

Cast Your Vote!

THINKING ABOUT WHAT YOU KNOW

In this project you will explore different methods of using voting to decisions. To begin, think about your own experiences with voting. the questions below:



List five real-world situations when voting is used to make a decision. Your examples might involve large groups of people or small groups of people.

Imagine that your school is voting to decide the menu for an end-of-the-year school picnic. You have been put in charge of carrying out the voting procedures. Write a detailed paragraph explaining how you would conduct the vote. You may use this page and the next for creating your plan. Be sure that your paragraph includes answers to all of the questions listed below:

- ☐ Who would you allow to vote?
- ☐ How would you design the ballot to give to voters? What would it say?
- ☐ When and where would the vote take place?
- ☐ Who would count the ballots?
- ☐ How would you determine the winning menu?

HOW VOTING WORKS

In general, voting is a procedure that allows each person within a group to indicate his/her preferences about a specific decision. The votes are then tallied in some way, and a decision is made. But there are many different ways to use voting. The most common system of voting is Plurality Method. You probably have a lot of experience with this method already.

Plurality Method

Each voter selects the one option that he/she most prefers.

All votes are counted and the option with the most votes is the winner.

AN EXAMPLE OF THE PLURALITY METHOD

Imagine that your town has just purchased land to create a new park. The town council is considering three options: using the land to build a new public pool, using the land to create a dog park, or using the land to create a children's play area. The town council decides to mail ballots to all of the town's residents. The ballot is shown below.

Which of the three facilities below would you most want to build in our town? Use an ☒ to mark your top choice.

- ☐ DOG PARK
- ☐ CHILDREN'S PARK
- ☐ PUBLIC POOL

Submit your ballot by mail before May 1.

When the ballots are returned, the town council adds up the total number of votes for each option. The Dog Park received 4,322 votes, the Children's Park received 2,380 votes, and the Public Pool received 8,225 votes. For this reason, the town council decides to build the Public Pool.

What makes this procedure an example of the plurality method? Refer back to the definition of the plurality method shown above. Then, write an explanation:

A MORE ELABORATE VOTING METHOD

When a vote is conducted using the Plurality Method, voters are only able to make one selection. However, in many situations, voters may like more than one option on the list. The Approval voting method helps address this problem.

Approval Method

Each voter marks all of the options that he/she approves.

Any option that is marked is counted as a vote.

All votes are counted and the option with the most votes is the winner.

AN EXAMPLE OF THE APPROVAL METHOD

The participants in a summer school recreation program decided to vote on which activity they preferred: Running/Track, Softball, Badminton, or Swimming. The ballot below was given to all students.

Which of the following activities would you like to do this summer? Use an ☒ to mark all of the activities you would enjoy.

- ☐ RUNNING/TRACK
- ☐ SOFTBALL
- ☐ BADMINTON
- ☐ SWIMMING

The results of the voting:

- ☐ 12 participants voted for Swimming and Badminton.
- ☐ 5 participants voted for Badminton, Running/Track, and Softball.
- ☐ 10 participants voted for Running/Track and Badminton.
- ☐ 13 participants voted for Softball and Badminton.

UNDERSTANDING THE DATA

Answer the questions below:

What makes this procedure an example of the approval method? Refer back to the definition of the approval method shown above. Then, write an explanation:

How many total votes did each activity receive?

Activity	Running/Track	Softball	Badminton	Swimming
Total Votes	15			

The program instructor has decided to include the two activities receiving the most votes. Which two activities will be selected?

AN EVEN MORE ELABORATE VOTING METHOD!

Even though the Approval Method allows voters to make more than one choice, it does not allow them to indicate which of their choices is their favorite. The Borda Count Method is an even more elaborate voting method, used to solve this problem.

Borda Count Method

Each voter ranks all of the options in order from 1st to last.

Each option receives 1 point for any last place vote,
2 points for a next-to-last place vote, and so on.

The option receiving the highest number of points is determined the winner.

AN EXAMPLE OF THE BORDA COUNT METHOD

The student council decided to use the Borda Count Method to elect their new president. Look at the ballot and the results below.

Who should be our new student council president? Rank your choices from 1st to 4th.

- Christine
Talía
Tawan
Marcus

	1st Place Votes	2nd Place Votes	3rd Place Votes	4th Place Votes
Christine	48	22	75	35
Talia	32	60	56	32
Tawan	50	85	14	31
Marcus	50	13	35	82

UNDERSTANDING THE DATA

Answer the questions below:

What makes this procedure an example of the Borda Count method? Refer back to the definition above. Then, write an explanation in the space below.

How many points does each student receive for each type of vote?

Vote	Number of Points
1st Place	
2nd Place	
3rd Place	
4th Place	1 point

Christine received 48 first place votes, 12 second place votes, 55 third place votes, and 8 fourth place votes. Use this information to calculate how many points Christine earned in this election. Show all of your work.

Calculate the total number of points earned by each student in order to determine who won the election. Show all of your work.

TRY THIS! Write a formula that could be used to determine the number of points earned by any candidate in this election. Use these variables in your number sentence:

F = number of first place votes

S = number of second place votes

T = number of third place votes

L = number of fourth (last) place votes

WHICH METHOD?

Use what you have learned about voting methods to analyze the situation below.

Imagine again that your school is voting on a menu for the school picnic. All of the students in the school were given the ballot shown below. The results of the vote are displayed in the chart.

What should we serve at the school picnic?
Rank your choices from 1st to 4th.

___ Hot Dogs

___ Pizza

___ Chicken Sandwiches

___ Hamburgers

	1 st Place Votes	2 nd Place Votes	3 rd Place Votes	4 th Place Votes
Hot Dogs	72	141	27	10
Pizza	96	12	40	102
Chicken	51	9	56	134
Hamburgers	31	88	127	4

Based on the ballot, it appears that the Borda Count method is being used. However, we can use the data from this vote to determine the winner using any of the three methods.

- ☐

Imagine that we determine the winning menu using the **plurality method**. You will need to use the existing data to make an assumption about which option students would have chosen if they had been required to make only one choice. Which meal would win? Explain how you know.
- ☐

Imagine that we determine the winning menu using the **approval method**. We will assume that students would have approved of their top three choices, but not their fourth place choice. Which meal would win? Use written explanation and calculations to support your answer.

- ☐ Imagine that we determine the winning menu using the **Borda Count method**. Which meal would win? Use written explanation and calculations to support your answer.
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- ☐ Are you surprised by your findings? Explain what you have learned.
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- ☐ If the choice were up to you, which method would you use to determine the winner of this vote? Why?

Your Challenge

Conduct your very own classroom vote using the Borda Count method!

PLANNING YOUR VOTE

- ☐ Choose an issue to vote on.
- ☐ Design and create ballots.

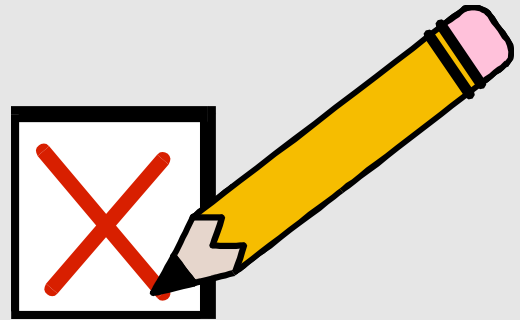
CONDUCTING YOUR VOTE

- ☐ Distribute ballots for voting.
- ☐ Collect ballots.
- ☐ Tally results and display data in a labeled chart.
- ☐ Use the Borda Count method to calculate points and determine the winner. Be sure to use the formula you developed earlier in this project.

REVEALING THE RESULTS

- ☐ Create a poster, sign, letter, or display that explains the results of the vote to the class.

Be sure to explain the formula you used for calculating the results.



REFLECTION

Answer the following questions:

- ☐ Did the Borda Count method work well for the class vote you designed? Would it have been better to use the approval method? Would it have been better to use the plurality method? Explain why or why not.
- ☐ One of your classmates believes that all votes should be determined using the plurality method. “We should just pick our favorite, and the one with the most votes wins!” he tells you. Do you agree? Is the plurality method the fairest of the three? Explain your own opinion
- ☐ Imagine that we are going to use the Borda Count method to determine students’ favorite TV show. But instead of giving four choices, we will be giving six. Write a new formula for how to calculate the results of the vote.
- ☐ In what types of careers would a person use mathematics to analyze the results of votes? List at least three. Are these careers that you would enjoy? Explain.

GOING BEYOND

How the President of the United States is Elected

http://www.enchantedlearning.com/vote/presidential_elections.shtml

Visit this web page to read about one of the most important voting methods in our country. You will learn more about how the President of the United States is elected, and how the results of presidential elections are analyzed.

Student and Teacher Evaluation

	4	3	2	1
My final project is accurate, and shows that I have applied mathematical ideas or learned new mathematical ideas.	I did a great job! This is a good example of my best work.	I did a good job, with just a few areas to improve.	If I could do this again, there are several things I would change.	There are many ways that I could have done better on this.
COMMENT:				
I followed each step in the directions carefully.	I did a great job! This is a good example of my best work.	I did a good job, with just a few areas to improve.	If I could do this again, there are several things I would change.	There are many ways that I could have done better on this.
COMMENT:				
I used my creativity and imagination to create a final project that is unique and represents my own thoughts and ideas.	I did a great job! This is a good example of my best work.	I did a good job, with just a few areas to improve.	If I could do this again, there are several things I would change.	There are many ways that I could have done better on this.
COMMENT:				
I made effective use of class time. I was able to get myself started quickly, answer questions for myself, and stay on task.	I did a great job! This is a good example of my best work.	I did a good job, with just a few areas to improve.	If I could do this again, there are several things I would change.	There are many ways that I could have done better on this.
COMMENT:				
My presentation was clear and detailed. The students in the class learned new information about my topic.	My presentation was well done. Students learned about the topic.	My presentation was good, but there are one or two things I would improve.	Students learned a few new facts, but I could have been louder or more organized.	I needed to be more prepared for my presentation.
COMMENT:				