

A note from MiddleWeb editor John Norton:

Early in the fall of 2004, MiddleWeb included this notice in our biweekly "Of Particular Interest" newsletter:

TAKE THE PRINGLES CHALLENGE!

Long-time MiddleWeb member and middle grades science teacher Charlie Lindgren is organizing a "Pringles Challenge" that encourages students to apply their science and math skills to win a national competition. Here's how it works: Students design and test a container for shipping a single Pringles potato chip, via the US Postal Service. Schools send their container to a partner school somewhere in the U.S., where students evaluate and score the results. The goal is to engineer a package with the smallest volume and smallest mass that still protects the chip from breaking in the mail. You'll find all the rules, procedures and contact information at this link!

<http://www.gatesscience.info/teamescience/pringle.htm>

As Charlie Lindgren relates in this final report, his first annual Pringles Challenge was a success, with nearly 40 schools and more than 800 students participating. Below, Charlie describes the set-up, reveals how things actually played out, and shares some lessons learned. A "must read" for other teachers contemplating a cross-school Internet adventure!

PRINGLES CHALLENGE – FINAL REPORT

BACKGROUND

I have always believed that one of the major strengths of the Internet was its ability to bring schools together. Collaborative activities between middle schools are a natural. I have met with mixed success on doing such activities.

In the early days of the Internet we participated in the Jason Project when they were doing Hawaii and comparing it to the satellite Io. Our students did the curriculum, and then went to Bridgewater State College to participate in an interactive session with the people in Hawaii. It was poor. Interacting was limited to one student asking one question that wasn't answered.

When I went on an eclipse cruise in 1998, I designed an activity where schools from North America could submit data on what was happening during the eclipse in their area. More than fifty schools from the United States, Mexico and England participated in the project! As a minimum the schools recorded the change in temperature, barometric pressure, and light intensity as the eclipse progressed. I created a website for recording the data. Each

page contained a graphic of what the eclipse would look like at maximum from each of the different schools. The graphic came from Fred Espenak's website:

<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

For each eclipse located in populated areas he put together a graphic along with detailed information regarding the eclipse. Because we had two schools in Mexico participating, one of our Spanish teachers, Senora Green, translated the entire site into Spanish! The activity was a huge success! Almost everyone saw some part of the eclipse *and* reported the data.

When we taught weather and climate in our building, the eighth grade science department put together a project called *Weathergate*. Each of the students was assigned a city to follow for the school year. Each month they took the data from their city and did an analysis including graphs of temperature (line graph), precipitation (bar graph) and weather conditions (circle graph). In addition, they wrote a "compare and contrast" essay describing how what actually happened in the city compared with the climatological averages. We created a website where *all* of the information was posted. We also linked the pages to middle schools in those cities. The plan was to have the schools interact with our students and share weather data. It met with very limited success. Out of the 50+ schools that agreed to participate, only two ever did on a regular basis.

Always in the background has been the *Pringles Challenge*. We were introduced to the *Challenge* by Ms. Joanne Van Voorhis who headed an organization called *Transformations* that brought middle schools together for interactive activities. We did the *Pringles Challenge* with her three times. Each time it was a huge success. Students were excited! Real science was happening! Real learning was taking place as students attempted to send a single Pringles Potato Chip to a distant middle school in the smallest, lightest package possible. It had been about four years since our last Pringles experience.

Last summer I was on a committee for the MiddleWeb listserve designing topics for their first convention. I chose *Activities that MiddleWeb Could Use with their Population*. I volunteered to run the *Pringles Challenge*, and received their endorsement.

DESIGN

I spent the last two weeks of summer vacation putting the *Pringles Challenge* website together. John Norton, administrator of the MiddleWeb Listserve posted an invitation to join to several locations, and I invited MiddleWeb people to join.

Several teachers requested that we do the activity in November to coincide with their individual units in math and science. I contacted Joanne Van Voorhis to establish a timeline for the activity with mid-November as a target start date. As schools joined, I made a link to their website's on an on-line map at my site. I also created a spreadsheet with all critical information including an alternative teacher to handle the project if the primary teacher was unable to continue. When the deadline for registration arrived, 42 schools had subscribed.

Five of my students met during study periods to create the matches. Our primary concern was that each school would receive approximately the same number of packages. We then looked at distances to try and make them as equitable as possible. Two weeks before the Pringles were to be mailed, I e-mailed each primary contact with their partner's information, and asked them to contact one another to make sure that all of the links worked. The only disaster that occurred during this time was that two school withdrew after the deadline. We quickly shuffled schools, and everyone agreed to the change.

At the same time I handed out fliers to all of the science teachers in my building inviting them to join the *Challenge*. I set up a system where students would come to me to receive an identification number, as well as a mailing address to our partner. A disappointing twelve students in our building participated – ten from the eighth grade, and two from the seventh. Of those, eleven samples safely arrived at our partner school in Topeka, Kansas.

E-mails flew back and forth during the time from official notification and first posting. Many questions were asked about specific details such as minimum size of the package, and what could be used as a "legal" packing material.

The packages had to be mailed between November 22nd and December 1st. Results had to be sent to be by December 10th. To help the schools score the packages and send me the results, I created an Excel spreadsheet with all necessary formulas and placed it on the website. Results arrived at a leisurely pace of one or two per day. This allowed me to add their data to their pages the same day. I also created two pages. One listed the top score of each school, and a second listed the "Best of the Best" scores from each school. Joanne Van Vorrhis didn't like the idea of listing only the top school for each school, because there might have been other students at the same school that scored higher than students from another school. The second page was a huge time consumer. I tried to have at least one "Best of the Best" from each school, but some of the scores were so low that it proved impossible. The task was still daunting! Many schools also included images and anecdotes. I included almost all of them with the data.

Meanwhile, packages from three schools were arriving at our school! This was caused by the two schools that dropped out after the deadline. We only

mailed packages to one school. Thirty-two students evaluated the packages from the three schools during study periods. They calculated the volume of the package and found its mass using a balance. Then they opened the package and evaluated the chip. Information was posted to the same spreadsheet model that all schools used.

Of the forty schools that agreed to exchange packages, thirty-seven actually did. Thirty-five schools reported scores. One school sent packages, but the partner school never evaluated the packages or sent their own, and a second school still hasn't reported. Two schools never participated. A total of 852 students participated in the *Challenge*.

SURVEY

I e-mailed a survey to each primary teacher at the end of the *Challenge*, asking them to evaluate the experience. Fourteen teachers responded. The results are shown below.

1. *Would you do the Challenge again next year? If "yes," why? If "no" why not?*

Yes = 13 No = 1 (The partner school never scored the packages or sent their own)

2. *If you answered "yes" to number one, when would you want to do it? The only reason I picked this time slot was because one of the math teachers wanted it to coincide with their "packaging" unit. We ran into the Thanksgiving break, which created issues for some. Would it be better to do it as a September/October "Getting to Know You" activity, Mid-Winter (January/February) "Getting through Winter" activity, or Spring (March/April) "Wrap up the Year" activity?*

Leave it here = 6 Early = 0 Winter = 5 Spring = 1 Anytime = 1

3. *Several schools wanted to do the activity in teams? If you did, how did it work out? Should teams be an option open to all? If yes, how many could be on a team?*

Teams = 5 Individual = 4 Either = 2 No Opinion = 3

4. *How did you do the activity? Was it a part of your curriculum, extra credit, what?*

Science Club = 1 Part of Curriculum = 12 Extra Credit = 1

5. *What about the scoring? I selected the 100, 50, etc. simply because it's what's always been done. Should the chip damage scoring be revised?*

Yes = 2 No = 9 No Opinion = 2 No Packages Received = 1

6. What did you like best about the activity?

Hands on Skills = 2
Working with other Schools = 2
Problem Solving Based = 1
Creativity = 5
Interactivity with Internet = 2
A Challenge as opposed to a contest = 1
Students of Different Abilities could shine = 1
Learned about the post office = 1
Excitement of students waiting for results = 3
All of it = 1
Measurement = 1

7. What didn't you like about the activity?

No check on accuracy of results = 4
No good way to integrate measuring all the packages into the class = 1
No follow-up activity = 2
The timeslot = 1
Post office was difficult with mailing = 1
Lack of feedback = 1
Nothing = 2
Partner School did not respond = 1
Participating schools did not respond = 1

FINAL THOUGHTS

This was a great experience for me. It gave me a chance to sharpen my webpage design skills. The highlight for me was "talking to" the different teachers. The schools ranged from urban to rural. Public, private, charter were all represented. The sizes ranged from massive to *very small!* It was an activity that *anyone* could do. It also generated genuine excitement in both student and teacher.

I definitely will try it again next year, probably in the winter. There will be some changes. Many schools originally wanted to do the activity in groups and I told them not to. That was probably a mistake. Those that did it in pairs said they had great success. I also will make it a part of my curriculum instead of having it as an extra credit assignment. It is too valuable an experience.

There were several problems this year. The biggest problem was schools that said they would participate and then didn't. Students get excited about this project. They want to know how they did! They want that answer, and it isn't for a grade – it's for personal satisfaction! One of the teachers replied in the survey that the best part of this was that it wasn't given the air of a *contest*, but a *challenge*. She believed that changed the whole atmosphere of the project for the better. I don't know if there is a solution to a school's failure to participate, but I'm going to make a very strong statement about commitment at the beginning. The final scores were also an issue. Some of those simply *couldn't* be right! When my students sent their samples out, they found their own volumes and masses. That allowed them to check the partner's answer with their own. That should be mandatory, and the sending school should question any answers they think are incorrect. I sent several e-mails out, but the scores stood "as is."

There are several people I must thank. First, John Norton, of MiddleWeb, endorsed the project and allowed me to use the MiddleWeb logo on my page. John also placed an announcement on key lists to attract potential schools. Joanne Van Voorhis introduced me to the *Pringles Challenge*, and also has taught me everything I know about web design. Richard Blake, my Principal, allowed me to do the activity in the building. Finally, I must thank the 37 teachers who actually did this thing! You people are the best!