stay, suspension, tension, truss, equivalent, ratio, scale, proportion, symmetry,

charismatic, genocide, usurper, amalgamation, Hellenism, Pax Romana, diversity, culture, and clout.

Day Three:

Lesson Overview: Unit Vocabulary

There is specific vocabulary that is necessary for the students to learn for this unit. Since vocabulary acquisition works best when the words are used throughout content areas and when the students are required to use them, the English class will introduce the vocabulary at the beginning or the unit: arch, beam, cable-stayed, cantilever, span, stay, suspension, tension, truss, equivalent, ratio, scale, proportion, symmetry, charismatic, genocide, usurper, amalgamation, Hellenism, Pax Romana, diversity, culture, and clout. From this point on, students will be responsible for learning the vocabulary and using it when appropriate. Teachers in all subjects will be responsible for using these terms whenever possible. Students will come to Day 2 prepared with flashcards for the vocabulary words. The class will be split into groups of four and the vocabulary words will be split between them. Each group will be responsible for teaching the class their group of words. Groups may use skits or give example sentences. At the end of class students will journal for five minutes.

Journal Prompt: Discuss the meanings of bridge building terms and how they relate to bridges between people.

Assignment: Choose your bridge to research. Begin initial note taking on 3X5 cards.

Day Four: Research Day

Lesson Overview: Creating an Outline

At the start of class students will journal for five minutes. For the mini lesson teacher will model how to create an outline. The class will focus on how to order the research they have acquired. As a class, students will come up with a model thesis statement and topic sentences. Teacher and students will brainstorm about how to provide supporting evidence. The remaining time will be used for the students to begin creating their outlines or furthering their research. Teacher will be available to support individual students.

Due: Initial notes on 3X5 cards.

Journal Prompt: Why does this bridge interest you?

Assignment: Create an outline including Thesis Statement, Topic Sentences, Supporting Evidence, and a Conclusion

Day Five: Research Day

Lesson Overview: Turning an Outline into Paragraphs

At the start of class students will journal for five minutes. The teacher will model how to turn an outline into paragraphs. The remaining time will be used for the students to work on their outlines, further their research, and begin forming paragraphs.

Due: An Outline with Thesis Statement, Topic Sentences, Supporting Evidence, and a Conclusion

Journal Prompt: How have bridges between different nations affected our history or the development of societies throughout history?

Assignment: Write a rough draft.

Week Two: Poetry

Day Six: Peer Editing

Lesson Overview: Editing

At the start of class students will journal for five minutes. For the rest of the period students will work together in pairs. They will be provided with a rubric for their essays. Each pair will read their essays aloud to each other in order to catch some of their own mistakes. Then they will exchange essays and read them quietly. Each student will fill out a rubric for a classmate indicating where he/she needs to work.

Due: Rough draft.

Journal Prompt: What are the criteria you're looking for in a bridge (could start by discussing the bridges they're building in science)? What does the bridge have to sustain? How long does it have to last?

Assignment: Complete your research paper.

Day Seven: Literal Bridge Poems

Lesson Overview: Introducing Bridge Poems

At the start of class students will journal for five minutes. As a class we will read a packet of poems. The poems will be about bridges

around the world like “Bamboo Bridge” by Owi Ivar Nandi (Appendix A). As a class, students will discuss what qualities each bridge has: where is it built? What does it support? How long will it last (did it last)? There will then be a mini lesson on figurative language, specifically personification.

Due: Research paper.

Journal Prompt: How do you build bridges between different "things"? Those things could be different types of land, peoples, cultures, sexes, languages, etc.

Assignment: Write your own bridge poem using the bridge you researched as inspiration. Make sure to show us the most important qualities of your bridge through the way you describe it. Use one example of personification in your poem. This poem will be used to teach your peers about your bridge.

Day Eight: Integrated Lesson: Metaphor (Science, Social Studies, English)

Lesson Overview:

At the start of class students will journal for five minutes. This class is integrated with Science and Social Studies; therefore, there will be about three hours. Look to each content area for specifics on each section. Science will be introducing the themes of what is necessary for a bridge to be built and then stay up. Also examining what criteria is necessary to know before we begin to build a bridge. For instance, how much must this bridge support? What is the bridge spanning? Etc. In English the students will have just learned how to look for qualities that their bridge has that

they might also share. In this class the English teacher will give a mini lesson on what metaphor. Future classes will build upon this lesson.

Journal Prompt: What's so complicated about bridges anyhow? How come they are so hard to make (for both physical and metaphorical bridges)?

Assignment: Read poetry packet with metaphor in mind.

Day Nine: Literal to Metaphorical Bridge Poems

Lesson Overview:

At the start of class students will journal for five minutes. The class will have a writing workshop in which they share the literal bridge poems they wrote after Day 7. During the workshop the students will be listening for one piece of positive feedback and one criticism that they can offer to the writer. In this way, each student will teach their classmates about the bridge that they researched. As a class we will brainstorm how these bridges relate to us. Following the integrated metaphorical lesson we will come up with ways in which we are bridges.

Journal Prompt: Do you ever act as a bridge? Do you ever feel you have to act as a bridge? Think of the poem you wrote about your bridge? Do you connect to it in any way?

Assignment: Brainstorm ways in which you are a bridge in your community, family, or school. Think about what the bridge you researched and the qualities it possessed. How do those qualities transfer to your life? Write one paragraph.

Day Ten: Integrated Lesson: Metaphor Bridge Poems (Unified Arts, English)

Lesson Overview: Project Introduction

At the start of class students will journal for five minutes. This class will bring together English and the Unified Arts. We will introduce the main project that they will be completing in the next week, which will be combining the poems they've written in English with what they've been learning in art class. We will read the poem "Bridge" by William Marr (Appendix B). Then, using that poem, we will model how to connect it to art.

Due: Paragraph about themselves as bridges.

Journal Prompt: Are there ever times when you do not want the responsibility of acting as a bridge?

Assignment: Begin writing your own metaphorical bridge poem.

Week Three: Poetry Continued

Day Eleven: Metaphor Bridge Poems

Lesson Overview: Image Explosion

At the start of class students will journal for five minutes. As a class we will do an Image Explosion with the poem "The Bridge Poem" by Donna Kate Ruskin (Appendix C). An Image Explosion is when the teacher reads the poem aloud and then students write in the journals off of an image or thought that stuck with them. The teacher then begins reading the poem again. The students interrupt by reading what they've written when the teachers reaches the part in the poem that pertained to them. At

the end, every student has contributed and the class has listened to a huge poem that is unique to the class and their experiences. This experience will be a bridge to each other's experiences. It will also help them develop their metaphorical bridge poems.

Due: Draft of metaphorical bridge poem.

Journal Prompt: How does it all connect? Consider your lives, the bridges you've studied, and the poems you've written.

Assignment: Finish your metaphorical bridge poem.

Day Twelve: Metaphor Bridge Poems

Lesson Overview: Writer's Workshop

At the start of class students will journal for five minutes. The class will then participate in a writer's workshop. During the workshop the students will be listening for one piece of positive feedback and one criticism that they can offer to the writer. The Gallery Walk cumulative project will be introduced at the end of class. For this project, the students must create a compilation of their work including: research paper, literal bridge poem, metaphorical bridge poem, and a responsive paper that stems from the journal prompts the students have written during class throughout the unit. Students will be encouraged to include work from their other classes in this compilation. They will be beginning to put it together for homework and they will have the next class period to work on it.

Due: Metaphorical bridge poem.

Journal Prompt: Why are bridges so important? What happens when bridges break or fall? Can they ever really be repaired... will people ever have true confidence in that bridge again?

Assignment: Begin working on your responsive paper by typing your journal entries and expounding upon ideas where needed.

Day Thirteen: Prepare for Gallery Walk

Lesson Overview: Work Day

At the start of class students will journal for five minutes. The rest of the class period will be a time to work independently on their compilation.

Due: Responsive paper.

Journal Prompt: Remember the first day in the cafeteria? What were some of the things that divided people? What is your responsibility to make a bridge over those divides? What do you need in order to do that? Is it okay to not build a bridge sometimes?

Assignment: Complete your compilation. Your work will be exhibited in the Gallery Walk tomorrow.

Day Fourteen: Gallery Walk

Day Fifteen: Culminating Activity

English References

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English - Appendix A:

Bamboo Bridge
By Owi Ivar Nandi

The steps of them you carry,
strive for other, greener bank.
You are not built for eternity!

Bamboo bridge, in order to cross,
what separates the other side from this,
you are firm in the beauty
of an uncovered Indian silt.

You overarch your back modestly,
curved bamboo frame.
Endowed with a single handrail,
you bind the banks.

You will not survive modernity,
will not face the future.
With the path which served you,
You will die from the pangs of progress,
passion and prosperity.

You are not built for eternity,
rather just for the moments-of-memory
of your passing guests!

English - Appendix B:

Bridge
By William Marr

clasped together
intimate and tight

we really don’t know
nor care
who was the first
to extend
a hand

English - Appendix C:

The Bridge Poem
Donna Kate Ruskin

I've had enough
I'm sick of seeing and touching
Both sides of things
Sick of being the damn bridge for
everybody

Nobody
Can talk to anybody
Without me

Right?

I explain my mother to my father my father
to my little sister
My little sister to my brother my brother to
the white feminists
The white feminists to the Black church
folks the Black church folks
To the ex-hippies the ex-hippies to the
Black separatist the
Black separatists to the artists the artists to
my friends' parents.

Then I've got to explain myself

To everybody
I do more translating
Than the Gawdamn U.N.

Forget it
I'm sick of it

I'm sick of filling in your gaps

Sick of being your insurance against
The isolation of your self-imposed
limitations
Sick of being the crazy at your holiday
dinners
Sick of being the odd one at your Sunday
Brunches

Sick of being the sole Black friend to 34
individual white people

Find another connection to the rest of the
world
Find something else to make you legitimate
Find some other way to be political and hip
I will not be the bridge to your womanhood
Your manhood
Your human-ness

I'm sick of reminding you not to
Close off too tight for too long

I'm sick of mediating with your worst self
On behalf of your better selves

I am sick
Of having to remind you to breath
Before you suffocate
Your own fool self.

Forget it

Stretch or drown
Evolve of die

The bridge I must be
Is the bridge to my own power
I must translate
My own fears
Mediate
My own weaknesses I must be the bridge to
nowhere
But my true self
And then
I will be useful.

Social Studies

Introduction: This unit explores both the positive and negative impact of the conquest of empire. Students consult a variety of resources (books, museums and museum staff, Internet, videotapes) in looking at Greek and Roman empires and the spread of culture. Student inquiry focuses upon a number of questions, with student teams selecting paths to follow from among the following: In an era of one empire after another, was the Greek Way or the Pax Romana a relative benefit for the conquered? How did Alexander the Great or Caesar Augustus plan to hold their vast empires together and how did it play out in actuality? Was there any cultural influence from the conquered peoples back to Greece or Rome? How much were the conquered peoples able to keep their own cultures? How did Greek and Latin become dominant languages (language as cultural bridge)? Why did Roman culture adopt so much from the Greeks as opposed to burying Greek culture and replacing it totally with that of the Romans?

A primary focus is on the charismatic figure of Alexander the Great, and cities such as Alexandria in Egypt that were noted for their Greek culture but also provided opportunities for the native peoples. Students also have the option of focusing their inquiry on Roman emperor Caesar Augustus, or they can specifically compare and contrast the Greek and Roman empires and their cultural collisions. The unit will also make connections to more current examples of one people usurping another and the cultural genocide that can result. Are there lessons we can learn from the Greeks or Romans in building cultural bridges today, or are the Greeks and Romans simply early examples of usurping conquerors?

We will explore in conjunction with Science faculty the Roman achievements in bridge building. This is in keeping with one of the overall themes of this unit, which is to explore the idea of bridges in actuality as well as metaphorically.

Also in conjunction with Science, we can sample a range of bridges in history from land bridges such as that which allowed early nomads to travel from what is now Asia to what is now North America, to the bridges of early civilizations, to modern bridges, such as the Brooklyn Bridge (itself the subject of a number of famous poems and works of art). These lessons will discuss how bridges affect area economies thanks to the ability to efficiently transport goods, and can touch on other effects as well. Inquiry-based questions in this area include: What role did this bridge play in the economic and/or social development of the culture? Discuss what would happen if this bridge wasn't present or if it were to suddenly collapse. How would it affect our lives or the lives or the lives of the people living there at the time?

With Language Arts, the unit looks at the idea of metaphor. Students will look at metaphors for how cultures can come together, with either assimilation (the melting pot) or separateness (the patchwork quilt) often the ruling metaphor. Students will come to see the bridge as still another metaphor for cultural connections at the same time as they experience various other metaphorical dimensions of the idea of “bridge” in Language Arts.

This unit addresses any number of learning and interpersonal skills and hones many different habits of mind. These skills and habits will be noted in conjunction with the individual lessons within this unit. An overarching habit of mind for the entire interdisciplinary unit is "Using Models and Metaphors: Thinking by Analogy". Students specifically study metaphor in Language Arts during the three weeks of the unit. Even more importantly, students learn to apply metaphoric thinking and thinking by analogy in a number of ways. In the Social Studies unit, these include:

- Connecting the Cafeteria Exercise and the Diversity Deck Lesson (Kreidler, 1997) to cultural interactions in history and in their own lives.
- Recognizing that a bridge can be a model or metaphor for any type of connective structure
- Comparing and contrasting heroes and villains in history to those in the media and in their own lives
- Finding how the history of particular bridges can link to both cultural connections and personal metaphor building

Standards:

Massachusetts History and Social Science Curriculum Framework:

Grade 7 Concepts and Skills:

History and Geography:

Compare information shown on modern and historical maps of the same region.

Construct and interpret timelines of events and civilizations studied

Identify multiple causes and effects when explaining historical events.

Grade 7 Learning Standards:

7.25: Explain how the geographical location of ancient Athens and other city-states contributed to their role in maritime trade, their colonies in the Mediterranean, and the expansion of their cultural influence.

7.28: Describe…the functions of slaves in ancient Athens

7.29: Analyze the causes, course, and consequences of the Persian Wars…

7.31: Describe the rise of Alexander the Great and the spread of Greek culture

7.32: Describe the myths and stories of classical Greece; give examples of Greek gods and goddesses…

7.39: Describe the influence of Julius Caesar and Augustus in Rome's transition from a republic to an empire and explain the reasons for the growth and long life of the Roman Empire.

A: Military organization, tactics, and conquests; and decentralized administration
B: the purpose and function of taxes
C: the promotion of economic growth through the use of a standard currency, road construction, and the protection of trade routes
D: the benefits of a Pax Romana

7.40: Describe the characteristics of slavery under the Romans

7.43: Describe the contribution of Roman civilization to…engineering, and technology (e.g., roads, bridges, arenas, baths, aqueducts, central heating, plumbing, and sanitation).

Lessons:

Day 1: Engaging Activity: See elsewhere within this overall ITU for a description of the shared activities during Day 1 of the unit: the cafeteria discussion and Diversity Deck activity; the introduction of essential questions, the presentation of the syllabus for the next three weeks.

The final hour of Day 1 is back in the Social Studies classroom, and includes the following structure:

Conduct a Graffiti Exercise (Rutherford, 2002), with chart paper and a variety of charts, each with one question for student feedback. This exercise is designed to get students moving, to allow for all students, including those usually reticent to speak out, to have their "voices" heard, to stimulate a desire to learn, and to assess students prior knowledge.

Interpersonal and Learning Skills:

- Written communication
- Giving feedback
- Moving smoothly from activity to activity

The Questions:

#1 Earlier in the Diversity Deck exercise, we learned about culture. Is it better when cultures come together and each changes to form a common culture (the "melting pot"), or is it better when cultures retain their individuality (the "patchwork quilt")?

#2 What examples of two cultures clashing in history or today can you list? Circle the culture that has the upper hand and indicate why that may be so.

#3 How might a bridge lead to a positive connection between two places? A negative connection?

#4 What specific bridges are you familiar with? Why do you think they might be important?

Students each have a different color marker. They spend time in groups of four before each of the posters/questions, silently adding their comments and reacting to those comments already present. Indicate to students that they will be discussing these charts utilizing a "Pens In the Middle" format (Baloche, 1998) on Day 3 of the unit.

Day 2: This lesson will be taught by three core teachers (Science, Social Studies, and English). This three-hour lesson includes a viewing of the film "Building Big – Bridges" which introduces many of the more concrete concepts about bridges that will be the focus of the Science and Mathematics curriculum as well as the Social Studies emphasis for the first week. All the teachers will expand further on the focuses of their unit. For Social Studies, this includes a discussion of how the unit will proceed from the concrete (bridges of ancient time) to the metaphorical (the Greek and Roman empire and their cultural bridge-building) to the interpersonal (as we come together in week 3 to build rope bridges together and reflect again on how to address issues of diversity in our school). The remainder of the day includes a thorough discussion of the research paper expected from the students (see the Language Arts lesson sequence, Day 2 for details).

Day 3: For the first half of the class, four groups of students meet in a "Pens In the Middle" format to discuss one each of the four charts produced by the class on Day 1. Students have been pre-assigned numbers: one student takes down the posterboard and brings it to the group, one student makes sure that all students have a chance to talk, one student makes sure that all students take notes during the conversation, and one student is assigned to report on the group discussion to the whole class. During the group discussion of Question #1, make sure to discuss "melting pot" and "patchwork quilt" as metaphors describing cultural interactions.

"Pens In the Middle" interpersonal and learning skills:

- Sharing ideas
- Taking turns

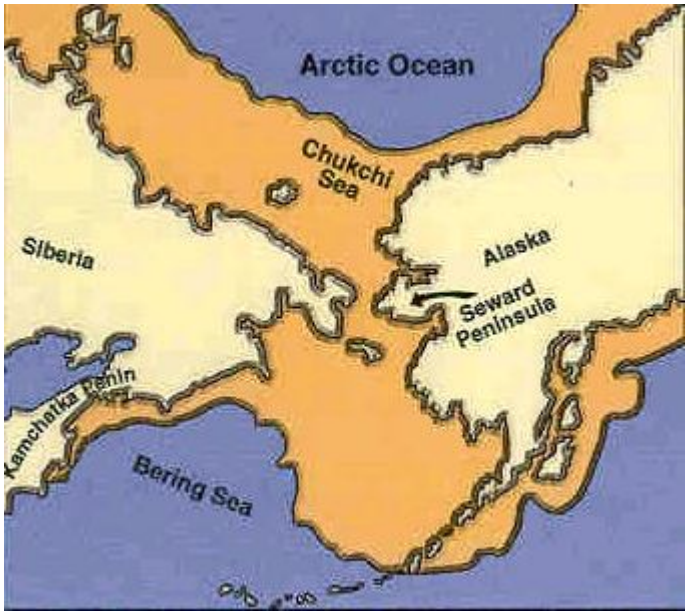
The second half of the class looks at various bridges in ancient times: This lesson includes a lecture with projected images of the bridges that are included in the lesson. Following the lecture is a group activity. The lecture includes the idea that bridges are not necessarily just a roadway that passes over land and/or water. Students use a graphic organizer (see a copy at the conclusion of the Social Studies unit) to list what type of

bridge, who erected it, who did it benefit and how, who did it hurt and how. The lecture looks at the following "bridges":

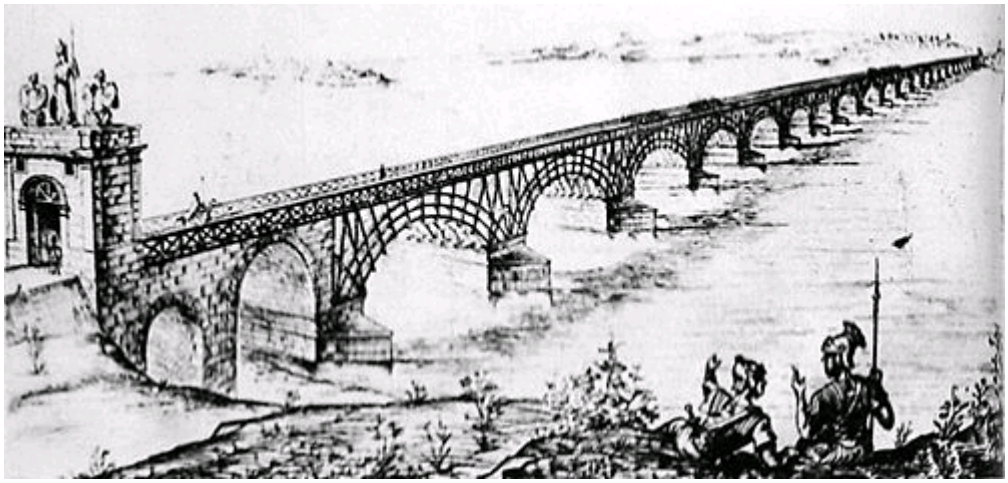
The Beringia land bridge: We will have covered this earlier in the year, so this will be a review. Show a map and or time-lapse photography with the land bridge between modern-day

Bridges of the Ancient World

Images from wikipedia.org unless otherwise indicated



Beringia Land Bridge from nps.gov



Trajan's Bridge

Pont du Gard

Tiberius Bridge

Remains of the Appian Way

Russia and Alaska breaking apart to where they are on separate continents. Discuss the movement of peoples facilitated by the bridge.

Trajan's bridge: Discuss how this bridge led to the conquest of the Dacian people. Introduce the idea that conquest can have positive attributes. It often brings cultural changes
that the conquered people may welcome: the Dacian aristocracy saw the advantages of the Roman imperial system and many Dacians became Romanized.

Caesar's temporary Rhine bridges: Introduce the idea that bridges can be temporary; make clear that these bridges were designed to subjugate peoples, not connect to them in any mutually positive way.

Roman Aqueduct (Pont du Gard): Introduce the idea that bridges include constructs such as the aqueduct. Discuss the idea that the aqueduct allowed for sophisticated water use in Rome, including plumbing. Rome built these aqueducts throughout the empire, providing the benefit of more easily available water to all, with the wealthy able to have water piped to their homes. Introduce the idea that bridges have economic impacts.

Roman roads: Discuss the Roman legacy of road building. Explore why roads would have been beneficial, and were necessary here in ways they might not have been before**.** Roads allowed for the efficient movement of Roman troops, but also allowed for goods to be transported into and around the empire. Expand on the idea that, like bridges, roads can connect peoples.

Tiberius Bridge, Rimini: This is one of the most beautiful bridges built by the Romans and still functions as a bridge today. Introduce the idea of a bridge as an aesthetically pleasing object in its own right.

Day 4: In the first half of the class, students meet in groups using a Consensus Conclusions (Rutherford, 2002) structure. Students reference their graphic organizer in discussing and ranking each of the bridges from most positive to most negative in terms of its impact on society. The list should include a rationale for the ranking of each bridge.

Consensus Conclusions Interpersonal and Learning Skills:

- Compare and contrast the various components of the lesson
- Turn taking
- Reaching consensus

In the second half of the class students can begin a brief essay (300 words) that is finished as homework and due Day 5. Students select any two of the bridges, one with a

positive impact , one with a negative impact, and write describing both bridges and comparing their impact. Students can select books to borrow from the resource library and/or visit the websites I will have assembled for the unit. Students should include an illustration of their bridges. Books are due back to the resource library on Day 5 as well.

Day 5: This lesson, including the homework, specifically promotes connection to prior learning and previews upcoming learning, while also asking students to think of comparisons.

Interpersonal and learning skills:

- Drawing on prior knowledge
- Making connections

Habits of mind:

- Searching for patterns
- Thinking by analogy

Mini-lesson on "Conquest" (Armento et al, 1991). Students take turns reading the text and take note of any examples from the text that also appeared in the Graffiti exercise from Day 2. The lesson explains that victory is not conquest, that conquest involves the conquerors remaining in the lands that they have won, and that conquest involves a mutual borrowing and adaptation of the other's culture. Greece and Rome are compared to 16th century Spain in the New World and the cultural amalgamation that is Latin America. Introduce the idea that over the next few days we will explore both the Greek and Roman empires and address the question as to whether conquerors such as Alexander the Great or Augustus were heroes or villains.

Set the stage for learning more about Alexander. Show a section of the DVD *In the Footsteps of Alexander the Great* that discusses Persia and pause the DVD to fill in details of the history of the Persian Empire and its prior interactions with Greece.

Assessment: Students write a written reflection (300 words) on the following questions: Do leaders lead by force or by persuasion? By command or by consent? (Crompton, 2003; Arthur M. Schlesinger, Jr. introduction). Explain why you feel as you do and provide three examples, one from history, one from personal experience, and one from literature/movies/TV. Due Monday, Day 6.

Day 6: Mini-Lesson on Alexander's approach to Persia. Alexander created a ceremony combining the Persian custom of bowing with the idea that to kiss a fellow man meant you considered him to be an equal. Alexander's intent was to show respect for Persian customs while also showing his men that they were his equals. In the ceremony, first Alexander's men bowed to him and then Alexander kissed each of them. One man,

Callisthenes, refused to bow. This act not only symbolized Alexander's failure to integrate Greek and Persian culture, it also prefigured his loss of the respect and trust of his men. (Shecter, 2006). In this lesson, model the use of a text source to locate an excerpt which sheds light on our essential questions. Students will be engaged in this sort of activity throughout the next two weeks as they conduct their own inquiry.

Group activity: Pair-Share (Baloche, 1998): Students meet with homework buddy to share leadership reflection. In a Waterfall activity, students report on his/her partner's answer to the question and one of their examples.

Pair-Share and Waterfall interpersonal and learning skills:

- Sharing ideas
- Listening carefully
- Paraphrasing
- Asking good questions
- Taking turns

Inquiry-Based Research:

This activity is the heart of the Social Studies unit. It utilizes the Group Investigation format (Baloche, 1998) and supports a number of interpersonal and learning skills as well as habits of mind.

Interpersonal and learning skills:

- Making choices
- Planning
- Asking questions
- Integrating ideas

Central Question:

- **Was the Greek (or Roman) conquest a good/bad thing for the conquered peoples?**

Habits of Mind:

Like any effective inquiry based lesson, this unit addresses most of Martinello and Cook's (1994) habits of mind. These particular habits are most pertinent:

- Finding and Keeping Focus: This unit includes an array of materials ranging widely over Greek and Roman history and culture. Students will need to focus in

on those sections of the material that are pertinent to the inquiry topic. The temptation to range far afield will be hard to resist.

- Asking good questions: Even though this unit features both central questions and key subquestions, students are encouraged to ask their own questions as they seek to understand the impact of culture clashes as a result of conflict. Students have the options to bring into play ideas of metaphor from Language Arts or ideas concerning the science of bridges from Science in proposing alternate areas for inquiry. Even for those students who stick with the suggested central questions, they can expand upon the proposed subquestions as they conduct their inquiry.

- Simplifying questions and problems: The subquestions allow students to break down their inquiry into manageable chunks. There are no easy answers to the essential questions, but the subquestions do have answers that will sharpen student thinking as they approach the big questions again at the end of the unit.

- Thinking fluently and flexibly: Both the unit mini-lectures and the student research will lead to situations where the initial assumptions of the student will be replaced by an "on the other hand" perspective. There are many pieces of the puzzle with each of the central questions under consideration in this unit; students will need to be able to revise their thinking over time.

- Searching for patterns: Particularly for those students comparing the Greek and the Roman empire, the search for patterns is paramount.

- Cooperating and Collaboration: This unit includes both small group and larger group work. Students will learn how their individual research can inform their work on the group project.

Introduce the inquiry-based activity (Martinello and Cook, chapter 7 informs this activity) that will be the centerpoint of the next few days. Students will be addressing the following primary Central Question:

Was the Greek (or Roman) conquest a good/bad thing for the conquered peoples?

Other Central Questions include

What kind of "bridge" did Greece (or Rome) create to forge connections with the other peoples in their empires?

What can we take from the Greek (or Roman) example in building cultural bridges today?

Student teams in a Group Investigation format will select one lens from the following choices in addressing these questions:

- Alexander the Great
- Augustus
- The Greek Empire in general, including the spread of Greek culture and language
- The Roman Empire in general, including the spread of Roman technology and Latin
- Compare/Contrast the Greek and the Roman Empire

Here are the specific subquestions and activities for each of these investigations:

Alexander the Great:

Subquestions:

- Where was Alexander born and how did his early education help shape his ideas?
- Why did Alexander choose to pursue a path of conquest?
- How far did his empire spread at its peak?
- How did Alexander plan to govern an empire so widespread and including so many different cultures?
- What leadership qualities helped Alexander maintain the support of his troops?
- What problems did Alexander encounter over the final years of his life?
- What is Hellenism?
- How did Alexandria, Egypt, show signs of Greek culture and of native culture?

Activities:

Students create an interactive timeline (with PowerPoint or an alternative tool) of Alexander's life with events that speak to his leadership and his interactions with other cultures illustrated on the timeline.

Students conduct a debate from the perspective of one of the peoples conquered by Alexander (one side pro Hellenism, one side anti).

Students use Inspiration or an alternative tool to create a concept map of Alexandria.

Students role play one of the heroic and one of the villainous encounters from Alexander's lifetime.

Students create a map showing the advancement of Alexander's empire, with conquered peoples designated and with positive and negative examples of cultural mixes/clashes identified.

Students create a museum exhibition illustrating Hellenism.

Augustus:

Subquestions:

- What was Augustus' prior name and why was he renamed Augustus?
- What are the Punic Wars and how did they help Rome build an Empire before Augustus?
- Why is Augustus considered the first Roman Emperor?
- What was Augustus's relation with Marc Antony and Cleopatra?
- How did Rome itself change from prior to Augustus's rule once Augustus consolidated power? (This gets at the idea that Rome evolved from Republic to Empire).
- How did Augustus plan on governing an empire so widespread and including s many different cultures?
- What is the Pax Romana?
- What is Greco-Roman culture?
- How did Rome utilize technology to consolidate their empire?
- How did the emperors that followed Augustus affect the fate of the empire?

Activities:

Students create an interactive timeline (with PowerPoint or an alternative tool) of the Roman Empire listing the various emperors with events that speak to their leadership and interactions with other cultures illustrated on the timeline.

Students conduct a debate from the perspective of one of the peoples conquered by the Romans during the Pax Romana (one side pro Greco-Roman culture, one side anti).

Students use Inspiration or an alternative tool to create a concept map of the life and era of Augustus.

Students role play one of the heroic emperors and one of the villainous emperors from the Roman Empire.

Students create a map showing the advancement of the Roman Empire, with conquered peoples designated and with positive and negative examples of cultural mixes/clashes identified.

Students create a museum exhibition illustrating Greco-Roman culture.

The Greek Empire:

Subquestions:

- How did the Greeks build on Alexander's conquests in expanding their empire?
- How far did the Greek Empire spread at its peak?

- How did the Greeks govern an empire so widespread and including so many different cultures?
- What is Hellenism?
- How did the empire show signs of Greek culture and of native culture?
- What caused the downfall of the empire?

Activities:

Students create an interactive timeline (with PowerPoint or an alternative tool) of the Greek Empire with events showing interactions with other cultures illustrated on the timeline.

Students conduct a debate from the perspective of one of the peoples conquered by the Greeks (one side pro Hellenism, one side anti).

Students use Inspiration or an alternative tool to create a concept map of the Greek Empire, including its positive and negative impacts upon the conquered peoples.

Students role play one interaction of the Greeks with another culture.

Students create a map showing the advancement of the Greek Empire, with conquered peoples designated and with positive and negative examples of cultural mixes/clashes identified.

Students create a museum exhibition illustrating Hellenism.

The Roman Empire:

Subquestions:

- How did the Romans govern an empire so widespread and including so many different cultures?
- How far did the Roman Empire extend at its peak?
- What is the Pax Romana?
- What is Greco-Roman culture?
- How did the empire show signs of Greek culture and of native culture?
- How did Rome utilize technology to consolidate their empire?
- What caused the downfall of the empire?

Activities:

Students create an interactive timeline (with PowerPoint or an alternative tool) of the Roman Empire listing the various emperors with events that speak to their leadership and interactions with other cultures illustrated on the timeline.

Students conduct a debate from the perspective of one of the peoples conquered by the Romans during the Pax Romana (one side pro Greco-Roman culture, one side anti).

Students use Inspiration or an alternative tool to create a concept map of the Roman Empire, including its positive and negative impacts upon the conquered peoples.

Students role play one interaction of the Romans with another culture.

Students create a map showing the advancement of the Roman Empire, with conquered peoples designated and with positive and negative examples of cultural mixes/clashes identified.

Students create a museum exhibition illustrating Greco-Roman culture.

Compare/Contrast the Greek and Roman Empire:

Students select subquestions from both the Greek Empire and the Roman Empire list. Students select one activity from the Greek Empire list and one activity from the Roman Empire list and specifically compare the two empires as reflected in the activities.

Students are also free to select either an alternative Central Question and/or an alternative lens, subject to teacher approval. In general, the expectation is that the question and lens will address some aspect of the Greek or Roman Empire and how these empires created bridges to other cultures.

Students spend the remainder of the period examining some of the books and websites assembled (see Student Resources at the end of the Social Studies unit) to aid in their investigations. Students are free to take one book home for the night as well as continue to peruse the web resources. Tomorrow, all students will need to indicate the lens they wish to investigate.

Day 7: A representative from the Arthur M. Sackler Museum at Harvard visits and speaks about Hellenism and Greco-Roman culture, with particular emphasis on artworks that display a merging of the conqueror's and the conquered's cultures. The representative also describes for the students the resources available to them at the college and the museum to further their inquiry.

Following the presentation, students have a few more minutes to spend with the books/websites and then announce the lens they wish to utilize. That evening, form groups based upon shared interests for the Group Investigation activity.

Day 8: Combined lesson with Language Arts/Science&Math. This lesson starts to put together in the students' minds the various activities in which they are engaged. The lesson focuses on metaphor.

During the Social Studies portion of the lecture, show two segments of the Ken Burns video *Brooklyn Bridge*. One segment gives a panoramic summary of the story of its construction, the other shows a number of the artistic representations of the bridge over time, demonstrating how the bridge can be treated metaphorically. Stop the video and elicit student comment on the metaphoric treatments.

Follow up the film with readings of two poems from Hart Crane's collection *The Bridge*. One is "Proem: To Brooklyn Bridge", and includes the metaphor of the bridge as harp and altar. The other is "The Tunnel", a trip through a New York subway tunnel with an overall metaphor of subway tunnel as Hades.

Students share their progress in their actual bridge/metaphorical bridge research paper, modeling for those students who may be having more trouble with this assignment the ways it can be approached.

Day 9: Mini-Lecture on the similarities between Greek and Roman Gods and more generally on how Rome may have conquered Greece but Greek culture "conquered" Rome.

Students read selected scenes from Shakespeare's *Julius Caesar* touching on leadership, on the end of the Roman Republic, and on Antony and Augustus's role in the play compared to the history of the time.

Students spend the remainder of the class meeting with their investigatory groups. Students can choose either individually or in pairs to work on one of the activities associated with their lens. In addition, the entire group selects another of the activities to work on together. Finally, the group as a whole will be presenting their response to the central question, with individual students showing how one of the subquestions helps shed light on the central question.

Day 10: Investigatory groups work together for the entire period.

Homework for the weekend is for students to complete a WebQuest (general background on WebQuests at webquest.sdsu.com). The sites from the investigatory resources are also the resource for the WebQuest. The WebQuest addresses a few general areas of facts important for all the students to know. Half the class is assigned Greece, half Rome.

WebQuest: The sites suggested for the WebQuest can be found at the wiki for Jack Fidler: http://technohumanistteacher.pbwiki.com/The-Greek-and-Roman-Empires

WebQuest Skills:

- Using the Internet for research
- Synthesizing information
- Making judgments

WebQuest Habits of Mind:

- Simplifying questions and problems
- Thinking fluently and flexibly

WebQuest sites**:** All sites, including URLs are in the Resources section at the conclusion of the Social Studies lesson arc.

Day 11: Mini Illustrated lecture on Alexander the Great in art. This exercise includes one art reproduction which the students study as it is projected and then Think-Pair-Share their observation as to how it depicts heroism and what liberties the artist may have taken with the truth. This image represents the mother of Darius accidentally bowing to another, thinking him Alexander. Alexander with good humor tells her his intentions are good, and that she need not concern herself that she made a mistake. She becomes devoted to Alexander.

from http://www.nationalgallery.org.uk

Students pair up to share their WebQuest results, with Greece WebQuest students meeting with Rome WebQuest students.

Investigatory groups work together for the remainder of the period.

Day 12: Mini lesson on Slavery in Greece and Rome. This lesson addresses how both Greece and Rome treated conquered peoples. It also touches upon the idea that, unlike African slavery in the American colonies, many slaves in Greece and Rome were Greeks and Romans.

Students as individuals or in pairs present their activities.

Day 13: Students as individuals or in pairs complete their activities. Any time remaining is used for Group Investigation time.

Day 14: Groups present their activities.

Day 15: Culminating Activity Rope Bridge and concluding reflections. See the Culminating Activity section.

Social Studies Student Resources

Teacher References (see below) also available for student use

Internet (for use in both WebQuest and Inquiry-Based Assignment):

Ancient Civilizations
Social Studies for Kids
http://www.socialstudiesforkids.com/subjects/ancientcivilizations.htm
Ancient Greece
History, mythology, art, war, culture, society, and architecture.
http://www.ancientgreece.com/s/Main_Page/
Ancient Roman History Timeline
http://www.exovedate.com/ancient_timeline_one.html
Augustus Caesar and the Pax Romana
http://www.historyguide.org/ancient/lecture12b.html
BBC
History - Ancient History
http://www.bbc.co.uk/history/ancient/
Capitolium.org
Imperial Forums Official Website - Rome, Italy
http://www.capitolium.org/english.htm
Capitolium.org
Imperial Forums Official Website - Rome, Italy
http://www.capitolium.org/english.htm
Hellenic Alexandria
http://www.greece.org/alexandria/
In the Footsteps of Alexander the Great
Companion Website to the Film
http://www.mpt.org/programsinterests/mpt/alexander/
Internet Ancient History Sourcebook
http://www.fordham.edu/HALSALL/ancient/asbook.html
Kids (K-8) (Alexander the Great on the Web)
http://www.isidore-of-seville.com/alexander/24.html
Roman Emperors Online
Augustus
http://www.roman-emperors.org/auggie.htm
Rome
Republic to Empire
http://vroma.org/~bmcmanus/romanpages.html
Teaching And Learning About Ancient Rome
http://www.teach-nology.com/teachers/subject_matter/social_studies/rome/
The Roman Empire
Children's Section
http://roman-empire.net/children/index.html
The Roman Empire in the First Centure
The Roman Empire | PBS
http://www.pbs.org/empires/romans/empire/index.html

The ten-horned beast
Alexander the Great
http://www.livius.org/aj-al/alexander/alexander00.html
Usborne Quicklinks
Encyclopedia of the Roman World
http://usborne-quicklinks.com/usa/usa_entity_pages/usa_select_page.asp?lvl=1&id=747

Books:

Burgan, Michael (2005). *Empire of Ancient Rome*. New York: Facts on File.

Chandler, Fiona; Taplin, Sam; & Bingham, Jane (2001). *The Usborne Internet-Linked Encyclopedia of the Roman World*. London: Usborne.

Corbett, Scott (1978). *Bridges*. New York: Four Winds Press.

Corbishley, Mike (1989). *Ancient Rome*. New York: Facts on File.

Crompton, Samuel Willard (2003). *Alexander the Great*. Philadelphia: Chelsea House.

Dickinson, Rachel (2006). *Tools of the Ancient Romans*. White River Junction, Vermont: Nomad Press.

Greenblatt, Karen (2000). *Alexander the Great and Ancient Greece*. New York: Benchmark Books.

Mellor, Ronald & McGee, Marni (2004). *The Ancient Roman World*. Oxford, England: Oxford University Press.

Nardo, Don (2003). *Words of the Ancient Romans: Primary Sources*. San Diego: Lucent Press.

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Roberts, Jennifer T. & Barrett, Tracy (2004). *The Ancient Greek World*. Oxford, England: Oxford University Press.

Shecter, Vicky (2006). *Alexander the Great Rocks the World*. Plain City, Ohio: Darby Creek Publishing.

Slavicek, Louise Chipley (2005). *Alexander the Great*. Detroit: Lucent Press.

Williams, Jean Kinney (2005). *Empire of Ancient Greece*. New York: Facts on File.

Social Studies Teacher References

Student Resources (see above) also used in preparing theses lessons

Books:

Armento, Beverly J.; Nash, Gary B.; Salter, Christopher L & Wixson, Karen K. (1991). *A Message of Ancient Days*. Boston: Houghton Mifflin.

Baloche, Lynne A. (1998). *The Cooperative Classroom: Empowering Learning*. Upper Saddle River, New Jersey and Columbus, Ohio: Prentice Hall.

Crane, Hart (1970). *Hart Crane's "The Bridge"*. New York and London: Liveright.

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Massachusetts Department of Education (2003). *Massachusetts History and Social Studies Frameworks*.

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Shakespeare, William (2004). *Julius Caesar: Folger Shakespeare Library*. New York: Washington Square Press.

Websites:

Nationalgallery.org.uk
Nps.gov
Rubistar.com
Webquest.sdsu.edu
Wikipedia.org

DVDs:

Building Big: Bridges (2000). WGBH.

In the Footsteps of Alexander the Great (1998). PBS Home Video

Ken Burns America Collection: Brooklyn Bridge (2004). PBS Home Video

Bridges of the Ancient World Graphic Organizer – Front Side

	1st Bridge Name:	2nd Bridge Name	3rd Bridge Name:
Type of bridge			
Built By			
Benefited who?			
How was it beneficial?			
Harmful to whom?			
How was it harmful?			

Bridges of the Ancient World Graphic Organizer – Back Side

	4th Bridge Name:	5th Bridge Name	6th Bridge Name:
Type of bridge			
Built By			
Benefited who?			
How was it beneficial?			
Harmful to whom?			
How was it harmful?			

WebQuest (Homework assignment following Day 10)

You are a resident of the ancient world in the time of Alexander the Great. Your partner is a resident of the ancient world in the time of Caesar Augustus. Journey back in time at:
http://technohumaniststeacher.pbwiki.com/The-Greek-and-Roman-Empires
and tell us about it:

Describe where you are from (geography, history prior to the Greek Conquest):
Tell us what happened when your people met Alexander in battle:
Tell us three things about Alexander and the Greeks that would make being part of their empire a positive thing: 1. 2. 3.

Tell us three things about Alexander and the Greeks that are negative (include at least one of Alexander's personal weaknesses and at least one reason why the conquest was harmful to your people's culture): 1. 2. 3.
Based upon your research, was the conquest more of a positive or a negative experience for your people? Explain.

WebQuest (Homework assignment following Day 10)

You are a resident of the ancient world in the time of the Roman Empire. Your partner is a resident of the ancient world in the time of Alexander the Great. Journey back in time at:
http://technohumanistteacher.pbwiki.com/The-Greek-and-Roman-Empires
and tell us about it:

Describe where you are from (geography, history prior to the Roman Conquest):
Tell us what happened when your people met the Romans in battle:
Tell us three things about the Romans that would make being part of their empire a positive thing. Include at least one attribute of Caesar Augustus: 1. 2. 3.

Tell us three things about the Romans that are negative (include at least one fact about Caesar Augustus and at least one reason why the conquest was harmful to your people's culture): 1. 2. 3.
Based upon your research, was the conquest more of a positive or a negative experience for your people? Explain.

Rubrics for Social Studies Assignments

Rubrics created in Rubistar, available at rubistar.com

Rubric: Week 1 Writing Assignments

CATEGORY	4	3	2	1
ORGANIZATION	Organizational structure establishes relationship between/among ideas/events.	Organizational structure establishes relationships between ideas/events, although minor lapses may be present.	Organizational structure establishes some relationship between/among some of the ideas/events. The structure is minimally complete.	Organizational structure does not establish connection between/among ideas/events. The overall structure is incomplete or confusing.
ELABORATION	Elaboration consists of specific, developed details.	Elaboration consists of some specific details.	Elaboration consists of general and/or undeveloped details, which may be presented in a list-like fashion.	Elaboration is sparse; almost no details.
CONVENTIONS	Exhibits excellent control of grammatical conventions appropriate to the writing task	Exhibits reasonable control of grammatical conventions appropriate to the writing task	Exhibits minimal control of grammatical conventions appropriate to the writing task	Lacks control of grammatical conventions appropriate to the writing task

Rubric: Week 2 WebQuest

CATEGORY	4 - Above Standards	3 - Meets Standards	2 - Approaching Standards	1 - Below Standards
Evidence and Examples	All of the evidence and examples are specific, relevant and explanations are given for the various questions.	Most of the evidence and examples are specific, relevant and explanations are given for the various questions.	At least one of the pieces of evidence and examples is relevant and has an explanation given for the various questions.	Evidence and examples are NOT relevant AND/OR are not explained.
Support for Position	The conclusion includes multiple pieces of strong evidence that support the position statement.	The conclusion includes at least two pieces of strong evidence that support the position statement.	The conclusion includes at least two pieces of evidence that lend some support to the position statement, at least one of which is strong.	The conclusion includes no strong statements that support the position statement.
Factual Accuracy	All the statements in the report accurately reflect the Web material.	Almost all the statements in the report accurately reflect the Web material.	The report demonstrates a few factual errors.	The report demonstrates a significant amount of factual errors.

Collaborative Work Skills : Inquiry-Based Assignment

CATEGORY	4	3	2	1
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
Contributions	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.
Quality of Work	Final project thoroughly addresses the essential question and a significant number of the appropriate subquestions.	Final project addresses the essential question and touches on at least 3 of the appropriate subquestions.	Final project shows a limited grasp of the essential question or addresses no more than 2 of the subquestions.	Final project fails to address the essential question in any detail or addresses no more than one of the subquestions.

Depending upon the activity of the group's final project, this rubric will add a project specific category (i.e., a debate rubric would include a category for the quality of the debater's oratory style).

Individual/pair project rubrics vary based upon the specific project.

m a t h

Overview:

During this three week unit, students will see how math is integral to building bridges. Most of the math concepts will be used to explain the physical aspects and building of bridges, but will also include interdisciplinary lessons with other subjects where students are connecting their knowledge of physical bridges to the metaphorical use of the word "bridges" in cultures and societies.

Students start out by learning about ratios and proportion as they will be completing scaled-down drawings of their build bridges. Then students learn about trusses and the mathematics that goes hand-in-hand with making trusses that are stable. Lastly, adapted from the Connected Mathematics 2 *Thinking with Mathematical Models* text, students explain, through activities, linear and inverse relationships between strength and bridge thickness and length and more.

MA Curriculum Frameworks:

8.N.3 - Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change.

8.P.1 Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding.

8.P.2 - Evaluate simple algebraic expressions for given variable values, e.g., 3a2 - b for a = 3 and b = 7.

8.P.7 - Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.

8.G.5 - Use a straight-edge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.

Outline:

Day	Class	Homework
1	Cafeteria, Diversity Deck	
2	Proportion and Scaling	
3	Proportion and Scaling Activity	Ratios Practice: http://www.edhelper.com/math/ratios8.htm
4	Integrated Lesson with Science Introduction to Bridge Building	Calculate the number of nodes and members for each truss on handout "Truss Configuration." Does it fulfill equation?
5	Debriefing and review about how Math is used in Bridge Building	NONE, Enjoy the weekend.
6	Introduction to Linear and Inverse Variation. Testing Bridge Thickness	
7	Testing Bridge Lengths	Homework Problems from Book
8	Integrated Lesson – Bridge Metaphors	
9	Extra time for Bridge Building in Science	Homework Problems from Book
10	Bridge Testing with Science	
11	Custom Construction Parts	Homework Problems from Book
12	Integrated Lesson (Math) – Pay Scales and Bridge Weight Variance	
13	Linear Models	
14	X-Marks the Spot Activity	
15	Games	NONE, Enjoy the weekend

Week 1:

Day 1: Diversity Deck in the Cafeteria (all classes)

Day 2: Proportion and Scaling, (two day lesson)

(adapted from http://www.iit.edu/~smart/dvorber/lesson3.htm)

Objectives:

- Identify a proportion
- Test an equation to see if it a true proportion and find the missing term in a proportion.
- Use proportion for finding the reduced scale for a bridge (and other structures)
- NOTE: Most (if not all) of this should be review for 8th graders, but will help them in their orthographic drawing of their bridge in science.

Lesson:

- Ratio – a comparison of two quantities.
- Ask students to give examples of ratios. What is the ratio of boys to girls in this classroom? What is the ratio of people wearing jeans to those not wearing jeans? Etc.
    - Stand in a circle with students. Ask students to come up with different ratios describing the people in their class (color shoes, hair color, age, etc).
- Proportion – also a comparison of two quantities. The ratio 5 to 1 is the same as 10 to 2 and 15 to 3.
- Ask students how they decide if two ratios are a proportion. Discussion. Students will see the relationship between equivalent fractions and two ratios that are proportional to each other.
- Testing to see if two ratios are proportional
    - Reducing to lowest terms
    - Cross multiplication
- Discussion. What if a term is missing? For example, 5/9 = x/27?

- Go over real life applications of proportions:
    - Maps, blueprints, and scale models. An appropriate ratio, or scale, is chosen. Large objects or areas can then be shown in a considerably smaller size or space. Movies frequently use scale models of ship, planes, buildings.
    - Medicine dosages are frequently related to the weight of the patient, so the dosage must be increased proportionally to weight.
    - Recipes or formulas may be increased or decreased by using proportions.
    - Economic and sociological predictions based on the relationship of two quantities.

Day 3: Activity Using Scaling in Real-Life Bridges (continued from Day 2) - (http://www.emints.org/ethemes/resources/S00001541.shtml)

- Students will be working in groups of two to complete the following activity.
- Information on each bridge will be provided unless there is access to computers for all groups.
- Students will convert the actual height of skyscrapers or the actual length of bridges and tunnels into a reduced scale of inches. The scale you will use is 50 feet = 1inch; this is the ratio of 50/1. Round all answers to the nearest hundredth.
- To find the actual height or length, click on the name of the structure. Remember to keep the order of the terms the same in both proportions.

Name of structure	Actual height or length	Scale
John Hancock Center		
Chrysler Building		
Petronas Tower		
Sears Tower		

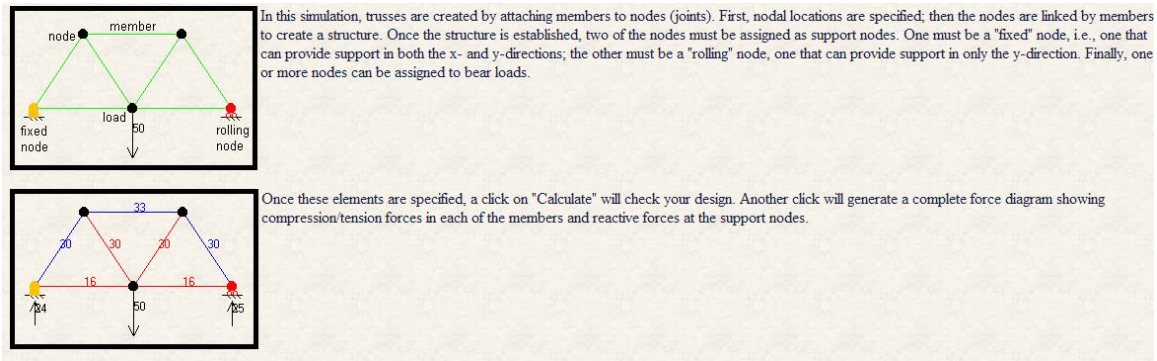
Citicorp Center		
Sunshine Skyway Bridge		
Firth of Forth Bridge		
Golden Gate Bridge		
Akashi Kaikyo Bridge		
New River Gorge Bridge		
Channel Tunnel		
New York Third Water Tunnel		
Central Artery/Tunnel Project		
Seikan Tunnel		
Underground Canal		

- Application to Science Activity of Building Bridges
    - How will this help with the orthographic drawing of their bridge for poster?

Day 4 – Integrated Lesson with Science - An Introduction to Bridge Building: Students will be covering some basic information and background about building bridges (http://www.jhu.edu/virtlab/bridge/truss.htm).

- Three Basic Bridge Types (see SCIENCE activities)
- Truss Designs (see SCIENCE activities)
- Bridge Designer (adapted from http://www.jhu.edu/virtlab/bridge/truss.htm)
    - Online program that allows students to design their own trusses)
    - Trusses have high strength to weight ratio
        - Quick Discussion with class. What does that mean?

- Trusses are created by attaching members to nodes (joints).



- Stable Trusses
  - There is a formula/equation for a determinate, stable truss where M = members and N = nodes.
  - Ask students to work in their groups to try to find an equation that works.
  - Equation is M + 3 = 2*N. Talk class through it.
  - Bridge Designer will not work if this equation is not met.
- Go over Directions and Specification to make structure
  - First, nodal locations are determined and then load are linked by members to create a structure.
  - Two nodes must be assigned as support nodes
    - One must be fixed (provide support in both x- and y- direction)
    - Other must be a rolling node (only provide support in the y-direction)
  - One or more nodes can be assigned to bear loads.
  - Once elements are specified, click on “Calculate”. Another click will give you a complete force diagram showing compression/tension forces in each of the members and reactive forces at the support nodes.
- Brief discussion about what they learned and how they think it will help them building their bridges.

- Discuss (briefly) the factors the influence bridge design:
    - Length of the bridge
    - Load it must carry
    - Strength of the riverbed earth
    - Effect of river current or oceantide on the supports
    - Effect of wind, rain temperature, and other weather conditions
    - Time required to build the bridge
    - Cost of building materials and labor (MATH)
- Use of Wooden Models
    - Bridge builders often use scale (MATH activity from days 2+3) models of their bridges to test their designs.
    - What do you think the model would test?
    - How is what we're going to do in class mimic real-life bridge makers?

Day 5 – Debriefing and Review of Week 1

- Ratios and Proportions
    - Scaling, Design of Bridge and Orthographic Drawing
- Truss Designs
    - Triangle – where else do you see it in architecture? (roof supports, space stations, etc)
    - M + 3 = 2*N
- Orthographic Drawing
    - Extra time in Friday's class will be devoted to students work on drawing.

Week 2:

Day 6 - Introduction to Linear and Inverse Variation (Adapted from Connected Mathematics 2 Textbook *Thinking with Mathematical Models*)

Questions to Start Students thinking. Read to class and discuss.

- How is the thickness of a steel beam or bridge related to its strength?
- How is the length of a beam or bridge related to its strength?
- The equation $c = 4 + 0.10t$ give the change c in dollars for renting a paddle boat for t minutes. For how long can you rent a paddle boat if you have $12?
- If you were getting paid for the bridge you're building in science, what's an equation you think you could use to give to your client to show them how much you want to get paid?
- The cost for a group of students to go on an overnight field trip to a nature center is $750. Describe the shape of a graph relating the number of students to the cost per student.

Testing Bridge Thickness

- Amount of weight a beam can support is related to its thickness, length and design. To design a bridge, engineers need to understand these relationships.
- How do you think the thickness of a beam is related to its strength? Do you think this relationship is linear?
- What other variables might affect the strength of a bridge?

Instructions for Brick-Thickness Experiment

Equipment:

- Two books of the same thickness
- A small paper clip
- About 50 pennies
- Several 11-inch by 4.5-inch strips of paper

Instructions:

- Start with one of the paper strips. Make a "bridge" by folding up 1 inch on each long side.
- Suspend the bridge between the books. The bridge should overlap each book by about 1 inch. Place the cup in the center of the bridge.

- Put pennies into the cup, one at a time, until the bridge collapses. Record the number of pennies you added to the cup. This number is the breaking weight of the bridge.
- Put two new strips of paper together to make a bridge of double thickness. Find the breaking weight for this bridge.
- Repeat this experiment to find the breaking weights of bridge made from three, four, and five strips of paper.
- Record data in a table.

After Experiment:

- Make a graph of your (bridge layers, breaking weight) data.
- Does this relationship between bridge thickness and breaking weight seem to be linear or nonlinear? How is this shown in the table and graph?
- Suppose you could split layers of paper in half. What breaking weight would you predict for bridge 2.5 layers thick? Explain.
- Predict the breaking weight for a bridge 6 layers think. Explain reasoning.
- Test your prediction (if time permits)

Connection to Bridge Building in Science –

- Will this experiment help with your bridge construction in science? How?

Day 7 – Testing Bridge Lengths (adapted from Connected Mathematics 2 textbook *Thinking with Mathematics Models*)

Testing Bridge Lengths

- Yesterday, you (students) tested paper bridge of various thicknesses. You found that thicker bridges are stronger than thinner bridges.
- How do you think the length of a bridge is related to its strength?
- Are longer bridges stronger or weaker than shorter bridges?

Instructions for Bridge Length Experiment

Equipment

- Two books of the same thickness
- A small paper cup
- About 50 pennies
- 4.4 inch wide strips with lengths 4, 6, 8, 9, and 11 inches.

Instructions

- Make paper bridges from the strips. For each strip, fold up 1 inch on each of the 4.5 inch sides.
- Start with the 4-inch bridge. Suspend the bridge between the two books as you did before. The bridge should overlap each book by about 1 inch. Place the paper cup in the center of the bridge.
- Put pennies into the cup, one at a time, until the bridge collapses. Record the number of pennies you added to the cup. As in the first experiment, this number is the breaking weight of the bridge.
- Repeat the experiment to find the breaking weights for the other bridges.
- Record data in a table.

After Experiment

- Make a graph of your data.
- Describe the relationship between bridge length and breaking weight. How is that relationship shown by patterns in your table and graph?
- Use your data to predict the breaking weights for bridges of lengths 3, 5, 10 and 12 inches. Explain how you made your predictions.
- Compare your data from this experiment with the data from the bridge thickness experiment. How is the relationship between bridge thickness and breaking weight similar to the relationship between bridge length and breaking weight? How is it different?

Day 8 – Integrated Lesson (all classes) – Bridge Metaphors.

- Groups discuss the following:

  1) How have bridges between different nations effected our history? the use of language? the development of societies throughout history?

  2) How do you build bridges between different "things"? Those things could be different types of land, peoples, cultures, sexes, languages, etc.

  3) What are the criteria you're looking for in this bridge (could start by discussing the bridges they're building in science)? What does the bridge have to sustain? How long does it have to last?

  4) What's so complicated about bridges anyhow? How come they are so hard to make (for both physical and metaphorical bridges)?

  5) Discuss the meanings of bridge building terms and how they relate to bridges between people.

  6) Why are bridges so important? What happens when bridges break or fall? Can they ever really be repaired... will people ever have true confidence in that bridge again?

Day 9 – Extra time for Bridge Construction

- Since testing of Bridges is on Day 10, students have math period to work on construction
- If they are done construction, students can work on poster

Day 10 – Bridge Testing

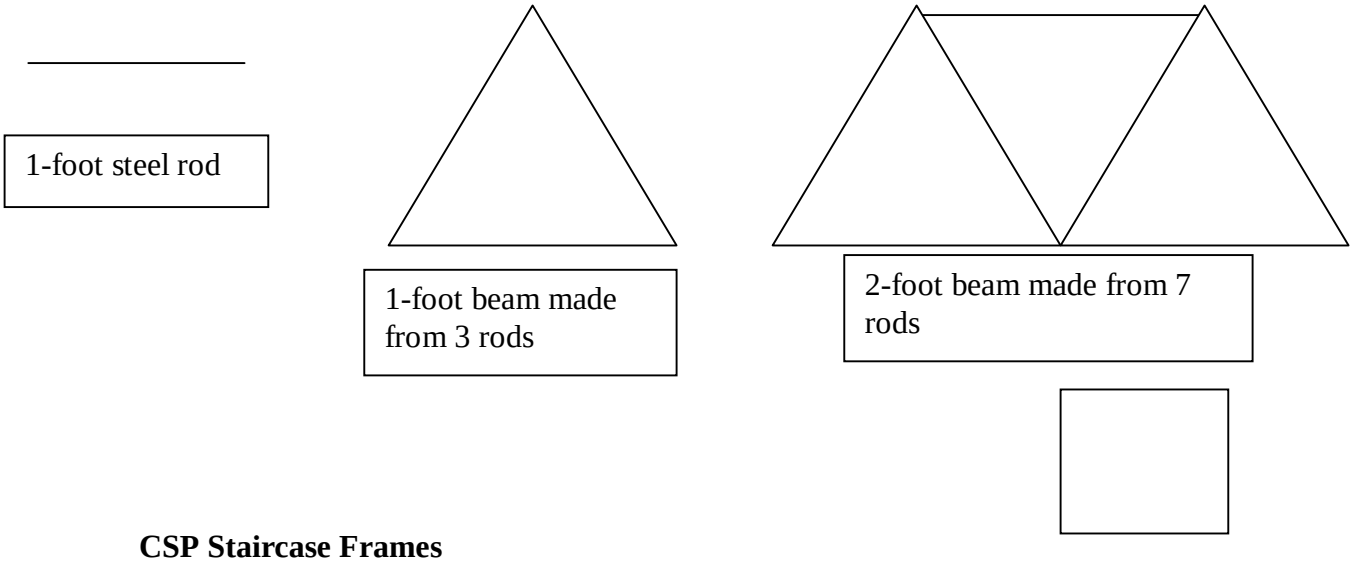
Week 3

Day 11 – Custom Construction Parts

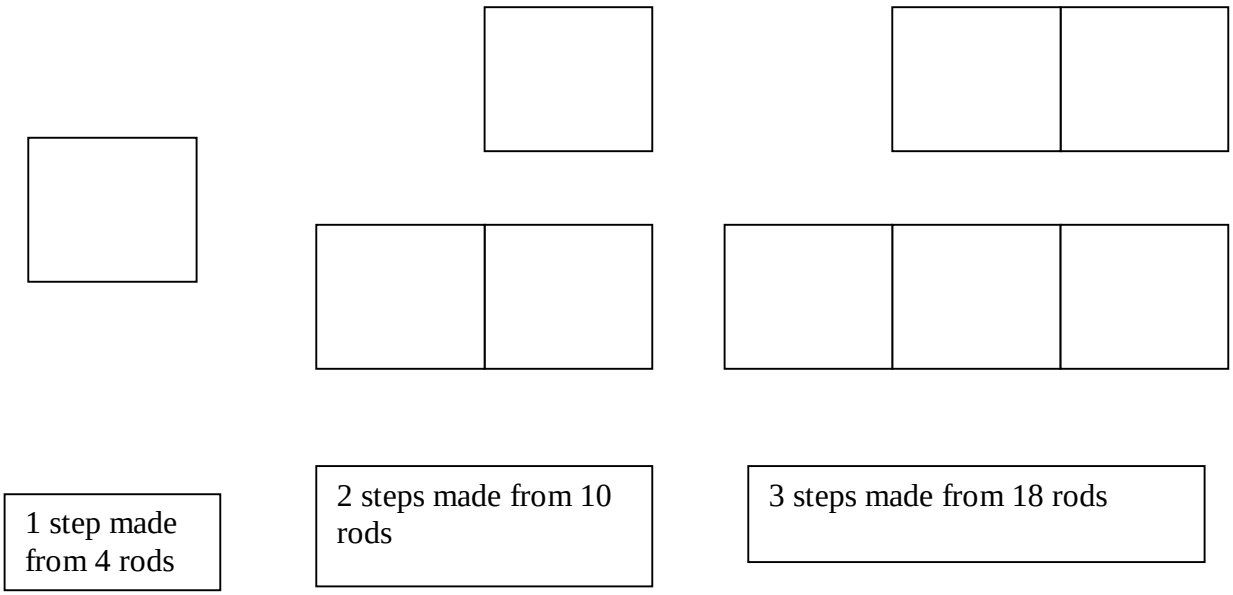
Introduction to Activity

- Suppose a company called Custom Steel Products (CSP for short) provides construction materials to builders. CSP makes beams and staircase frames by attached 1-foot-long steel rods in the following patters:

CSP Beams



CSP Staircase Frames



Exercises

CSP Beams

- Complete the following table in groups of 4 showing the number of rods in beam of different lengths up to 8 feet.
- Make drawings or use toothpicks (that would stand for a 1-food-long steel rod) if you choose to

Beam Length (ft)	1	2	3	4
Number of Rods	3	7		

- Make a graph of the data in your table
- Describe the pattern of change in the number of roads as the beam length increases.
- How is the pattern you described shown in the table? How is it shown in the graph?
- How many steel roads are in the beam of length 50 feet? Explain.

CSP Staircase Frames

- Complete the following table in groups of 4 showing the number of rods in staircase frames with different number of steps up to 8.
- Make drawings of use toothpicks or make drawings if you choose to

Number of steps	1	2	3	4
Number of Rods	4	10	18	

- Make a graph of the data in your table
- Describe the pattern of change in the number or rods as the number of steps increases.

- How is the pattern you described shown in the table? How is it shown in the graph?
- How many steel roads are in a staircase frame with 12 steps?

Day 12 – Integrated Lesson with Math

- Pay Scales
    - Students will have recorded the total number of hours (inside and outside of school) they've worked on their bridge.
    - We'll calculate "incomes" at different pay scales in an x,y table:
        - Flat fee
        - $10/hr, $20/hr, $30/hr, etc
        - Initial fee plus an hourly charge.
    - What are the equations (y = mx + b) for each pay scale
    - What would you have charged?
- Students will have estimated the weight their bridges will support – and will check the variance after the contest. Graph and compare:
    - Who guessed the best? (lowest variance)
    - Who guessed the worst (greatest variance)

Day 13 – Review of Exploring Data Patterns.

- Go over problems that students struggled with.
- Review of linear and nonlinear patterns in tables and graphs
- Describing data patterns using works and symbols
- (Maybe) Short Quiz for Understanding

Day 14 – X marks the Spot activity (adapted from http://ims.ode.state.oh.us/ODE/IMS/Lessons/Web_Content/CMA_LP_S04_BI_L08_I14_01.doc)

Pre-assessment (see Linear vs. Nonlinear Pre-assessment handout)

- The pre-assessment determines the extent of students' prior knowledge of linear and nonlinear functions, as well as direct and inverse variations, before the activity X Marks the Spot Activity occurs.
- Students will initially work individually, and then with a partner, to identify numerical, graphical and verbal representations as linear or nonlinear. Following a whole class discussion, students identify those representations which also represent direct variations. Students informally explore the difference between direct and inverse variations.

X Marks the Spot Activity

- Facilitate the *X Marks the Spot* data collection activity, which provides a hands-on introduction to direct variations.
  - Distribute Attachment C, *X Marks the Spot Activity Sheet*.
  - Provide an overview of the activity and directions.
  - Instruct students to start making "X's" on a blank sheet of writing/notebook paper after the count of 3 (1-2-3) for five seconds.
  - Have students count the number of "X's" made in five seconds.
  - Instruct students to record his/her individual tally on in the table on the *X Marks the Spot* activity sheet. Have students predict how many "X's" they can make in 10 seconds and 20 seconds, based on their results for five seconds.
  - Repeat the data collection procedure for 10, 15, 20, 25 and 30-second intervals.

Instructional Tip:

Students with limited fine-muscle control may need to make a mark other than "X" or perform a different task, such as tapping a pencil or pressing a key on a computer keyboard or use an assistive technology tool.

1. Direct student attention to the remaining sections of the activity sheet. Have students plot the results of the data collection on the grid provided and respond to the analysis questions.

a. Assist students, as needed, in recognizing that the table of values provides data that can be described using ordered pairs: number of seconds, number of "X's"
b. Monitor progress and provide assistance as needed when students plot data and begin the analysis. Some students may need guidance in making the graph; e.g., deciding which data represents the independent variable (number of seconds) and deciding what intervals to uses on the axes (how many seconds and how many "X's each "tic" mark should represent).

2. Facilitate a discussion about the relationships evident in the data. See sample responses for the questions on Attachment D, *X Marks the Spot Answer Key.* Bring closure to the activity using summary and probing questions, such as:

Why did today's activity produce data with a linear-like relationship between variables? *It takes approximately the same amount of time to make each "X". There is an approximate constant rate of change.*

- Does everyone's graph look the same? Linear? *Students may have used different intervals and students have different skill levels or rates for making the "X's." It is likely that all data might not be perfectly linear.*
- What factors might have contributed to the data not being perfectly linear? *Possible factors include a tired hand and human error in timing.*
- Not only does this activity produce linear-like results, it produces a direct variation. Why? *The data set contains the point (0,0) -- (0 seconds, 0 "X's")*

Day 15 - Games

- Students have been working hard and been working on a lot of projects and presentations. Students will have the class period to:
    - Play card games
    - Connect Four
    - Uno
    - Other games that teacher may have

Math Appendix

Linear vs. Nonlinear Pre-Assessment

- Cut out the following representations.
- Determine whether each relationship represented by the tables, equations, graphs and written descriptions is linear or nonlinear.
- Place each item in the appropriate column on your "Linear vs. Nonlinear Worksheet"

1.

x	0	3	6	9
y	2	6	10	14

2.

x	0	1	2	3
y	0	2	4	6

3.

x	1	2	4	5	10	20
y	20	10	5	4	2	1

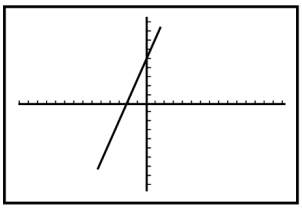
4. $y = 2x$

5. $y = 2x + 5$

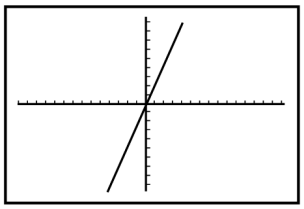
6. $xy = 20$

7. $y = x^2$

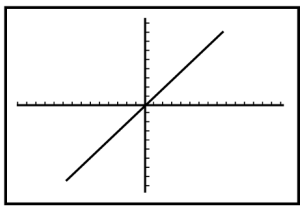
8.



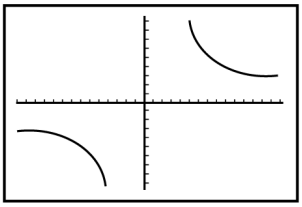
9.



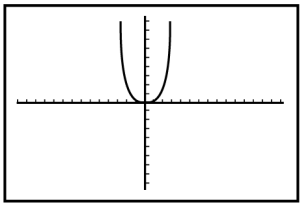
10.



11.



12.



13. The length and width of rectangles with areas of 20 square units
14. The number of hours and the distance traveled when driving in a car at a constant rate of 60 mph
15. The number of touchdowns scored in a football game and the points scored (from touchdowns)

Linear vs. Nonlinear Activity Sheet (continued)

Name _____ **Date** _____

<u>Linear</u>

Linear vs. Nonlinear Activity Sheet (continued)

Name _____ **Date** _____

<u>Nonlinear</u>

Notes:

X Marks the Spot Activity Sheet

Name: _____ Date: _____

Group Members

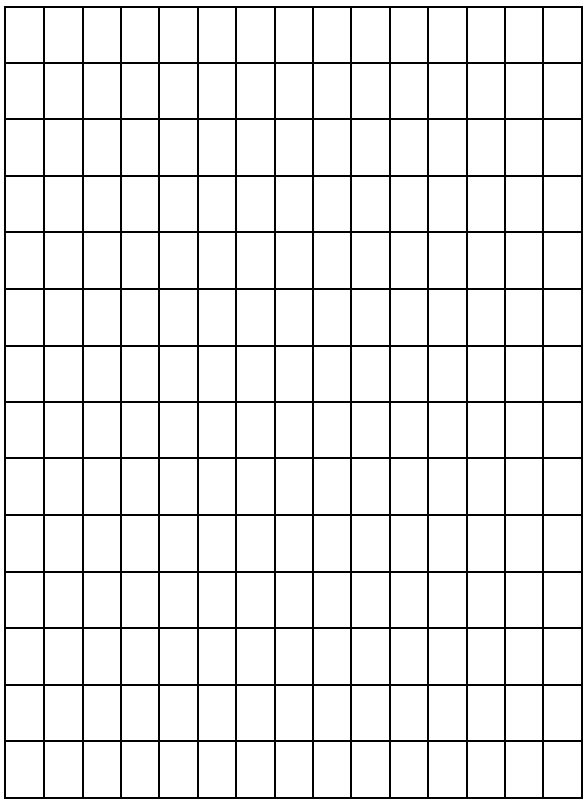
_____

Record the number of X's made during each time period in the table and plot the data points.

1. Record data in the table below:

Number of Seconds	**Number of "X's"**
0	0
5	
10	
15	
20	
25	
30	

2. Plot the data points on the grid below:



Analysis:

3. Describe the relationship between the number of seconds and the number of X's.

4. Explain why it may be expected that this data collection activity to produce linear-like results.

5. How could the data collection process be changed so that non-linear results would be obtained?

X Marks the Spot Activity Sheet (continued)

6. Explain why the activity produced a direct variation relationship.

7. How could the data collection process be changed so that the results would still be linear, but not a direct variation?

8. Complete the following table of values.

x	0	1	2	3		
y	0	5	10		20	

Explain why the table represents a direct variation.

9. Describe a situation that could be represented by the table in question 8.

X Marks the Spot Answer Key

Name: _____ Date: _____

Group Members

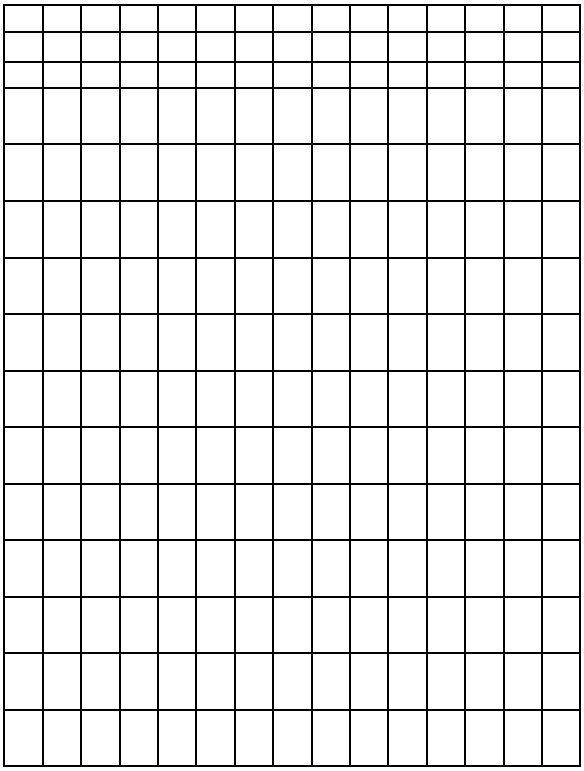
_____

Record the number of X's made during each time period in the table and plot the data points.

1. Record data in the table below:

Number of Seconds	**Number of "X's"**
0	0
5	
10	
15	
20	
25	
30	

2. Plot the data points on the grid below:



Answers will vary. Both should reflect linear-like relationships.

Analysis:

3. Describe the relationship between the number of seconds and the number of X's.

   The number of X's increases as the number of seconds increases. Some students may describe the relationship using a specific rate; e.g., can draw 20 X's for each 10 seconds.

4. Explain why it may be expected that this data collection activity to produce linear-like results.

   It takes approximately the same amount of time to make each X. There is an approximate constant rate of change.

Attachment D (continued)

X Marks the Spot Answer Key

5. How could the data collection process be changed so that non-linear results would be obtained?

   Answers may vary. Students could make or draw a different object during the time periods; e.g., draw Xs during the 5-second time period, dots during the 10-second time period, and stick figures during the 20-second time period.

6. Explain why the activity produced a direct variation relationship.

   The data includes the point (0,0) – (0 seconds, 0 X's)

7. How could the data collection process be changed so that the results would still be linear, but not a direct variation?

   Answers may vary. The students could draw 10 X's before the timing begins for each trial.

8. Complete the following table of values.

x	0	1	2	3	*4*	*5**
y	0	5	10	*15*	20	*25**

** Answers may vary.*

Explain why the table represents a direct variation.

The table is a direct variation because it is linear (has a constant rate of change of 5)and passes through the origin (0,0).

9. Describe a situation that could be represented by the table in question 8.

Answers will vary.

S c i e n c e

Overview:

During this three week Making Bridges unit, modeled after the Midwest Products Co. program, students will be engaging in a model bridge building program. The unit will be mainly focused on the physical aspects and building of bridges, but will also include interdisciplinary lessons with other subjects where students are connecting their knowledge of physical bridges to the metaphorical use of the word "bridges" in cultures and societies.

Students start out by learning about different types of bridges and truss designs and investigate a real bridge of their choosing. Students will then be designing, testing and evaluating their own bridge. Students will conclude by presenting their bridge building process to the class.

Students will be graded on the following: Research Paper, Bridge Results, Bridge Poster and Bridge Presentation.

MA Curriculum Frameworks:

Technology/Engineering:

5.1 Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.

5.2 Identify and describe three major types of bridges (e.g., arch, beam, and suspension) and their appropriate uses (e.g., site, span, resources, and load).

5.3 Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.

5.4 Describe and explain the effects of loads and structural shapes on bridges.

Outline:

Day	Class	Homework
1	Cafeteria, Diversity Deck	
2	Integrated Lesson on "Bridges", Movie, Research Paper	Read Article on Charles River Bridges (http://www.masspike.com/bigdig/background/crb.html), Choose Bridge to Research
3	Bridge Building: Research	Continue Research/Work on Bridge Research Paper
4	Integrated Lesson with Math - Introduction to Bridge Building	Choose truss design you'd want to use for bridge. Why?
5	Bridge Building	Plan Poster Board Layout (don't need to put in data)
6	Bridge Building	State goal and input – possible solutions. Finish up Research Paper
7	Bridge Building	
8	Integrated Lesson – Bridge Metaphors	
9	Bridge Building (also given time in math to finalize building)	
10	Testing Bridge	Data Chart
11	Feedback – Testing	Evaluation of Solutions
12	Integrated Lesson (Math) – Pay Scales and Bridge Weight Variance	
13	Prepare Poster Board + Presentations	Continue Preparation
14	Presentations	Implement Feedback
15	Presentations	Implement Feedback

Habits of Mind:

- Open-minded, willing to change your mind in the face of reliable evidence, and respect another's point of view.
- Look at a matter from many sides before drawing a conclusion. Do not jump to conclusions or decide on the basis of one observation; deliberate and examine until you are as sure as you can be.
- Keep records of investigations and observations and do not change the records later.
- Recognize when comparisons might not be fair because some conditions are not kept the same

Lessons and Activities:

Week 1:

Day 1: Diversity Deck in the Cafeteria (all classes)

Day 2: Integrated Lesson on Bridges (Introduction to Bridges and Research Project)

- Students will be watching the first part of the miniseries Building Big about bridges.
    - (From PBS website: http://www.pbs.org/wgbh/buildingbig/desc.html#bridge) How does a bridge withstand the forces of nature and traffic? Host David Macaulay takes viewers from the stone arch bridges of the Roman Empire to Japan's giant, all-steel Akashi Kaikyo suspension bridge, the longest in the world. Through the epic sagas of the Brooklyn, Golden Gate, and other great bridges, Macaulay shows how engineers have conquered ever-wider spans with better construction materials and innovative designs. **Program highlights:** Brooklyn Bridge, San Francisco's Golden Gate Bridge, Tacoma Narrows Bridge, Japan's Akashi Kaikyo Bridge, Gustave Eiffel's Garabit Bridge, Scotland's Firth of Forth Railway Bridge
- During the movie, I want students to be looking listening jotting down or thinking about:
    - Vocabulary they are unsure about (these might include span, truss, types of bridges, etc)
    - Engineering design process

- Impact the bridge had

Day 3: Bridge Research (Integrated project with English)

- Students choose bridge to research (list provided by www.pbs.org). Bridges can include (link to bridge), but are not limited to:
  - Akashi Kaikyo Bridge
    Brooklyn Bridge
    Charles River Bridge
    Chesapeake Bay Bridge-Tunnel
    Firth of Forth Bridge
    Garabit Viaduct
    George P. Coleman Bridge
    Golden Gate Bridge
    Iron Bridge
    New River Gorge Bridge
    Sunshine Skyway Bridge
    Tacoma Narrows Bridge
    Tower Bridge
- Students need identify the following:

  1) Name of Bridge, Where it's located (or was located), When it was Opened, How long it took to Build

  2) Type of Bridge (Beam, Cable-Stayed, Cantilever, (Truss), Arch or Suspension)

  3) Statistics on the bridge (Cost, Length, Purpose, Longest Span, Engineer who build it)

  4) Any other interesting facts about this bridge that you've read about (Construction Difficulties, What is was made to withstand)

  Extra Credit) Forces that act on the specific type of Bridge (tension, compression, torsion, bending and shear)

- Students will be graded on this project based on a rubric. Student will be provided rubric.

Day 4 – Integrated Lesson with Mathematics - An Introduction to Bridge Building: Students will be covering some basic information and background about building bridges (Midwest Products Co, Inc., Teaching with Model Bridge Building Programs).

- Three Basic Bridge Types
    - Student will be given handout "Basic Bridge Types"
    - Students will look at the basic types of bridges – Beam, Arch and Suspension.
    - Discussion:
        - What forces (push or pulls) need to be balanced in the different types of bridges.
        - Downward Forces (weight and gravity) and upward forces (the supports).
- Truss Designs
    - Students will be given handout "Truss Designs"
    - Trusses are just combinations of triangles.
        - Where else in architecture to you see triangles?
    - With pieces of cardboard and fasteners, students will construct triangles and squares and compare their strength (how easily they collapse).
    - Does anyone have a truss design in a bridge they've studied
    - Can you see how the triangle shape is used in these trusses to strengthen and distribute downward (weight, gravity) forces?
- Bridge Designer (see MATH activities)
- Discuss (briefly) the factors the influence bridge design:
    - Length of the bridge
    - Load it must carry

    - Strength of the riverbed earth
    - Effect of river current or oceantide on the supports
    - Effect of wind, rain temperature, and other weather conditions
    - Time required to build the bridge
    - Cost of building materials and labor (SCIENCE AND MATH ACTIVITY, DAY 12)
- Use of Wooden Models
    - Bridge builders often use scale (MATH Lesson/Activity done on Days 2+3) models of their bridges to test their designs.
    - What do you think the model would test?
    - How is what we're going to do in class mimic real-life bridge makers?

Day 5 – Poster Board Presentation and Contest Rules

- Poster Board and Presentation Discussion
    - Presentations will be starting two weeks from today.
    - Posterboard from each group must include: Title, Goal, Hypotheses, Output (Data Chart and Graph), Materials, Processes, Orthographic Projection (scaled drawing), Research, Conclusion, Bibliography. Can also include Applications, Feedback
- Contest Rules
    - Students can choose to work independently or in groups of 2 to 3.
    - Students will be given handout "Truss Technology" for Builders and are asked to at pick a truss configuration.
    - Students will be given 15 pieces of balsa wood and 2/3 to 1 oz. of wood glue.
    - Students will be given the handout "Student Instructions" that specify dimensions and rules. Dimensions:

	Bridge	Roadbed	Optional Overhand
Length	250 to 300mm	200 to 300mm	Less than 180mm
Width	50 to 75 mm	50 to 75 mm	50 to 75 mm
Height	Less than 100 mm	Less than 50 mm	Less than 20mm

Week 2:

Days 6, 7, and 9 – Designing plans and construction process

- Things to keep in mind:
  - Students have to include plans for their bridge in 4 views:
    - End
    - Side
    - Roadbed
    - Topview
    - This must be submitted for approval before construction begins.
  - After students' drawing is approved, they will be allowed the following materials:
    - Large piece of cardboard to work on.
    - Straight pins, to hold pieces together as glue dries.
    - Single Edge Razor or X-Acto® knife for cutting (go over safety)
    - Ruler
    - Balsa wood and wood glue

Day 8 – Integrated Lesson (all classes) – Bridge Metaphors.

- Groups discuss the following:

  1) How have bridges between different nations effected our history? the use of language? the development of societies throughout history?

2) How do you build bridges between different "things"? Those things could be different types of land, peoples, cultures, sexes, languages, etc.

3) What are the criteria you're looking for in this bridge (could start by discussing the bridges they're building in science)? What does the bridge have to sustain? How long does it have to last?

4) What's so complicated about bridges anyhow? How come they are so hard to make (for both physical and metaphorical bridges)?

5) Discuss the meanings of bridge building terms and how they relate to bridges between people.

6) Why are bridges so important? What happens when bridges break or fall? Can they ever really be repaired... will people ever have true confidence in that bridge again?

Day 10 – Bridge Testing

- On the day of the testing, two testing platforms (two desks will work) will be placed with 200mm (20cm) between them. Also needed:
    - 49mm x 49mm x 7mm wood plate, with a HEAVY screw-eye hook anchored securely in the center
    - Heavy rope or cable
    - Metric Scale
    - Large, sturdy bucket, with hand that is secure
    - Plenty of weighted items (weights, brick, sand, etc.)
- Complete before Testing:
    - Attach ~18 inches of rope to the bucket handle, weigh the assembly and mark the weight (in kg) on the bucket (with masking tape).
    - Weigh items and mark with masking tape.
- Students will estimate the amount of weight their bridges will support (used for math lesson in Week 3)

- Record the necessary information on spreadsheet below:
    - Before the bridge breaking/testing occurs, bridges will be evaluated on:
        - Accurate Specifications
        - How closely it matches the blueprint.
        - Overall appearance/neatness
    - Weigh the bridge (grams)
    - Place the bridge in position, spanning the 200mm gap between the two testing platforms.
    - Position the 49mm x 49mm plate on the roadbed, and suspend the bucket
    - At 30 second intervals, add weights to the bucket
    - Designed record keeper (or teacher if deemed necessary) will record the weight of the bridge, watch to be sure the 30 second rules is adhered to and record the maximum load supported by the bridge.
    - The last weight that the bridge holds for 30 second will be considered the maximum load.

		Meets Requirements			Weight of Bridge	Maximum Weight Supported	Engineering Effeciency Rating (to be done in math)	Bartlett Effeciency Rating (to be done in math)
	Name of Student	Specifications	Matches Blueprint	Neatness				
1								
2								
3								
4								

<u>Week 3</u>

Day 11 – Additional Testing Time and Feedback

- After testing is completed, as a class, students will discuss:
    - Testing Results
    - What went well
    - What didn't go well
    - What could you have done to your bridge to improve on it
    - Suggestions from other class members

Day 12 – Integrated Lesson with Math

- Pay Scales
    - Students will have recorded the total number of hours (inside and outside of school) they've worked on their bridge.
    - We'll calculate "incomes" at different pay scales:
        - Flat fee
        - $10/hr, $20/hr, $30/hr, etc
        - Initial fee plus an hourly charge.
    - What are the equations (y = mx + b) for each pay scale
    - What would you have charged?
- Students will have estimated the weight their bridges will support – and will check the variance after the contest. Graph and compare:
    - Who guessed the best? (lowest variance)
    - Who guessed the worst (greatest variance)

Day 13 – Prepare poster board and presentation

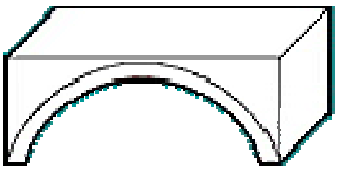
Day 14 – Presentations

Day 15 – Presentations

Science Appendix:

BASIC BRIDGE TYPES:

http://www.thesolutionsite.com/lesson/5506/brinfows.htm



Arch Bridge

Arch bridges are one of the oldest types of bridges and have great natural strength. Instead of pushing straight down, the weight of an arch bridge is carried outward along the curve of the arch
to the supports at each end. These supports, called the abutments, carry the load and keep the ends of the bridge from spreading out.

When supporting its own weight and the weight of crossing traffic, every part of the arch is under compression. For this reason, arch bridges must be made of materials that are strong under
compression.

The Romans used stones. One of the most famous examples of their handiwork is the Pont du Gard aqueduct near Nîmes, France. Built before the birth of Christ, the bridge is held together by mortar only in its top tier; the stones in the rest of the structure stay together by the sheer force of their own weight.

Today materials like steel and pre-stressed concrete have made it possible to build longer and more elegant arches, including a spectacular 1700 foot span in New River Gorge, West Virginia. (More typically, modern arch bridges span between 200-800 feet.)

Constructing an arch bridge can be tricky, since the structure is completely unstable until the two spans meet in the middle. One technique is to build elaborate scaffolding, or "centering," below the spans to support them until they meet. A newer method supports the spans using cables anchored to the ground on either side of the bridge. In situations where there is an active water or road way below, this method allows contractors to build without disrupting traffic.

Beam Bridge

A beam or "girder" bridge is the simplest and most inexpensive kind of bridge. According to Craig Finley of Finley/McNary Engineering, "they're basically the vanillas of the bridge world."

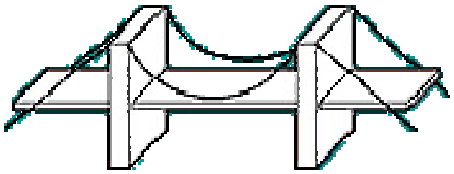
In its most basic form, a beam bridge consists of a horizontal beam that is supported at each end by piers. The weight of the beam pushes straight down on the piers.

The beam itself must be strong so that it doesn't bend under its own weight and the added weight of crossing traffic. When a load pushes down on the beam, the beam's top edge is pushed together (compression) while the bottom edge is stretched (tension).

Pre-stressed concrete is an ideal material for beam bridge construction; the concrete withstands the forces of compression well and the steel rods imbedded within resist the forces of tension. Pre-stressed concrete also tends to be one of the least expensive materials in construction. But even the best materials can't compensate for the beam bridge's biggest limitation: its length.

The farther apart its supports, the weaker a beam bridge gets. As a result, beam bridges rarely span more than 250 feet. This doesn't mean beam bridges aren't used to

cross great distances -- it only means that they must be daisy-chained together, creating what's known in the bridge world as a "continuous span."



Suspension Bridge

Aesthetic, light, and strong, suspension bridges can span distances from 2,000 to 7,000 feet -- far longer than any other kind of bridge. They also tend to be the most expensive to build. True to its name, a suspension bridge suspends the roadway from huge main cables, which extend from one end of the bridge to the other. These cables rest on top of high towers and are secured at each end by anchorages.

The towers enable the main cables to be draped over long distances. Most of the weight of the bridge is carried by the cables to the anchorages, which are imbedded in either solid rock o massive concrete blocks. Inside the anchorages, the cables are spread over a large area to evenly distribute the load and to prevent the cables from breaking free.

Some of the earliest suspension bridge cables were made from twisted grass. In the early nineteenth century, suspension bridges used iron chains for cables. Today, the cables are made of thousands of individual steel wires bound tightly together. Steel, which is very strong under tension, is an ideal material for cables; a single steel wire, only 0.1 inch thick, can support over half a ton without breaking.

Cable-Stayed Bridge

Cable-stayed bridges may look similar to suspensions bridges -- both have roadways that hang from cables and both have towers. But the two bridges support the load of the roadway in very different ways. The difference lies in how the cables are connected to the towers. In suspension bridges, the cables ride freely across the towers, transmitting the load to the anchorages at either end. In cable-stayeded bridges, the cables are attached to the towers, which alone bear the load.

The cables can be attached to the roadway in a variety of ways. In a radial pattern, cables extend from several points on the road to a single point at the top of the tower. In a parallel pattern, cables are attached at different heights along the tower, running parallel to one other.

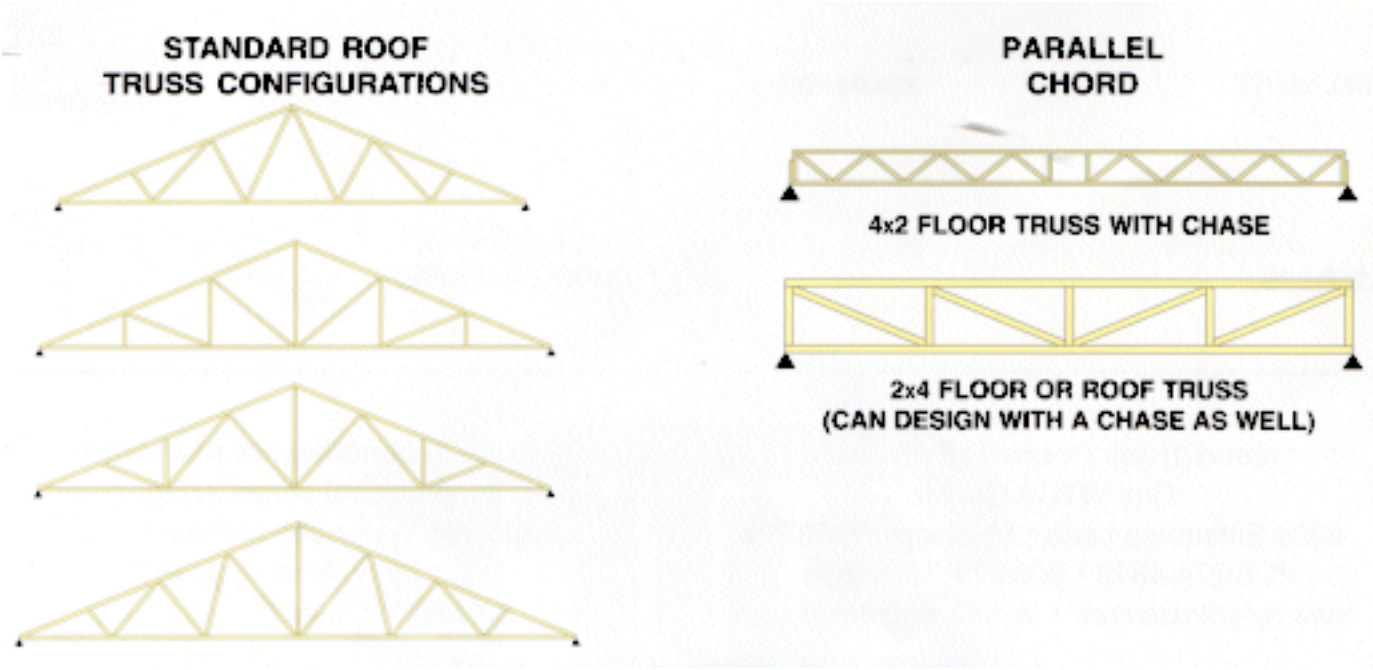
For medium length spans (those between 500 and 2,800 feet), cable-stayeds are fast becoming the bridge of choice. Compared to suspension bridges, cable-stayeds require less cable, can be
constructed out of identical pre-cast concrete sections, and are faster to build. The result is a cost-effective bridge that is undeniably beautiful.

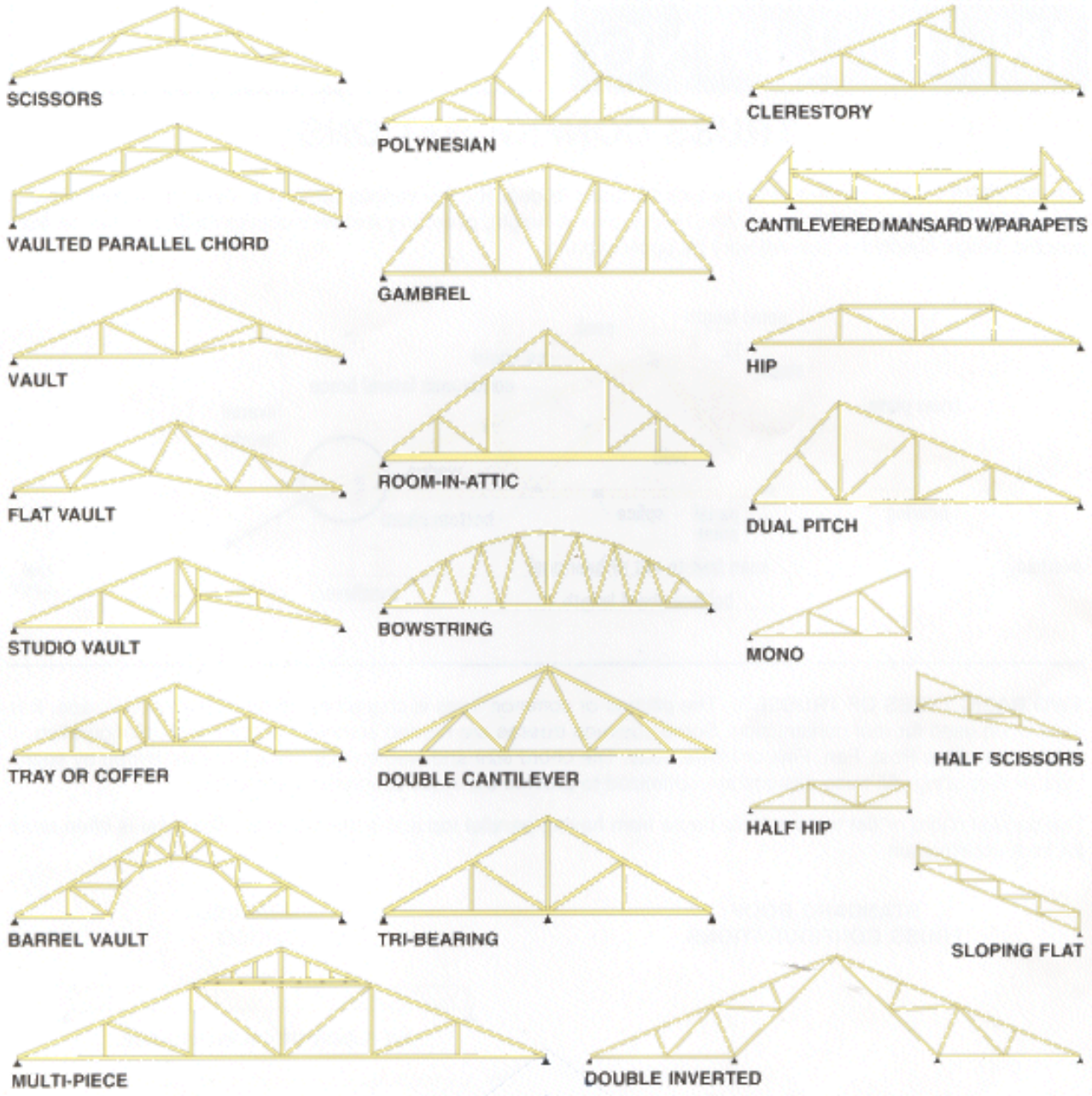
TRUSS DESIGNS

www.trussnow.com

Two Basic Types of Trusses

The pitched or common truss is characterized by its triangular shape. it is most often used for roof construction. Some common trusses are named according to their web configuration, such as King Post, Fan, Fink or Howe Truss. The chord size and web configuration are determined by span, load, and spacing. All truss designs are optimized to provide the most economical application.




SCISSORS
POLYNESIAN
CLERESTORY
VAULTED PARALLEL CHORD
CANTILEVERED MANSARD W/PARAPETS
GAMBREL
VAULT
HIP
ROOM-IN-ATTIC
FLAT VAULT
DUAL PITCH
STUDIO VAULT
BOWSTRING
MONO
TRAY OR COFFER
DOUBLE CANTILEVER
HALF SCISSORS
HALF HIP
BARREL VAULT
TRI-BEARING
SLOPING FLAT
MULTI-PIECE
DOUBLE INVERTED

Unified Arts- Art

Objectives:

1. Use historical or modern architecture as a model for artistic interpretation.

2. Incorporate different artistic tools to illustrate writing.

3. Understand how art allows students to make connections to different people, cultures, time periods, and academic disciplines.

Guiding Questions: How do a culture's beliefs and customs affect the art? Does art influence architectural structure? What is the importance of symbols, colors, and design when creating personal art?

Students will be able to: Describe and explain how the characteristics of a society or culture influenced works of art. Analyze a piece of work by comparing it to a work from another time or another culture. Create, present and/or perform a work of art by selecting, using and combining artistic and cultural elements.

In seventh grade, the art curriculum will include many elements of art and color theory. The students will continue to paint in watercolor, acrylic and other mediums such as paper mache and clay. Students will study drawing techniques (e.g., such as perspective) as well as art history and architecture. The seventh graders will be involved in several cross-curricular projects between art and the subjects of science, math, social studies, and ELA in order to enhance their classroom-learning environment and to further explore the essential question.

Week 1: After the engaging activities, the art classes will meet to discuss the relationship of bridges to the arts- culturally, architecturally, and historically. Over the first couple of

periods of the unit, students will take a bridge they are learning about in social studies or math and re-create it in an artistic form- this will be done using an art form called repousse. This process is an ancient form of art in which a design is pressed into a sheet of metal to create a 3-deminsional surface (much like a stained glass window but without the glass). Stemming from Social Studies, this form is relative to the bronze Ancient Greeks used when decorating armor. In this middle-school friendly version, students use a matte-black aluminum foil sheet and extra-soft colored pencils.

Procedure:

Period 1: Students use the blueprints from math class to draw preliminary drawings on thick paper. The class will review ratio, scale, proportion, and symmetry during preliminary sketches, and the final project must show the grasp of those concepts. During the art project, students have to understand that the lines they draw will become thick, black, embossed lines. Therefore, students have to pay close attention to the blueprint lines, and go over them with black marker to show future effect. Although this is an artistic representation, drawings must include proper and accurate portrayals of the chosen bridge. Students must demonstrate an appreciation of the literal bridge through representation of the bridge's arch, beam, span, stay, suspension, tension and truss, while using creativity to emboss designs.

Period 2: Students center drawing on the metal sheet, and transfer their sketches directly onto the back of the piece, varying the weight of pencil use to create embossed designs, and blending colors to enhance the dimensions. This allows for creative interpretation- the color of the bridge, the sky, and the surrounding landscape.

Period 3: With drawings complete, students turn the piece face down, cut away the metal sheet and fold sides over to create a thicker frame. Use classroom tools to smooth the sides and corners and make sure project is secure.

Week 2: During the second week, the students incorporate cultural interpretations of bridges, focusing on their own family cultures mixing with their personal identities. Each student will use the poem written in ELA as inspiration for the accompanying illustration. Through modeling, the teacher will show a final project of the poem "Bridges" by William Marr. During this week, students explore the artistic approaches of texture in art and emotion in art and in writing.

Procedure: Students will use poetry as artistic inspiration, and paint their own version of their poem on a cardboard frame using tempera mixing mediums. Students will mount their edited writing in an opening cut from the cardboard frame, this will be set back to create dimension in the piece. The cutout part showcases expression in writing and the blank cardboard is a canvass for artistic expression.

Period 1: On the cardboard frame, students lightly sketch their artwork. Using paint they go over the sketch, making creative changes through the process (changes in depth of tones and variety of textures).

Period 2: Once the initial painting is drawn, students use craft sticks to add and spread thick paint to create a dimensional effect on painted objects that the student feels needs emphasis. For example, a dark poem might use additional texturing and deeper colors to emphasis an ominous sky (an abstract interpretation of a literal poem), or a lighthearted

poem might have a painting with whimsical additional textures. Students are learning how to add texture as an artistic tool to an otherwise one-dimensional painting. Additional creative changes include adding different textures or small items to the painting, including thicker paint, glitter, yarn, feathers, and/or beads.

Period 3: Students then return back to their poetry and re-write it using different colored pencils, fonts, and direction (could be written vertical, horizontal, just main words, etc). Finally, students fit the poem into the back of the cardboard painting (much like a picture into a frame) and add small scraps of cardboard around the back of the writing window.

Week 3: Students are working to complete their creative approaches of bringing the realistic to the abstract (artistic interpretations of concrete, architectural bridges into repousse drawings), and the literal to the metaphorical (poetry to creative interpretation). At the week's end there will be a gallery walk to conclude the unit, and the students will display the work completed in art, as well as its connections to the other subjects.

Standards:
Standard 6: Purposes and meanings in art, includes architecture. Interpret meaning.
Standard 7: Role of art in cultures and society (ELA), past and present (Social Studies)
Standard 10: Interdisciplinary Connections to other subjects

Unified Arts - P.E.

Overview: In Physical Education students will be engaged in physical, teamwork activities that call for each member of the team to help motivate and direct their peers, and to participate in a variety of roles. Students explore risk, leadership, communication, problem solving, and coaching. The trust built during the three week P.E. unit will develop the skills and create the teamwork necessary for the culminating activity.

Objectives: Students will learn to trust one another and provide physical as well as emotional support during physical challenges. Students will challenge themselves and their peers. Students will understand how communication and teamwork helps them meet individual and group goals.

Skills Developed: Communication skills, collaboration, teamwork, ability to follow instructions, ability to give directions.

Week 1

Period 1: Trust Lean- In random pairs, one student becomes the faller and the other the catcher. Teach methods for spotting, falling, and catching. Start at small falls and build to bigger ones. Period ends with a debriefing- ask: what made you feel more or less trusting?

Period 2: Trust Fall- Involves a student standing at desk height, falling backwards into classmates below (arms outstretched and interconnected). Brings the Trust activity from the previous period into a full class activity.

Week 2

Period 1: Bridge Activity- Conducted outside or in the gymnasium. Students are split into four teams and can choose from a variety of materials placed in the center of the area. Each team has to create a path from one platform to another using simple materials.

Period 2: Bridge Activity Continued- Building on what was learned in the previous period, the four teams are mixed to make two larger teams. Using the given materials, each team creates a longer path between the platforms, and the two teams' bridges must meet in the middle in a secure fashion. Each student then walks across the class-made bridge to the other side (no higher off the ground than a foot).

Week 3

Period 1: Rock climb- Students, attached to harnesses, climb a rock wall (in the gym). Only three students try at one time, and must trust other students to hold their ropes on the ground and keep the harness secure. Students cheer each other on and provide emotional support and direction during this physical challenge.

Period 2: Ropes course- Culminating activity. At a designated ropes course activity site, students incorporate the skills developed in prior periods and depend on each other for direction and physical and moral support while participating in low level challenges (such as crossing beams between trees) and high level challenges (such as crossing a log suspended 20 feet above ground). These activities force students outside of their physical and emotional comfort zones, while fostering teamwork and promoting communication.

Standards:
Through the study of personal and social competency students will:
2.14: Apply advanced movement concepts and beginning game strategies to guide and improve individual and team performance.
2.15: Demonstrate strategies for inclusion of all students in physical activity settings related to strength and speed.

Guiding Principle IV: Comprehensive health education contributes to the capacity of students to work in a positive manner with families, school staff, peers and community members to enhance personal health and create a safe and supportive environment where individual similarities and differences are acknowledged.

Guiding Principle V: Comprehensive health education is strengthened through collaboration and partnerships among all components of the coordinated school health program and other subjects.

Culminating Activity – Ropes Course

Students engage in thematic, inquiry-learning activities throughout the Bridges integrated unit. Academic and team building activities encourage students to explore the essential questions. Student collaboration during this curriculum unit incorporates the importance of negotiation, mutual respect, risk taking, and intercultural dialogue and appreciation. While this unit spans just three weeks, the invaluable lessons serve as a foundation for the rest of the academic year. The culminating activity is a ropes course challenge, an outdoor team event that involves the students in a closing activity similar to the active involvement of the engaging activity. The ropes course enables students to grow at both the team and individual levels, and through this activity students explore risk, leadership, communication, problem solving, and coaching. Stemming on the trust and team building activities used throughout the unit, the ropes course challenge focuses on collaboration. The challenge calls for each member of the team to participate in a variety of roles and responsibility, thus building interdependence and improving communication.

Guiding Questions: What is the difference between the low ropes course and the high ropes course? Is one more challenging than the other? How does one force you to depend and trust others more than the other? What makes crossing the suspended bridge/log difficult? What makes building cultural bridges and crossing them difficult?

Materials: Helmets, ropes course venue, itinerary, appropriate attire, safety harnesses

Procedure: Begin with meeting in cafeteria (where engaging activity began) and cover safety training and overview of rules and expectations. Proceed to ropes course site. The ropes course begins at the low level, using beams between trees and team support to help classmates go from one platform to another. This builds trust and comfort with the activity. In small teams, students engage in rope activities challenges that require teamwork to climb up, across, and down. One trust activity the students will participate in is a wall climb- where students must help one another climb a high wall and get over the side. The ropes course main challenging activities are at the high level, about 20 feet or higher in the air. While building confidence in the lower activities, students will move onto other challenges such as the activity in which students cross a log that is suspended about 20 feet off of the ground. While completely safe and harnessed, this gives the impression of risk, and requires students to rely on one another for direction, and physical as well as moral support. After each course the facilitator will lead a debriefing discussion about individual and team experiences.