Lesson 1, Part C Instant Runoff

Elections are held every day to choose persons for public office. Election methods can also be used to select between multiple scenarios or issues, such as the menu for an office party.

1) In an election involving two people, when looking at the votes cast, what criteria would you use to determine who should win? What about an election involving three people?

Credit: flysnow/Fotolia

Objectives for the lesson

You will understand:

- ☐ That earning the most votes may not be sufficient to win an election.
- ☐ That there are multiple considerations and methods for ranking candidates in an election.
- ☐ That multiple ranking methods can be employed to make decisions about other issues.
- ☐ The difference between the terms plurality and majority in an election.

You will be able to:

- ☐ Create a first-degree equation involving percentages and solve for the variable.
- ☐ Employ the "Instant Runoff" method to determine the winner of an election.
- ☐ Apply and justify selection strategies to election results and decisions about other issues.

A candidate (or proposal) who receives more than half of the votes in an election is said to have won a **majority** or an **absolute majority.** In an election with more than two candidates, the candidate who receives the largest number of votes (but not necessarily more than half) is said to have received a **plurality** of the votes. A plurality is sometimes called a **relative majority.**

There are several ways to determine a winner in situations where no candidate received a majority of the votes. This activity and the next provide some examples.

2) In 2012, one of Texas' U.S. Senate seats was up for grabs. Nine candidates were on the ballot for the Republican Party primary. The results of the primary are shown below.[1] Who do you think should have won? Why?

Candidate	Glenn Addison	Joe Agris	Curt Cleaver	Ted Cruz	David Dewhurst	Ben Gambini	Craig James	Tom Leppert	Lela Pittenger
% of Vote	2%	0%	0%	34%	45%	1%	4%	13%	1%

3) Texas election rules state that elections are majority elections. Who is the winner of this election?

4) The number of votes received by Cruz and Dewhurst are listed below.

Candidate	**Original Primary Votes (%)**
Ted Cruz	477,428 (34%)
David Dewhurst	621,850 (45%)

Part A: How many total votes were cast in the election?

Part B: How many votes would be needed to win in a majority election?

5) Since no candidate received a majority in the original primary election, the election rules required a runoff election. The results of the runoff election are shown below. The runoff is also a majority election. Who won the runoff election? How?

[1] Source: http://www.thepoliticalguide.com/Elections/2012/Senate/Texas/1/

Candidate	**Runoff Votes (%)**
Ted Cruz	628,336 (57%)
David Dewhurst	477,888 (43%)

Another election method called the "Instant Runoff" method, or elimination method, is to ask voters to rank the candidates in order of preference. Consider the following scenario:

Three candidates (Alex, Blake, and Charlie) applied for a position at a company. The interviewing committee ranked their choices in order of preference on a ballot. The completed ballot from one committee member is shown.

	List the candidates in order of your preference
1st choice	Alex
2nd choice	Blake
3rd choice	Charlie

6) Once all of the ballots are collected, the results are compiled in a preference schedule. Notice that three people ranked Alex in 1st place and Blake in 2nd place, and so on.

	3 voters	1 voter	2 voters	1 voter	2 voters
1st choice	Alex	Alex	Blake	Blake	Charlie
2nd choice	Blake	Charlie	Alex	Charlie	Blake
3rd choice	Charlie	Blake	Charlie	Alex	Alex

Part A: How many voters were on the interviewing committee?

Part B: A majority is still needed to win in his scenario. How many votes are needed for a majority?

Part C: How many 1st place votes did each candidate receive? Do we have a winner?

Part D: Which candidate received the fewest 1st place votes? To employ the Instant Runoff method, mark out or eliminate that person's name in each column of the table. Any name below that one in the table will now move up.

Part E: How many 1st place votes do we now award to the two remaining candidates? Who wins the election?

7) The method shown in question 6 is known as the Instant Runoff method. What are some pros and cons of this method?

8) Can you think of another election method for choosing the winning candidate in an election? What are pros and cons of your method? Can any process guarantee that the choice made (or winner) in an election is correct and fair to all candidates?

Lesson 1, Part C

Instant Runoff

Overview and student objectives

Overview

In this lesson, students begin a sequence of activities around civic responsibility by exploring some concepts of social choice. Specifically, they investigate the first of several ways to determine the winner of an election. Lesson 1, Part D extends the discussion with the Borda Count method.

An important point of this lesson is to encourage discussion as the students in the class get to know one another.

Lesson Length: 25 minutes

Prior Lesson: Lesson 1, Part B, "Our Learning Community"

Next Lesson: Lesson 1, Part D, "Borda Count" (25 minutes)

Constructive Perseverance Level: 1

Theme: Civic Responsibility

Goals: Reasoning, Evaluation

Quantitative Reasoning Outcomes: N1, N2

Related Foundations Outcome: N8

Objectives

Students will understand:

- That earning the most votes may not be sufficient to win an election.
- That there are multiple considerations and methods for ranking candidates in an election.
- That multiple ranking methods can be employed to make decisions about other issues.
- The difference between the terms plurality and majority in an election.

Students will be able to:

- Create a first-degree equation involving percentages and solve for the variable.
- Employ the "Instant Runoff" method to determine the winner of an election.
- Apply and justify selection strategies to election results and decisions about other issues.

Suggested resources and preparation

Materials and technology

- Computer, projector, document camera

- Preview Assignment 1.C (for review; students will have completed before class)
- Student Pages of Lesson 1, Part C
- Practice Assignment 1.C
- Syllabus Quiz from Lesson 1, Part B, if desired
- Determine a grouping method, such as a deck of cards.

Prerequisite assumptions

Students should be able to determine the original amount, given the percentage that a given number is of the original.

Making connections

This lesson:

- Connects back to work that students encountered in the *Foundations of Mathematical Reasoning* course, reading, interpreting, and making decisions about data summarized in tables and graphical displays.
- Connects forward to the remainder of the course in which decisions are based on data rather than emotion or anecdotal evidence.

Background context

None.

Suggested instructional plan

Frame the lesson

(5 minutes)

- Give Syllabus Quiz from Lesson 1, Part B, if desired.

Student Page

- Be mindful of the timing of each component in this lesson. It will be necessary to stay on task to complete the lesson.
- Separate the class into groups of 3 or 4 students by whatever process makes sense to you. Possible methods:

  - Distribute playing cards to students, and put those who have Kings in one group, all who have Queens in another group, etc.
  - Create random groups, counting off (1, 2, 3, 4).
- Ask students to consider question 1 on the Student Page. Students may respond by saying, “The person with the most votes.” Ask follow-up questions designed to lead to more specificity, such as:
  - “What if all three candidates each win 33% of the vote?”
  - “What if two candidates are very close and one candidate is far behind?”
  - “What if one candidate has almost all of the votes and the other two candidates have very few votes?”
  - “What if there are four or more candidates? Would your answers to any of the earlier questions change?”
  - “What if a voter can submit a first choice and a second choice?”
- Note: The names for the voting example were purposefully chosen to reflect gender-blindness and can be either a male’s or female’s name.
- Transition to the lesson activities by briefly discussing the **Objectives for the lesson**.

Lesson activities

(17 minutes)

Group Work then Debrief

Questions 2–5

- Allow about 5 minutes for students to answer questions 2–4. Remind them that they need to always justify their responses in this class.
- Students may realize from the discussion of question 1 that just having the most votes may not be sufficient. If not (if students are saying Dewhurst should have won because he had the most votes), ask the following:
  - “What percent of the voters in this election did <u>not</u> support Dewhurst? What might this indicate about his future ability to lead his constituents?”
- For question 3, students often think that a majority of the votes is the same as having the most votes.
  - Ask, “If majority means ‘more than 50% of the votes,’ how many votes are needed to win a majority in an election with 20 voters? How many votes are needed in an election with 27 voters?” [Answer: With 20 voters, 20 x 0.50 = 20/2 = 10 votes are needed to win exactly 50%, so

11 votes are needed to capture more than 50% of the votes. With 27 voters, 27/2 = 13.5 votes, so 14 or more votes would constitute a majority.]

- Students will need to realize that only 79% of the votes are shown in the table and that they need to find 79% of total votes shown.

Questions 6–8

Group Work then Debrief

- Point out that the table in question 6 is called a **preference schedule**, as it shows the preferences of the voters.
- Allow about 5 minutes for group work on these questions. Circulate throughout the room and ask questions to ensure that students are reading the table correctly.
    - For example, ask, "Is it clear to you how many first-choice votes were received by Charlie?"
- Question 6, Parts A and B: Indicate to students that it is always a good practice to first determine the total number of voters and the number needed for a majority. There may be a majority winner, and work done in eliminating the lowest vote getter will be wasted.
- Question 6, Part C: Students determine that Alex does not have enough votes for a majority.
    - Ask, "Hypothetically, what if we give the position to Alex? How do the people who didn't put Alex in 1st place feel about him or her?"

      [Answer: Three people put Alex in last place, which is almost as many who put Alex in first place.]
- Question 6, Parts D and E: Charlie has the fewest 1st place votes. Eliminating Charlie only affects the last column, where Charlie was first. Blake would move up into the 1st place slot, giving Blake a total of five 1st place votes. Blake now has a majority and is the winner.

Wrap-up/transition

(3 minutes)

Wrap-up

- The overall goal is to give students awareness that there are multiple methods to run elections and to count votes and that there is not necessarily a "right" method. The next lesson will explore the Borda Count method.
- Ask students to reflect on this lesson and write their reflections on a 3x5-inch card. Sample questions and prompts include:

- "Was the lesson interesting? How did the discussion go in your group? Did everyone contribute? How can we ensure that group discussions are productive?"
- "List one concept that is not clear after the lesson."
- "Is there anything you would like to share with your instructor?"

Transition

- Have students refer back to the **Objectives for the lesson** and check the ones they recognize from the activity. Alternatively, they may check objectives throughout the lesson.
- Mention that the next lesson will explore another method of choosing a winner in an election.

Suggested assessment, assignments, and reflections

- Give Practice Assignment 1.C.
- Give the Preview Assignments, if any, for the lesson activities that you plan to complete in the next class meeting.