Rincon Valley BiMathlon
2009

The top 4th and 5th grade mathematics students in all eight of the Rincon Valley Elementary Schools participated in two days of math and technology at the Sonoma County Office of Education. Led by Carol Newman, Mathematics Consulting Teacher, and Rick Phelan, Sonoma County Technology Support Coordinator, the fifty students investigated how mathematics is applied, and worked to move from a simple facility with math calculations to a deeper understanding of the meaning and uses of mathematics.

The over-arching theme of this year's BiMathlon was statistics and data analysis. In addition to arithmetic operations, the integrated math skills were: fractions, decimals, ratio, diameter, circumference, pi, and mean, mode, and range. Technology was incorporated throughout the two days and included lego-robotics, laptop computers, individual response systems (clickers), teleconferencing, and a variety of computer software.

The following descriptions are taken from student journals, written following each activity.

INTRODUCTORY CLICKER ACTIVITY

Amanda and Isabella
We used clickers to answer questions. We learned what numerical surveys are. We also learned what categorical surveys are. We had a lot of fun. A numerical survey is a survey that has an answer that is a number. A categorical survey is a survey that has an answer that is in words.

Sierra & Ana
We answered survey questions with a clicker thingamabob. The clicker looked like a cross between a calculator and a mini television. The clickers helped all of us be able to answer the questions at the same time.

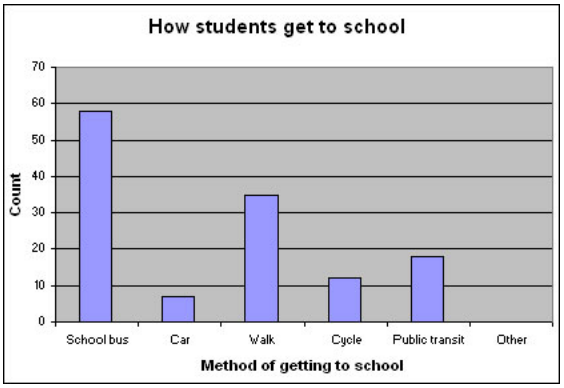
Feodor and Angela
Clickers send our answers to the master computer and show us the results. On the clickers, there are letters from A-E, numbers 0-9, true or false, enter, and some other buttons. In college, people use them instead of raising their hands to answer problems.

Arezou & Reily
We learned about clickers and other people by taking a survey asking us different questions. We learned some mathematical terms by answering some of the questions and about numerical and categorical surveys. We also learned that you don't have to be good at numbers to be a mathematician; you just have to be a good thinker.

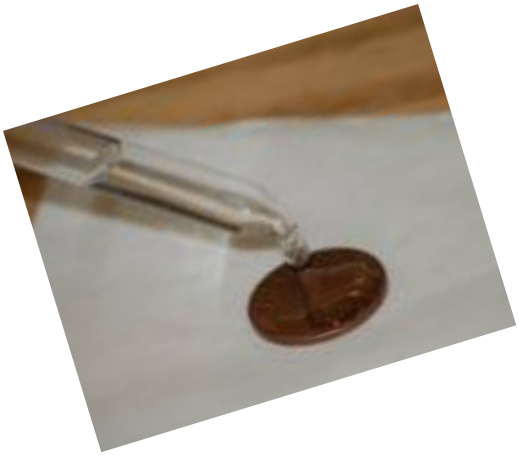
The clickers helped us gather data by giving us a chance to answer the questions without people hearing our answers and laughing at us because we got them wrong. We could also see all of the answers at the same time.

The question was up on the screen, and we could answer it by pressing the letter or number. It would be a great thing for a classroom because the teacher could modify how she taught by checking how everyone was doing. She would know if they had to go over it as a class or if it was just one or two students who needed extra help. No one would laugh because the troubled students would be a secret and no one would know who they were.

Christine & Cassandra
We worked together on the clickers. We put our answers on the clickers and it was fun! They would put a timer for 30 seconds and we would press the button on the clickers for our answer. Then a graph bar showed up and told us the different answers people got. We learned that the mode is what number showed up the most.



HONEST ABE SPREADSHEET ACTIVITY



Ryan & Christopher
We used spreadsheets to record the number of water drops that we used to make a penny over-flow with water. The spread sheets helped us by finding the average of the amounts of water drops that we used to over-flow the penny, telling us in graphs on the amount of water that can over flow the penny, and helping us keep organized

Natalie & Taylor
Spreadsheets help us understand data by organizing the data that we found while dropping the water on the pennies. We were dropping water on the pennies to see how many drops would fit on. We found out that the spreadsheets not only organized our project but also helped us compare the differences between our team and the other teams.

Sean, Casey, and Endrias
Spreadsheets helped us organize the data so that it was neat and easy to understand. The graph helped us see and visualize so that it was easy to compare the graphs. It also helped us by giving us the mean (average.)

Alex & Daniel
The spreadsheet we worked with helped us organize our data. It showed a data table and a graph. It even found the average of the numbers we typed in. We gathered data from our group and three other groups. We then typed the data onto our spreadsheet. The data we typed on our table was automatically put into a graph. Most of the other groups had different data than our group. There were some numbers the same as ours and some were way different.

GOING THE DISTANCE

Joseph & Jeffrey

We just completed an accuracy contest for our robots. The problem was to program the robot to go a distance, by changing the distance into wheel rotations. We had to figure the whole distance because the instructor gave us a line of tape and told us it would be ¾ of the distance of the distance the robot needed to travel. Then we had to figure out how far one rotation was. We did this by taking a special cord and sticking into the robots main socket and then typing and syncing it with the computer so that the number would be the distance, in rotations, the robot would travel.

Jamie & Taylor

Our robot's name was Mickie. Poor Mickie had memory loss. He thinks his name is NXT! He wasn't even old! Now back to the subject.

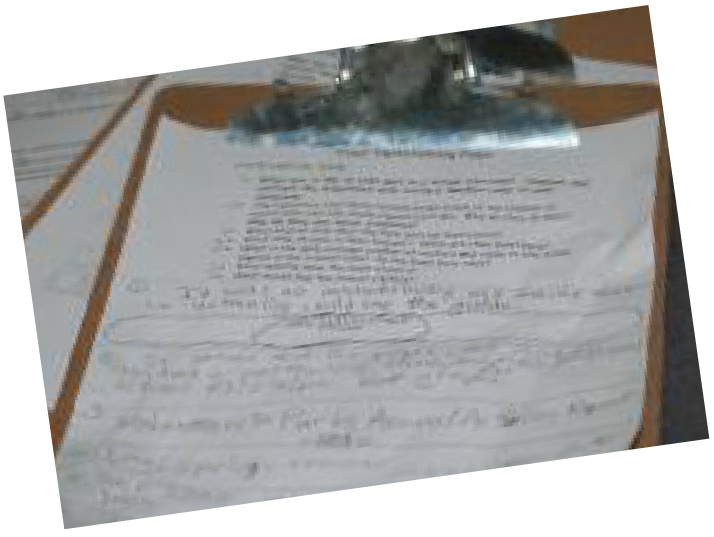
We figured the whole length by listening to the teacher when she said the whole length is 1/7 of the blue piece of tape marked with an A. So next we measured the blue tape and figured out it was 13cm. Then we multiplied that by 7 and that equals 91, and then we answered the questions.

Avery and Jaymee

We figured out how far the robot went when we measured the length of the line and since one unit equaled five and one half inches, we measured five and one half inches until we got to the end of the distance we had to go. Our number of rotations was three and a half. We entered the units into the computer and the plugged in the robot so that the information could be downloaded. Our team actually won the contest for who had the most accurate measurement. This project related to how NASA workers build robots to go to different planets and how they need to be accurate.

Reily & Arezou

We had to measure the amount of distance that the robot would go in one rotation. Then we had to measure the distance that we wanted the robot to go. After that we had to find out how many rotations the robot needed to go the distance we wanted it to. For all the measuring we had to use rulers.



Leo and Zach

We had to measure line A. Ms. Newman said that this line is 1/7 of a different line and we had to find that line. We measured line A as 4 in. and then we multiplied 4 by 7 and got 28. Then we measured 28 inches and marked it. Then we put the robot on the ground right behind the line marked as A. We pressed the button and it went one rotation. We did it again until it reached the tape that we marked for that measurement. We decided on 6 rotations.

Jeffrey and Varun
We entered the inches the robot should go. We did challenges and Avery's team won all of the challenges. It was a very complicated activity. Jeffrey's team almost beat Avery's team, but we were off by a centimeter. Varun said he was off an inch.

Kyle and Azadeh
We thought it was really fun and our teams had to measure and come up with a number of revolutions to land perfectly on the line. We really enjoyed it.

Isaac
We used Lego Robotics and we learned how to measure lines and then tell the robot to go that distance but we had to translate our understandings of it into math so that the robot could understand it. Once the robot understood the message that it needed to go a certain distance, it went exactly the distance we wanted it to go because we did the math correctly, but some people messed up their robot because they had the math incorrectly done. That is why math is so important.

Lola and Jeffrey
We measured the length of the line then multiplied it by three. A bigger wheel diameter makes the robot go farther because a bigger diameter has a bigger circumference. All of the circumferences are about a different multiple of three because in this case pi equaled three and a little more and pi is the relationship between diameter and the circumference.

Christopher and Jacob
First we figured out how far the robot would go in one traveling distance. Then we figured out how far it had to go. After that we compared the two and put in the distance.

Sierra, Reily, and Olivia
With the next sized wheel it will go farther in one rotation because the bigger wheel has a bigger diameter, which will make it go farther.

Alex and Daniel
We had to do hard math problems to figure out the number and a decimal to program the robot. We measured in inches and centimeters to find out how far our robot should go. After recording our answers we programmed the robots to go the exact number of rotations we needed it to go to get to the location we wanted it to. The wheels' diameter affects the distance the robot travels per rotation because the bigger the wheels' diameter, the bigger the distance per rotation. The smaller the wheels' diameter the smaller rotation distance for the robot.

VIRTUAL FIELD TRIP TO THE STATE CAPITOL

Will and Spencer
Taking part in a virtual interview was very interesting. We have never done anything like that and we were astounded that we were able to do this in real life. Wow! We thought only in movies you could do that apparition thing. Sham! WOW!

Olivia, Reily, and Sierra
Taking part in the virtual interview was exhilarating, exciting, and educational. It was very fun because we got to actually see the capitol. We got to learn all about the volunteer system. We had a chance to experience a new kind of technology.

Kayla & Jenna
Taking part in a virtual interview was different than having a docent actually come into your classroom and talk to you. It was different because when he wanted to call on the students he had to have our teachers do it, because he wasn't actually in the room. Docents at the Capitol building use statistics in their work in many different ways. They use fractions, percents, and decimals. They use them to keep track of money, volunteers, and guests at the building. People at the Capitol building use math in lots of different ways. Using the virtual interview made things a lot different than they would usually be if he were to actually be in the room.

Varun & Akshey
It is cool because you don't have to talk to them face to face. With a speaker coming, you might get nervous or shy. When you use a webcam, you won't be shy or nervous.

Ross & Parker
The video chat was cool! We learned many interesting things, like there are two buildings connected; one has 6 levels and the other has 4 levels but they are the same height.

Daniel and Jacob
We both learned that the State Capitol gets about 3,000 visitors in a day.

Taron and Joseph
It was easier to talk to our amazing docent because nobody had to travel to the other speaker. Docents use statistics in their work by gathering data and sharing their data with our community. Interesting statistics are that the capitol building is 220 ft. tall and that the Capitol has about 1 million visitors a year.

Megan and Amanda
People do not have to pay to visit the State Capital, but they ask people for donations. The slowest month of the year is October. When they aren't busy they put on shows to draw more people in. Sometimes the volunteers put on costumes for the shows.

Leo & Zach
It was really fun to do the virtual interview. It wouldn't be as fun to have him in real person because the virtual interview was a cool experience.

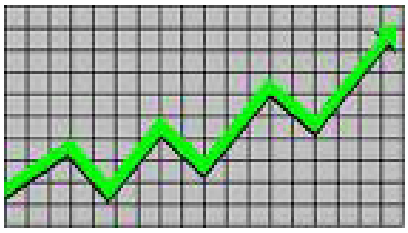
Natalie and Christopher
It was very interesting to have our first virtual interview with a volunteer coordinator/docent. They keep track of people that come in every day because they use that information to tell people that come and ask them if the program should keep working. In April, May, June, July, and August are the months of the year that most visitors come. October is the least busy time of the year.

Jeffrey and Hannah
It was very high-tech and a little bit like he was almost in the room. When a docent comes to your class we can see the docent and we can hear him, on the virtual interview he can see us, hear us, and knew we were there.
Docents use statistics in their work at the capitol by keeping track of how things have increased or decreased during the years. We learned that they did not have electrical outlets in the early 1900s.

Christopher, Azadeh, Arezou
We learned that you can talk to people in the Capitol without going there. You can talk to people in the Capitol on your computer. You don't have to pay to get into the Capitol. It is open to public. We have had 38 governors.

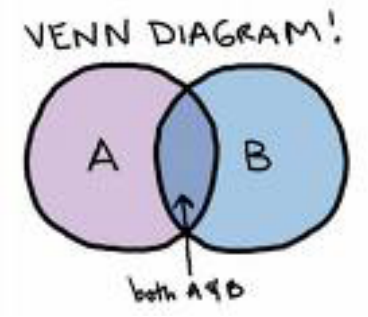
InspireData

Card Experiment



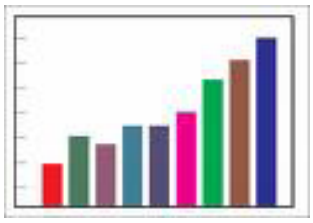
Feodor and Angela

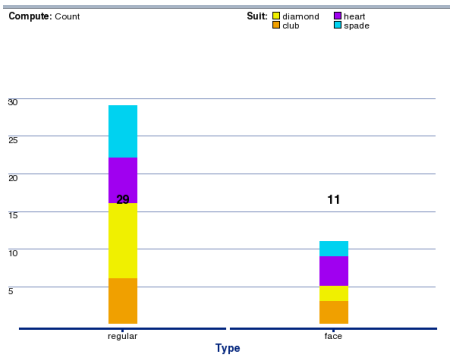
In InspireData, we used different graphs such as the pie graph, bar graphs, line graphs, and venn-diagrams to show information on the probabilities of picking out a random card in a 52 count deck. Different displays made it easier to view the data, depending on what we wanted to know. There were 40 picks, which were represented by colored stars. There were different categories to choose from to make graphs for different things. For example if we wanted to know how many face cards were clubs, we could make a line graph with the x-axis as the suit and the y-axis as the type, or using the Venn Diagram we could have one circle for face cards and the other for clubs.



Ana and Jessica

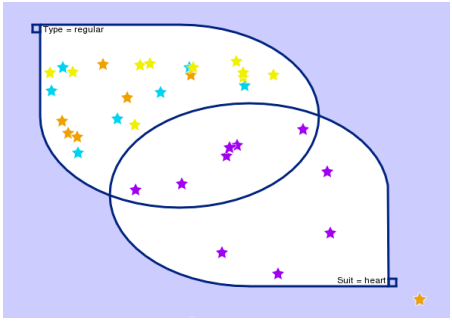
We learned from this activity that data is easier to read when you have a graph. The graphs could arrange the data in any way that we needed it to be.





Jeffrey and Hannah

It sorts out all of the data and makes it quicker and easier to read. You could look at it in different forms of organizations. Probability helps you make predictions about what card would be drawn because you would be ready to know which one you will probably get when you pick a random card. It helps you eliminate what cards you will probably not choose.



Christine & Cassandra

With the Venn diagram we could compare suits and types really easily. With the bar graph, we could measure the four suits with their numbers such as hearts with four. With the pie charts, we could tell what percentage of the results of the different kind of suits they got for the results.