

Where's the End? A Finish Line Design Challenge

Developed by: Jen Reiter, 2014 Iditarod Teacher on the Trail™, created 2/2017

Discipline / Subject: Engineering/ STEM/ Team Building

Topic: Arches/ Engineering

Grade Level: 3-5; others with modification

Resources / References / Materials Teacher Needs:

Champion of Alaskan Huskies: Joe Redington, Sr. Father of the Iditarod by Katie Mangelsdorf

Iditarod: The First Ten Years, compiled by The Old Iditarod Gang

Historic photo of the Burred Arch:

Lesson Summary:

In this full class building challenge, students will learn about the history of the famed Burred Arch while being challenged to build their own version of a finish line suitable for the Iditarod.

Standards Addressed: (Local, State, or National)

Next Generation Science Standards – Engineering 3-5

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Learning Objectives:

TLW use the design thinking process to create a freestanding structure that could model a finish line.

TLW demonstrate the understanding that triangles are the strongest shape for building.

Assessment:

Students can self-assess using the included chart.

Teacher could also use the same chart to assess the students.

Procedural Activities:

- Prior Knowledge:
Prior to beginning this challenge, students should have had experience building three-dimensional shapes with gumdrops and toothpicks, straw building materials, or other similar materials. They should have an understanding that building cubes with triangle reinforcements provides a strong support for building.
1. Ask the students to visualize themselves coming into Nome at the end of the first Iditarod Race. Guide their thinking to really put themselves in that time and place. Ask them to think about what they would expect to find at the end after all of their struggle to get there.
 2. Share with the students the included quotation from Katie Mangelsdorf’s book to set the scene for the finish line in Nome at the end of the first Iditarod.
 3. Have the students discuss with their table or a partner the following questions: What do you think happened the next year? The year after? Do you think things ever changed? Why or why not?
 4. Have the students read excerpt one from “A Finish Line Like No Other.”
 5. Tell the students that their challenge today is to build a suitable finish line for the Iditarod Sled Dog Race.
 6. Bring their attention to the following quote about the finish line, “something significant, something permanent, something that would forever be etched in a musher’s mind as well as the minds of those who watched.” That is the crux of their building challenge.
 7. Introduce the materials to the students. I like to use Newspaper Builders so that something large and kid sized can be created. See “Other Information” for alternative ideas. NOTE: Rolling the newspaper tubes is not easy. We’ve discovered it works best if the boys work in pairs to do it. I use several morning “seat work” times to make a large batch of them and then finally reveal to the boys why they’ve been doing all that building! To create the tubes you tape plastic tubes to each end of the paper and roll, taping it sealed at the middle and the two ends. To build, you pinch the tubes to side in the connector pieces.
 8. Give the students time to brainstorm individually first. Depending on the time frame you have and their background experience, you may want to provide smaller materials for exploration first (toothpicks and gum drops for example) or just paper for drawn sketches and planning.
 9. Then just turn them loose and see what happens! I like to let them have at it for a while first and then reel them in and redirect if needed. It helps to have an extra set of adult hands in the room for this if possible!
 10. When the final project has been completed, have the boys reflect on their work. What worked well, what could have been better, what they would change things the next time around? I like to have them take a photo of the final project and reflect in their SeeSaw portfolio, but you could use whatever method works for you.
 11. Have the students read the full story, “A Finish Line Like No Other” to see how the challenge was ultimately solved in 1974.
 12. You can share the photo of the original arch mentioned above, as well as photos of today’s arch.

Materials Students Need:

Roylco Newspaper Builders: <https://roylcostore.com/products/newspaper-builders>

Newspapers, lots of newspapers

Technology Utilized to Enhance Learning:

Other Information:

If you don't have access to the Newspaper Builders, you could do this activity on a smaller scale with any building supplies. The students create a model instead of a full sized object.

Modifications for Special Learners/ Enrichment Opportunities

- Students could write a story to accompany their creation. They could write a creative story to tell how the arch came to be, a how-to article on how they built the model, or an article comparing and contrasting the real arch to their creation.

Additional Information

The First Finish Line

From Champion of Alaskan Huskies - Joe Redington Sr., Father of the Iditarod by Kaite Mangesldorf (used with permission of the author); Page 177

“At the last minute someone realized there was no finish line, only the yellow banner they had strung across the street in Anchorage, which read: STARTING LINE on one side and WELCOME TO NOME! on the other side. They ran into one of the buildings and came out with some red Kool-Aide and sprinkled it across the snow to make an official finish line. Wilmarth and his team had been on the trail 20 days, 40 minutes, and 41 seconds.”

Excerpt One:

A Finish Line Like No Other

By: Al Crane

By the time Joel Kottke and Richard “Red Fox” Olson crossed the finish line in Nome, twenty-nine days after they had started the 1974 Iditarod Trail Sled Dog Race in Anchorage, all that was left to signify the ending was a barely visible remnant of a finish line in the snow, created when race officials poured out a packet of Kool-Aid.

Red was a dreamer and a self-starter. Back in the Fairbanks area, he worked for himself logging, selling logs, building log cabins, and making whatever he wanted to do happen. So it came as no surprise when his and Joel Kottke’s arrival in Nome had been determined by their drawing straws. Joel lost and arrived with the word THE written on a paper plate sign displayed on his sled and Red arrived at the finish line with the word END written on a similar sign.

Even with all the fanfare and celebration as the winner of the Red Lantern “Last Musher In” award that year, Red couldn’t shake the nagging feeling that there needed to be more than line in the snow for a finish marker. That finish line was so anti-climactic to him that he became determined to do something to add more to the experience of finishing for future mushers – especially after travelling such a long distance with such life-changing experiences – something significant, something permanent, something that would forever be etched in a musher’s mind as well as the minds of those who watched, as he finished the incredible Iditarod. And thus the idea, the finish arch, was born. It would become one of the most recognized symbols of the Iditarod.

Like every first time participant of those early epic trips running the Iditarod, he knew he would never be the same again. And with that change, he felt even more compelled to act on his impulse to do something to enhance that finish line.

Reprinted with permission of the author

Pages 87-88: “A Finish Line Like No Other” by Al Crane as published in Iditarod: the First Ten Years, compiled by The Old Iditarod Gang

A Finish Line Like No Other

By: Al Crane

By the time Joel Kottke and Richard “Red Fox” Olson crossed the finish line in Nome, twenty-nine days after they had started the 1974 Iditarod Trail Sled Dog Race in Anchorage, all that was left to signify the ending was a barely visible remnant of a finish line in the snow, created when race officials poured out a packet of Kool-Aid.

Red was a dreamer and a self-starter. Back in the Fairbanks area, he worked for himself logging, selling logs, building log cabins, and making whatever he wanted to do happen. So it came as no surprise when his and Joel Kottke’s arrival in Nome had been determined by their drawing straws. Joel lost and arrived with the word THE written on a paper plate sign displayed on his sled and Red arrived at the finish line with the word END written on a similar sign.

Even with all the fanfare and celebration as the winner of the Red Lantern “Last Musher In” award that year, Red couldn’t shake the nagging feeling that there needed to be more than a line in the snow for a finish marker. That finish line was so anti-climactic to him that he became determined to do something to add more to the experience of finishing for future mushers – especially after travelling such a long distance with such life-changing experiences – something significant, something permanent, something that would forever be etched in a musher’s mind as well as the minds of those who watched, as he finished the incredible Iditarod. And thus the idea, the finish arch, was born. It would become one of the most recognized symbols of the Iditarod.

Like every first time participant of those early epic trips running the Iditarod, he knew he would never be the same again. And with that change, he felt even more compelled to act on his impulse to do something to enhance that finish line.

Back home, he eyed a log that he and his twelve-year-old son Randy had cut a season earlier as a log of value – it had two large burls close together and was somewhat symmetrical. Upon reexamination, almost instantly, he knew this was it. All he had to do was shave one side to flatten the surface and it could be used as a sign. Supported on both ends by three stanchions, it would be perfect. On the main structure he would inscribe: END OF THE IDITAROD SLED DOG RACE, and on top of the burls he wrote the mileage: 1,049 MILES (1,000 for the approximate distance and 49 for the 49th State). On the bottom of the two burls he would etch ANCHORAGE and NOME.

His ideas had jelled. Now all he had to do was put the pieces together and get it to Nome. It became a family project at first, but soon expanded into a service project for the Fox Lions Club. By fall 1974, after many hours of cutting, stripping, finishing, and assembling all the pieces, the arch was finished and finally ready to go.

With special cooperation of Wien Air Alaska, a carrier with historic roots in Alaska, the arch was disassembled and loaded on a plane bound for its permanent home on Front Street. Red followed on a commercial flight to oversee and to assist in unloading and reassembling the structure. The rest is history – the monument arrived in Nome in the fall of 1974 and with the help of Howard Farley, the Nome Lions Club, and downtown businesses, \$1,300 was raised to pay the freight bill. As word got out, a group of volunteers materialized to help move and

reassemble the pieces. Red's vision had become a reality, and his name would be forever known in the annals of Iditarod history.

Only one thing remained – the Widow's Lamp. Another of Red's ideas: a flame that would be lit when the race started in Anchorage and extinguished when the last musher was safely across the line in Nome. Red donated his antique oil lantern for that, too!

Reprinted with permission of the author

Pages 87-88: "A Finish Line Like No Other" by Al Crane as published in Iditarod: The First Ten Years, compiled by The Old Iditarod Gang

Where's the End? A Finish Line Design Challenge

Building Task: Self-Assessment

Name: _____

	Glow	Mostly	Grow
I contributed to the team.			
I exhibited scientific thinking.			
I maintained a positive attitude.			
I completed the building task.			
I reflected on my work thoughtfully.			

I'm most proud of...
