

## **The Fascination of Bridges and How They Relate to a First Grader**

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What People need and what they want may be different...  
Teachers are those who educate the people to appreciate the things they need.  
Elbert Hubbard

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### **Overview:**

I have created a creative curriculum unit for my project relating to the fascination of bridges and how they relate to a first grader. Pittsburgh Public Schools are required to complete an Everyday Math, Macmillan Reading, Foss Science, and social studies curriculum. Each subject needs to be covered thoroughly with specific information needed to be taught. The unit I have created will intertwine throughout the curriculums. Each subject of reading, math, science, social studies, and art will involve not only the subject matter needed to be taught but, why Pittsburgh has so many bridges, how they were built, who built them, why we need them, and the different structures of the bridges. The curriculum unit will begin at the start of the school year.

I will introduce the children to Pittsburgh's bridges through each subject. I would like the students to first take a look at the many different bridges Pittsburgh has. The unit will begin with a discussion with the students about all of the bridges they see or pass over each day. We would talk about the number of bridges Pittsburgh has. We will make a chart. We would read a few books about bridges. I would like to choose books that are

not about Pittsburgh bridges specifically. I would like to first expose the children to other cities. I would do this because I would like to generate a discussion based on what they see and what other places have. We would notice differences and similarities in Pittsburgh's bridges and the books' pictures and descriptions. We will make a Venn Diagram to go along with our discussion that we can use later on.

In the first grade students' Everyday Math curriculum there are so many things that we can do that surround bridges. I will discuss the measurements of the bridges with the children. For example, we can discuss the length, the width, and the height measurements of all of the different bridges that we see. We will discuss the geometric shapes and patterns that the bridges display. We will discuss how long they think it will take them to walk across through estimation. We will count the number of bridges Pittsburgh has. We will count them in different ways as well, for example by ones, fives, tens, etc. We can make a graph of our favorite bridges.

In science the first grade students have a curriculum called FOSS. This curriculum is based on Balance and Motion. This will fit in perfect because the children will be able to discuss the importance of why balance is needed for building and maintaining the bridges. We will be able to make a model as a whole group of a Pittsburgh bridge. We can test out the balance and motions of the bridge to see if it will pass or fail. I would also like the children to build their own bridges within a group of four students. The students will work together to come up with an idea, build it and test it.

In social studies the children have a curriculum that is based on community. The children and I will have a discussion of how bridges connect communities and how bridges have developed communities. I will teach my students about the importance of bridges and the connections made for all of the people in the Three Rivers. For example, bridges allow people to get around and without them, they would not be able to get to certain places. Making real world connections is important to a small child's mind.

Art will revolve around all of the other subjects within the classroom. I do not teach the children their specific art class, but I will teach the children the aesthetic views of all of the bridges. The children will still be able to appreciate the beauty of the bridges. We will discuss the different pictures or statues that they may see on some of the bridges. When discussing the bridges, we will take note of the beauty and the uniqueness that each bridge will display. When the children have to build their bridge, they will have to add some kind of "beautiful" touch to it, to make it unique. They will see all of this beauty through pictures that I will show them of the different Pittsburgh bridges.

## **Rationale**

I have written this particular curriculum unit because I believe that exposing children to the different aspects of their city will make them better persons. I believe that if the children are shown what their city is about and how it pertains to them, they will have a better appreciation for what they have. I believe in exposing the children to everything and anything that is possible. This unit will open the children to new aspects of their city that they may never have been exposed to. This unit will also expose the children to other parts of the world and how it compares to their city.

I have created a creative curriculum unit for my project relating to the fascination of bridges and how they relate to a first grader. Pittsburgh Public Schools are required to complete an Everyday Math, Macmillan Reading, Foss Science, and social studies curriculum. Each subject needs to be covered thoroughly with specific information needed to be taught. The unit I have created will intertwine throughout the curriculums. Each subject of reading, math, science, social studies, and art will involve not only the subject matter needed to be taught but, why Pittsburgh has so many bridges, how they were built, who built them, why we need them, and the different structures of the bridges. The curriculum unit will begin at the start of the school year.

I will introduce the children to Pittsburgh's bridges through each subject. I would like the students to first take a look at the many different bridges Pittsburgh has. The unit will begin with a discussion with the students about all of the bridges they see or pass over each day. We would talk about the number of bridges Pittsburgh has. We will make a chart. We would read a few books about bridges. I would like to choose books that are not about Pittsburgh bridges specifically. I would like to first expose the children to other cities. I would do this because I would like to generate a discussion based on what they see and what other places have. We would notice differences and similarities in Pittsburgh's bridges and the books' pictures and descriptions. We will make a Venn Diagram to go along with our discussion that we can use later on.

## **Objective:**

I plan to incorporate the Board of Education's standardized guidelines and focus for this project while utilizing the Macmillan, Everyday Math, FOSS, and First Grade Social Studies curriculums. This unit will have optimum value when utilized at the beginning of the year and continued throughout.

Primarily, I will establish a sense of what the children know about their city and bridges. Beginning at the start of the school year, while introducing the new concepts in each curriculum, I will find a sense of what the children know about bridges and their city. In the Macmillan curriculum I will do this by reading books about bridges, showing pictures of bridges throughout our city, and showing different pictures of our city's landmarks. I would like to show the students the other pictures because this may help them to become more familiar with where they live and what surrounds them.

In addition, the students will be able to use the school's library to look at other books on bridges in different cities to set up information to be filled into their Venn Diagram. I feel the exposure to different areas will give them an idea of what their city not only has but what other cities consist of. They will be able to bring their books back to the classroom to show each other the pictures and discuss what they have found out. We will then compile the information from the stories that I read to them about Pittsburgh bridges and their information that they learned about other cities bridges to complete the Venn Diagram.

Next, I would like to discuss bridges in the students' Everyday Math curriculum. I will do this by taking a look at the pictures of bridges from the books and then looking at the different geometric shapes and patterns. We will take measurements of the bridges in inches and centimeters and compare. Also, discuss the width and height of the different bridges. We will discuss estimation by talking about how long they think it will take them to walk along each of the bridges in the pictures. We will count the number of bridges Pittsburgh has. We can count them in different ways as well, such as by ones, fives, tens, etc.

In the student's first grade FOSS curriculum they will take a look at the balance and motion that the bridges consist of. We will discuss the importance of why balance is needed for building and maintaining bridges. We will make a model as a whole group of a "new" Pittsburgh bridge. The children will be able to take a vote on a name. We will test out the balance and motions of the bridge to see if it will pass or fail. The students will then build their own bridge within a group. They will come up with their own ideas, build it and test it.

In the students' community theme based social studies curriculum, we will have a discussion of how bridges connect communities and how they have developed them. We will make real world connections, by thinking about our own communities and if there weren't any bridges, what would happen? I would also like to tie in the naming aspect of their bridges (previous science paragraph). I would like to discuss why their community chose the names that they did, what is the significance?

The students' art will involve all aspects of the project. I will teach the students the aesthetic views of all the bridges and the importance of it. When building their own

bridges they must add some type of “beauty” to it. It must make the bridge unique.

After completion of this unit, I believe the students will be proud of what they have learned and their accomplishments. I believe they will be able to transfer ideas to future endeavors. This unit, *The Fascination of Bridges*, and *How They Relate to First Grader* will inspire thought-provoking ideas, that although may be tedious at the outset, but the outcome is essential to continued creative development.

The goal of this exciting curriculum unit is to stimulate a student’s imagination through, reading, math, science, social studies, and art.

## **Strategies**

At the beginning of the school year I will discuss with the students that during each part of their curriculum, they will be discussing something that has to do with bridges and their city. There will be an introduction to the city of Pittsburgh and its bridges and landmarks. We will have a discussion involving all of the bridges they have seen in Pittsburgh.

I can introduce the children to Pittsburgh’s bridges through each subject. I would like the first graders to first take a look at the many different bridges Pittsburgh has. I would have to begin this unit by, first, starting a discussion with the students about all of the bridges they see and or pass over each day. We would talk about the number of bridges Pittsburgh has. We will make a chart. We would read a few books about bridges. I would like to choose books that are not about Pittsburgh bridges specifically. I would like to first expose the children to other cities. I would do this because I would like to generate a discussion based on what they see and what other places have. We would notice differences and similarities in Pittsburgh’s bridges and the books’ pictures and descriptions. We will make a Venn Diagram to go along with our discussion that we can use later on.

In the first graders’ Everyday Math curriculum there are so many things that we can do that surround bridges. I can discuss the measurements of the bridges with the children.

For example, we can discuss the length, the width, and the height measurements of all of the different bridges that we see. We will discuss the geometric shapes and patterns that the bridges display. We can discuss how long they think it will take them to walk across through estimation. We can count the number of bridges Pittsburgh has.

In science the first graders have a curriculum called Foss. This curriculum is based on Balance and Motion. This will fit in perfect because the children will be able to discuss the importance of why balance is needed for building and maintaining the bridges. We will be able to make a model as a whole group of a Pittsburgh bridge. We can test out the

balance and motions of the bridge to see if it will pass or fail. I would also like the children to build their own bridges within a group of four students. The students will work together to come up with an idea, build it and test it.

In social studies the children have a curriculum that is based on community. The children and I will have a discussion of how bridges connect communities and how bridges have developed communities. I can teach my students about the importance of bridges and the connections made for all of the people in the Three Rivers. For example, bridges allow people to get around and without them, they would not be able to get to certain places. Making real world connections is important to a small child's mind.

Art will revolve around all of the other subjects with in the classroom. I do not teach the children their specific art class, but I can teach the children the aesthetic views of all of the bridges. The children will still be able to appreciate the beauty of the bridges. We will discuss the different pictures or statues that they may see on some of the bridges. When discussing the bridges, we will take note of the beauty and the uniqueness that each bridge will display. When the children have to build their bridge, they will have to add some kind of "beautiful" touch to it, to make it unique. They will see all of this beauty through pictures that I will show them of the different Pittsburgh bridges.

## **Classroom Activities**

### **Background Information**

Before this curriculum unit begins, the routines and guidelines will already be in place in the classroom. The background information regarding the unit will be covered initially.

### **Reading Lessons**

\*These lessons, depending on your class, can take as long as needed to have a full understanding of the lesson. The lessons can be adapted as needed.

In a circle on the carpet begin a discussion about the city they live in. Make a list of the things they know about their city and what they see. This could be buildings, roads, parks, etc. Show and read to the children books about Pittsburgh and introduce the photos of Pittsburgh. Ask the children what these photos they are looking at are all about. The photographs you will show are the bridge photos (See Appendix A). Proceed to tell the children they are going to begin a yearlong lesson on bridges in Pittsburgh and around the world. Proceed to tell them that each of their core curriculums will also include activities and projects about bridges.

Begin to introduce the children to photos and books of bridges throughout the United States and other parts of the world (See **Appendix B**). Make a Venn Diagram about the similarities and differences of the Pittsburgh bridges and the other bridges they have viewed (See **Appendix C**).

The students will then make a written chart about their findings. This will be recorded in their bridge journal that the teacher has made prior to the lessons. The journal cover can be decorated. The information recorded in their journal will be used for reference throughout the year's lessons. The first assignment to be recorded in the journal will be the similarities and differences they have found between the sets of pictures. The first will be in a written chart and the second will be the Venn Diagram we have put together on large chart paper.

Next, the students will make predictions about what they think they will be doing throughout the year in regards to bridges. Again, depending on grade level, the depth of information will vary. In first grade and many grades this will be done together and copied by the children from the chalkboard or chart paper to their bridge journal. The children can draw pictures of their predictions as well.

The children will be asked to use the journal throughout the lessons to record information in all subjects. The journal will be used for sloppy copies in writings and drawings and to record information in Science, Math, and Social Studies.

The students will write several writings throughout the lessons. Their first writing will be about what they have learned just from the pictures they have been shown about Pittsburgh bridges and the other bridges throughout the United States and the world. The writings when they have reached final drafts will be displayed on a special bulletin board or wall dedicated to their bridge lessons. There can be several writings depicting what they have learned about the different activities they have accomplished.

Leave the different photographs and books in a designated area just for the bridge activities. These should also be easily accessible, as all bridge materials, for the students as needed.

### **Math Lessons**

\*These lessons, depending on your class, can take as long as needed to have a full understanding of the lesson. The lessons can be adapted as needed. See Appendix D

At the beginning of the school year when reintroducing counting and shapes, begin to discuss with the children the idea that they can use their counting skills to count the many different bridges that our city has. They can use their different counting strategies to

count the bridges, such as by ones, fives, tens, twos, skip counting, and counting backwards. You will need the Pittsburgh Bridge pictures only for reference at this point, but can introduce the other bridges they have discovered and compare in numbers.

When displaying the pictures, whether the photographs they have hanging up or the pictures from the books have the children begin to discover and point out the different geometric shapes they have learned. They can point out squares, triangles, rectangles, circles, trapezoids, etc. The children can make graphs in reference to their favorite shapes they have discovered. The students can then use pattern blocks to make a flat bridge. The students can name their bridge and make a picture in their bridge journal to remember what they have made. They can also do a writing to go along with their picture describing what they have done and how they did it. You can do this several times for the children may want to make different bridges each time.

Next, the children can discuss estimation (you can fit this in at the time you are teaching estimation). The students can estimate how long it will take to walk over certain bridges. The students can pick several bridges to compare and make an estimation chart in regards to their estimations. You can also do this several times; comparing different bridges each time.

Other lessons that can be done are picking your favorite bridge and making a graph of it. This can be displayed in your special area designated to bridges. The students can discuss the length, the width, and the height measurements of all of the different bridges that they have discovered. Make a chart with this information and display it in the designated area.

The bridge activities can be incorporated throughout all of the math lessons as needed.

### **Science Lessons**

\*These lessons, depending on your class, can take as long as needed to have a full understanding of the lesson. The lessons can be adapted as needed.

See **Appendix E**

While following the first graders Science curriculum called Foss, complete the required focus on Balance and Motion while fitting in bridges. The students will be able to discuss the importance of why balance is needed for building and maintaining the bridges. The students will be able to make a model as a whole group of a Pittsburgh bridge. We can test out the balance and motions of the bridge to see if it will pass or fail.

I would also like the children to build their own bridges within a group of four students. The students will work together to come up with an idea, build it and test it. The students will be able try out materials with popsicle sticks, playdough, toothpicks, or

straws. The students will use their bridge journals to help document materials needed and used and the steps needed to follow the directions in making the bridge. Again, based on grade level, this can be done individually or as a whole group. Words and pictures will work.

### **Social Studies Lessons**

\*These lessons, depending on your class, can take as long as needed to have a full understanding of the lesson. The lessons can be adapted as needed.

See **Appendix F**

In first grade social studies the children have a curriculum that is based on community. The children will have a discussion of how bridges connect communities and how bridges have developed communities. The teacher can teach his/her students about the importance of bridges and the connections made for all of the people in the Three Rivers. For example, bridges allow people to get around and without them, they would not be able to get to certain places. Use the big books provided and get more community oriented books about Pittsburgh and show why it is so important to have bridges for them to get around. Make pictures depicting their communities and where they go outside of their community using bridges. Make a community mural with a large bridge linking the pictures of their communities.

### **Art Lessons**

Art will be incorporated throughout the entire unit. It will be depicted throughout the murals, journals, and the walls showing all the charts and information made from what the students have learned.

### **Bibliography**

#### **Student Bibliography**

Bunting, Eve. 2006. Pop's Bridges. A story about Robert's father who is a 'skywalker' who builds The Golden Gate Bridge.

Brown, David J. 2005. Bridges: Three Thousand Years of Defying Nature. A story about presenting the technical and artistic achievements in the creation, design, engineering, construction and social history of more than 100 bridges, from the Ancient World to the 21st century.

Cortright, Robert S. 2003. Bridging the World. A story about a remarkable gallery of lavish photographs which elevate bridges from pieces of the roadway to pieces of art.

Cortright, Robert S. 1998. Bridging: Discovering the Beauty of Bridges. A story of 283 colorful pictures that cover 20 centuries and 16 countries across North America and Europe, concentrating on structures with striking aesthetic features

Curlee, Lynn. 2001. Brooklyn Bridge. A story that celebrates a monumental feat of engineering and craftsmanship, and makes clear the human contributions behind it. Completed in 1883, the Brooklyn Bridge's "stone towers" were the most massive structures on the continent, its span was by far the longest in the world.

Graf, Bernhard. 2005. Bridges That Changed the World. A story about a pictorial list of 50 spans, Graf's album exalts both famous and utterly obscure bridges. By including rope bridges in Nepal, and the newest suspension bridge giants in Japan and Denmark, the author underscores the commonality to any bridge's purpose: vaulting chasms and straits to link people and commerce.

Haslam, Andrew. 1997. Building (Make it Work! Science). A story about how building is a unique blend of imaginative activities; experiments and science facts that helps develop scientific thought.

Kline, Michael P., Johmann, Carol A., Reith, Elizabeth. 1999. Bridges! Amazing Structures to Design, Build and Test. A story about an upbeat blend of science, history, and how-to instruction that will delight children and educators alike. Each chapter consists of numerous short articles combining historical and technical information on the design and construction of bridges with easy hands-on experiments.

Regan, Bob. 2006. Bridges of Pittsburgh. A story about how the bridges are architectural and engineering marvels, soaring over rivers and valleys and contributing to the city's unique sense of place.

Sturgess, Philemon. 1998. Bridges Are to Cross. A story about bridges from around the world and how you will come to realize that crossing is only one reason for having a bridge.

## **Internet Resources**

[http://en.wikipedia.org/wiki/Pittsburgh\\_bridges](http://en.wikipedia.org/wiki/Pittsburgh_bridges)

<http://www.abcdpittsburgh.org/kids/kids.htm>

<http://www.abcdpittsburgh.org/FAQ2.htm>

<http://abcdpittsburgh.org/>

[www.tryscience.org/teachers/teachercontest08.html](http://www.tryscience.org/teachers/teachercontest08.html)

<http://www.bridgeslearning.com/learningprograms/conceptprep.html>

<http://www.pghbridges.com/articles/PA3-13.htm>

## Appendix A

### \*Photos of Pittsburgh's Bridges

Various photos of Pittsburgh bridges. The photos will be used to look at, at the beginning of the school year and throughout. These photos will be used for recognition and exposure purposes. We will also compare and contrast the Pittsburgh Bridges to other bridges throughout the world (See **Appendix B**). The photos below are only sample pictures, there are many more pictures on the internet to choose from.



Pittsburgh Skyline-Use in introductory lessons and for reference.



McKees Rocks Bridge



## Historic Smithfield Street Bridge

### Appendix B

\*Various photos of bridges throughout the world. Use these photos to compare and contrast with photos of the various Pittsburgh bridges (See **Appendix A**). The photos below are only sample pictures, there are many more pictures on the internet to choose from.



Panoramic view of the new bridges under construction- The Clark Bridge in Alton, Illinois.



Anderson's Mill Bridge



Tower Bridge, London



Japanese Covered Bridge in Hoi An, Vietnam

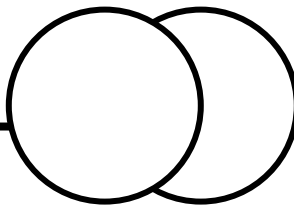


Langkwai, Malaysia

## Appendix C

### Venn Diagram

\* Use the Venn Diagram at the beginning of the lesson after you have compared Pittsburgh bridges to bridges from around the world. Discuss the differences and similarities. Keep the Venn Diagram out for the duration of the year for quick reference for each lesson if needed.



## **Appendix D**

### **\*Attachments for lessons**

After looking at the different pictures of the bridges during your math lessons here are some ideas for gathering data.

#### **Math:**

Blow up the pictures and measure the lengths, the height, and the widths. Discuss estimation of each bridge. Have the children realize that your measurements will not be exact. Make a chart with each bridge's estimated measurement.

Make a graph of the students' favorite bridges.

Use the pattern blocks to make flat bridges. Have children walk around and look at their classmates' different bridges.

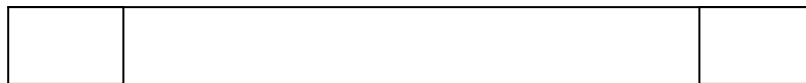
Count the different bridges and compare to other cities. Make a chart with amounts.

### **\*Attachments for lessons**

#### **Science:**

Using your FOSS Science Curriculum and Kit have the students use the pan balance to discuss weights. Discuss the importance of weight limits on bridges and support and stability.

Build a 3-D bridge in a small group using straws, Playdough or other usable/suitable materials for your classroom.

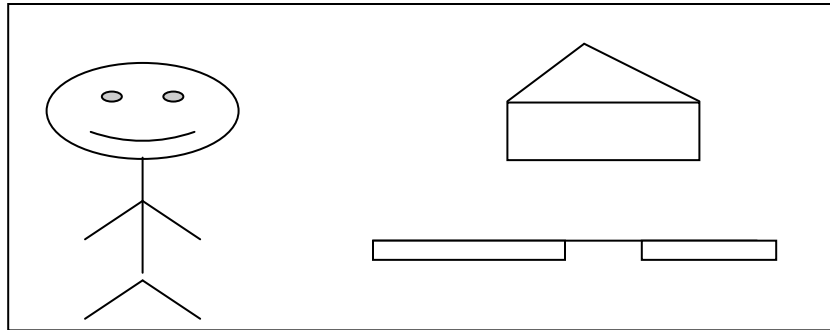


## Appendix F

### \*Attachment for lessons

#### Social Studies:

Show the children the pictures of bridges again and notice the important aspect of having bridges connect you to other parts of the city and neighborhoods. Have the children draw pictures of their community and a bridge that will connect them to another community and write about why this is so important. Display the murals in the hallway with a description of what the children are learning about.



<p>Score of 3 * * *</p> <p>The student understood all activities and followed all directions</p>	<p>Score of 2 * *</p> <p>The student understood most of the directions and followed them</p>	<p>Score of 1 *</p> <p>The student did not understand the directions and could not follow any of them</p>
------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------

<p>Score of 3 * * *</p> <p>The student used correct grammar, spelling, and conventions</p>	<p>Score of 2 * *</p> <p>The student used some correct grammar, spelling, and conventions</p>	<p>Score of 1 *</p> <p>The student did not show any evidence of grammar, spelling, or conventions</p>
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**\*Appendix G-Rubric (very general-can be adjusted as needed)**

**Content Standards for the state of Pennsylvania, followed by the Pittsburgh Public Schools.**

**Academic Standards for Reading, Mathematics, and Science**

**Reading:**

1. Learning to read independently.
2. Reading critically in all content areas.
3. Types of writing.
4. Quality of writing.
5. Speaking and listening.
6. Research.

**Mathematics:**

1. Numbers and Operations
2. Measurement
3. Geometry

**Science:**

1. Inquiry and design