

OPERATION





Operation: ELECT

The K20 Center for Educational and Community Renewal is a statewide education research and development center that promotes innovative learning through school-university-community collaborations. The K20 Center's mission is to cultivate a collaborative network engaged in research and outreach that creates and sustains innovation and transformation through leadership development, shared learning, and authentic technology integration.

The K20 Center's Game-Based Learning team designs and develops engaging, research-based, interactive learning experiences for a variety of audiences.

Operation: ELECT (Election Lesson Encompassing Computational Thinking) is funded through a GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) grant sponsored by the U.S. Department of Education, which was awarded to the K20 Center in 2018.

You can access the game at games.k20center.ou.edu.





Purpose

Operation: ELECT (Election Lesson Encompassing Computational Thinking) is a game-based learning application that aims to teach election vocabulary, the electoral process, and computational thinking to junior and senior high school students.

The purpose of this guide is to support integrating Operation: ELECT into your classroom as an effective tool to enhance critical computational thinking and the electoral process. This guide provides an overview of the game's objectives, narrative, and mechanics. This Teacher's Guide contains a helpful overview of all five levels (or "missions") and the estimated time it takes to play each one. This is designed to help you:

- Gain familiarity with the game and each of its five missions
- Find out what standards apply to each mission
- Tether levels to learning content
- Prepare lessons

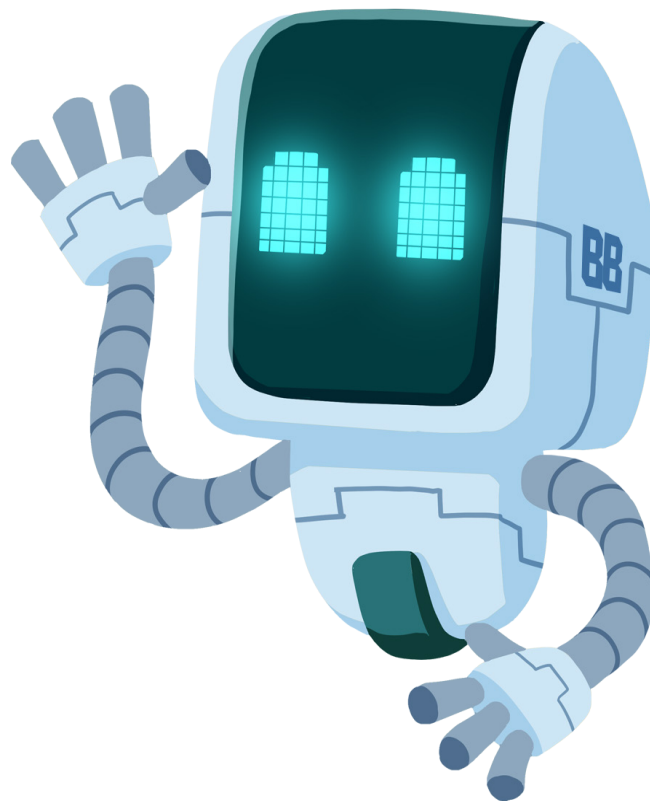




Table of Contents

| | |
|---------------------------------|-------|
| Purpose | 2 |
| Table of Contents | 3 |
| What is Computational Thinking? | 4 |
| Objectives and Standards | 5 |
| Game Narrative | 6 |
| Playing the Game | 7 |
| Game Interface | 8-9 |
| Mission 1 | 10-11 |
| Mission 2 | 12 |
| Mission 3 | 13 |
| Mission 4 | 14 |
| Mission 5 | 15 |
| General Tips | 16 |
| Vocabulary | 17 |
| Reference | 18 |
| Contacts | 19 |



What Is Computational Thinking?

Computational thinking (CT) is a cognitive process characterized by “solving problems, designing systems, and understanding human behavior by drawing on the concepts fundamental to computer science” (Wing, 2006). In other words, it involves “thinking like a computer scientist” in order to solve real-world problems. This makes CT applicable to many different fields (e.g. biology, engineering, economics, law).

Jeannette Wing, a researcher and computer science professor at Columbia University, envisions that CT will become a worldwide fundamental skill by the mid-21st century. With our growing reliance on computers and other technologies, CT is gaining endorsement as an indispensable skill in modern-day society (2006).

Although there is no single accepted definition for CT, experts agree that it includes the following concepts: decomposition, generalization (pattern recognition), abstraction (modeling), algorithmic thinking (algorithm design), and evaluation (Mindetbay et al., 2019).

Enoch Hunsacker (2020) defines these concepts as a problem-solving process:

1. **Decomposition:** Breaking down data, processes, or problems into smaller, more manageable parts.
2. **Pattern Recognition:** Observing patterns, trends, and regularities in the data.
3. **Abstraction:** Making a problem more understandable by reducing unnecessary detail.
4. **Algorithm Design:** Developing the step-by-step instructions for solving this and similar problems.
5. **Evaluation:** Ensuring that the solution is correct, efficient, and usable.

The Computer Science Teachers Association (CSTA) and the International Society for Technology in Education (ISTE) collaborated with scholars and industry leaders to develop a comparable definition of CT that provides a framework and common vocabulary for K–12 educators (CSTA, 2017):

- formulating problems in a way that allows students to use digital tools to solve them (i.e., **decomposition**)
- logically organizing and analyzing data (i.e., **pattern recognition**)
- representing data through **abstractions** such as models and simulations
- automating solutions through **algorithmic thinking**
- identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources (i.e., **evaluation**)
- generalizing and transferring this problem-solving process to a wide variety of problems



Objectives and Standards

Objectives

Based on this analysis, we have developed a set of social studies objectives and a set of CT objectives.

Social Studies Objectives:

- The student can explain how the Electoral College figures into the electoral process.
- The student can explain how media and public opinion affect the election process.
- The student can explain how local and national campaigns are conducted.
- The student can explain how campaign funding figures into the electoral process.
- The student can analyze various factors affecting the political process.

Computational Thinking Objectives:

- The student can break down data, processes, or problems into smaller parts.
- The student can make a problem more manageable by identifying and reducing unnecessary detail.
- The student can identify patterns, trends, and regularities in a given data set. The student can utilize these patterns to make predictions and inform actions.
- The student can develop a set of steps or instructions to solve a complex problem. The student can instigate a series of actions in sequence to solve said problem.
- Through trial, error, and iteration the student can evaluate the effectiveness of a solution and propose changes.

Standards

USG.5.4: Analyze factors affecting the political process and their role in government, including the role of political parties, interest groups, mass media, public opinion, and campaign funding.

USG.5.5: Explain the steps of the electoral process including the components of local and national campaigns, the nominative process, and the Electoral College.



Game Narrative

Operation: ELECT is a strategic social studies game of politics, press, and the election process. As a campaign manager, the player computes their way through five levels of government elections and helps their candidate secure a spot in the history books. The player is in control—from fundraisers to smear campaigns, and from the humble city council to the United States presidency. Secure votes, outwit opponents, and tackle the Electoral College head-on in this engrossing game of candidates and computational thinking.





Playing the Game

Operation: ELECT consists of a tutorial and five levels. Each level—or “mission”—is divided into 10 turns and can be completed in about 20 minutes.

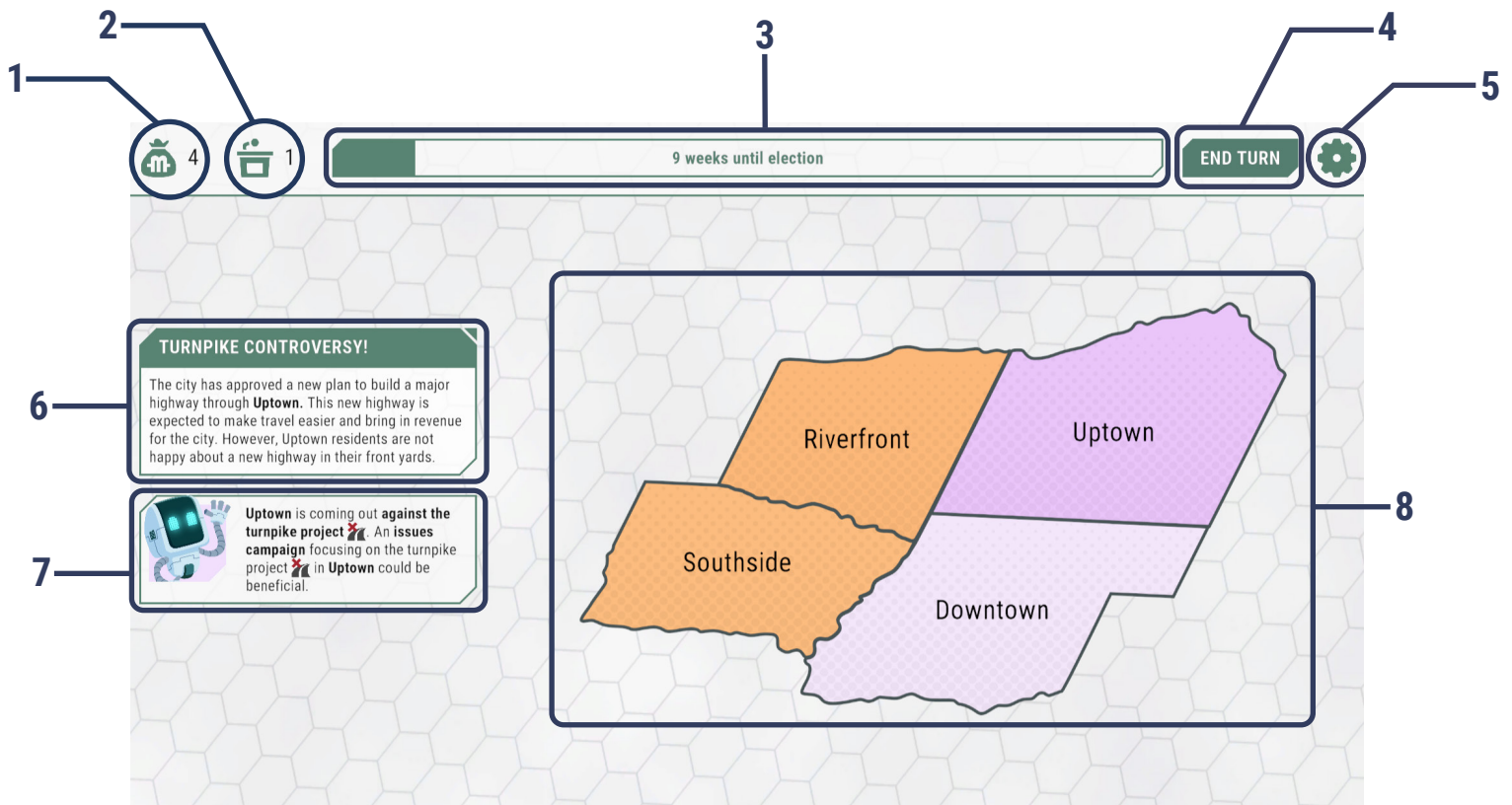
In Operation: ELECT, the player assumes the role of a campaign manager tasked with obtaining enough votes for their candidate to win an election in each level. Throughout the game, the player learns about the electorate process, comprehends targeted vocabulary terms, and exercises computational thinking.

Winning the game involves securing a plurality on voting day in the first four missions and, in the final mission’s presidential election, securing more electoral votes.

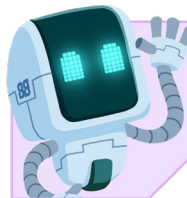
The screenshot displays the game interface. At the top, there is a progress bar showing "7 weeks until election" and an "END TURN" button. On the left, a news article titled "NEW CITY PARKS PROMISE SEEMS PROMISING" is displayed. The article text reads: "The message is clear: Precinct 567 wants more parks. The fastest-growing county in the state is in dire need of some green, and prospective candidates are eager to jump on the chance to please the metropolitan area." Below the article is a small robot icon and the text: "Maybe we could win over some voters with an issues campaign?". On the right, a map shows several precincts: Precinct 534 (purple), Precinct 588 (yellow), Precinct 567 (orange), Precinct 491 (orange), Precinct 568 (yellow), and Precinct 520 (orange).



Game Interface



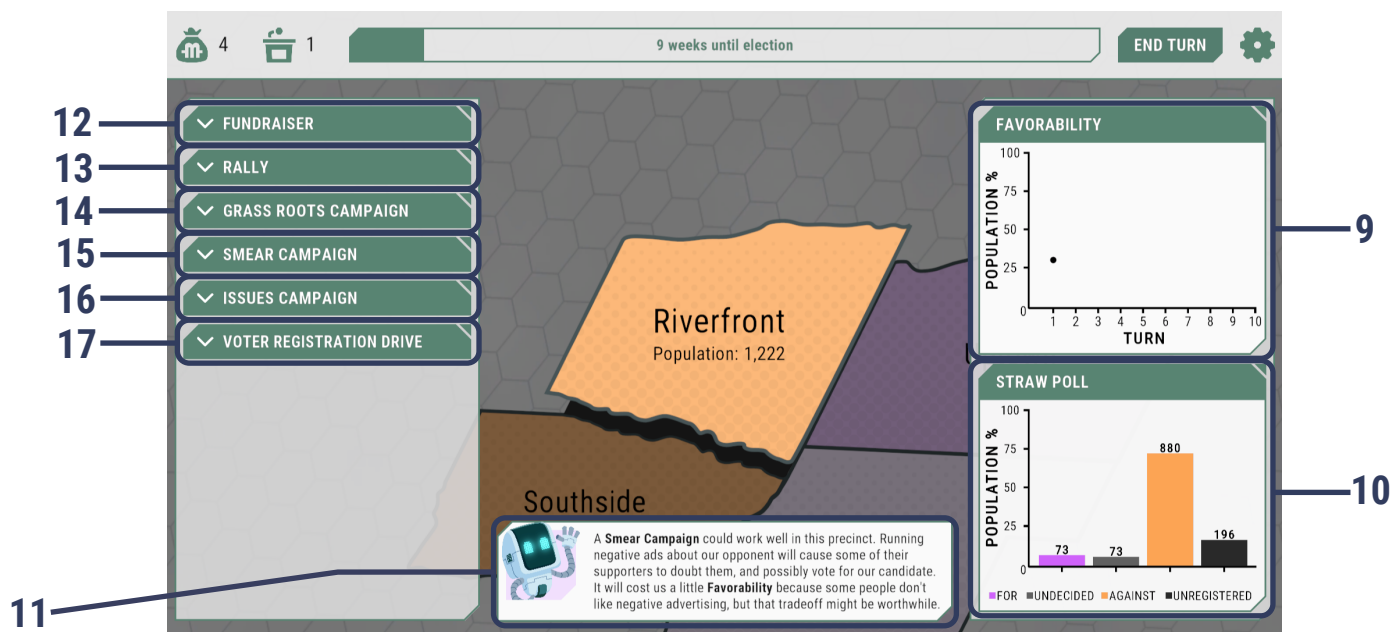
- 1. Money Tokens:** The counter next to this icon shows how much money you have left to spend for this turn.
- 2. Appearance Tokens:** The counter next to this icon shows how many more appearances your candidate can make this turn.
- 3. Countdown Meter:** This bar fills to show how many turns (weeks or months) you have left until election day.
- 4. End Turn:** Use this button to end the current turn and continue the game.
- 5. Settings:** Use this button to change the language options or return to the main menu.
- 6. News:** Every turn, a new, random news event appears here. These news events impact your campaign in a variety of ways.
- 7. News Reaction:** Here, your campaign assistant explains what the news means for your campaign and provides helpful tips for what you might wish to do next.



- 8. The Map:** The map shows you an overview of your candidate's precinct. Select individual districts to initiate campaign actions.



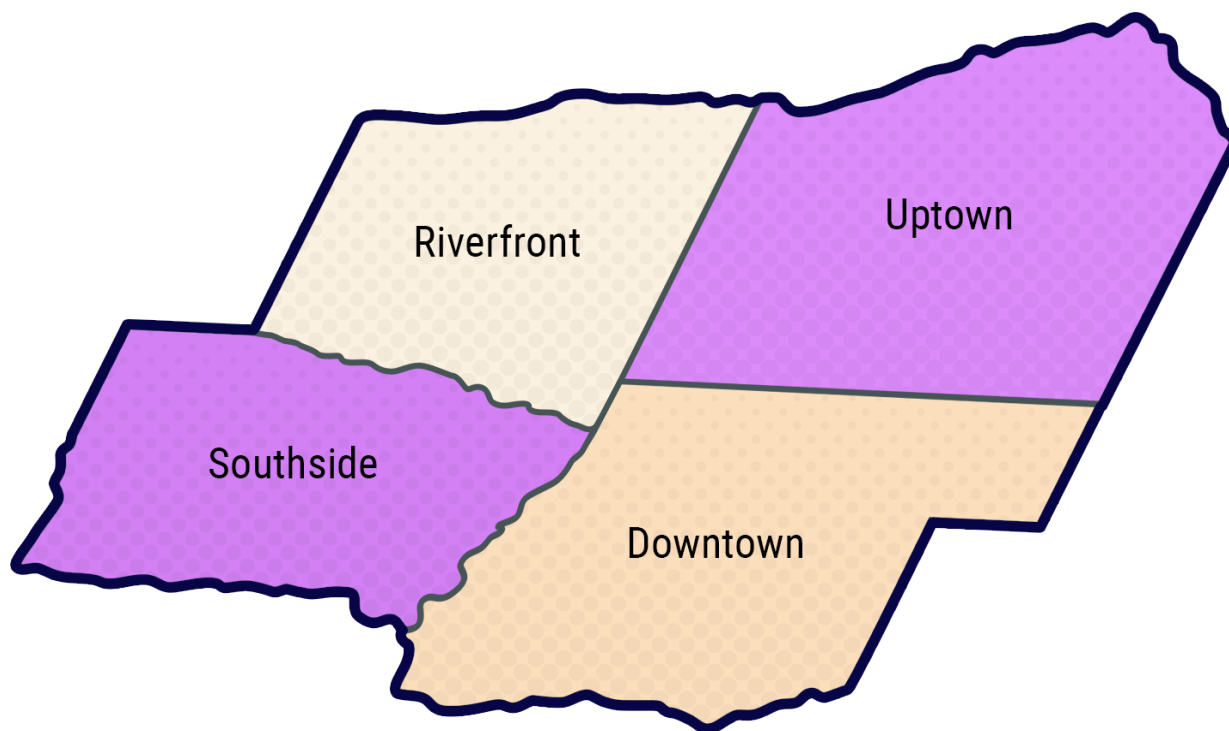
Game Interface



9. **Favorability:** This line graph shows your current favorability in the selected district. It moves up and down as you proceed through turns and take campaign actions. Favorability ultimately determines how many undecided voters vote for your candidate on election day.
10. **Straw Poll:** This column graph shows the percentage and number of the population who currently plan to vote for and against your candidate, as well as undecided and unregistered voters.
11. **Tips:** Here, your campaign assistant provides you with helpful tips tailored to each district.
12. **Fundraiser:** Selecting this campaign action allows you to gain money based on the percentage of people voting for your candidate in that district. Fundraisers lower favorability by 2% and cost one appearance token.
13. **Rally:** Selecting this campaign action allows you to raise your candidate's favorability in the district. Rallies cost one appearance token and two money tokens.
14. **Grassroots Campaign:** Selecting this campaign action allows you to convert a small number of undecided voters based on favorability and costs one money token.
15. **Smear Campaign:** Selecting this campaign action allows you to convert some of your opponent's voters to the undecided column. Costs one money token.
16. **Issues Campaign:** Selecting this campaign action allows you to choose a particular issue with which to cater to that district. Each district has its own set of interests, some of which are revealed through the news. If you select a popular issue, you'll gain a small number of voters and increase favorability. Select the wrong issue, and you'll gain fewer voters and lose favorability. Costs two money tokens.
17. **Voter Registration Campaign:** Selecting this campaign action allows you to register people that are currently unregistered to vote. These new voters support your candidate.



Mission 1



Mission 1 begins the player's campaign management career with a local race for city council. As a fully-fledged campaign manager, the player is tasked with securing votes from four independent districts. To begin, the player selects a political affiliation (the Robo Party or the Dino Party) and starts the game. Once on the district map, the player can select any district to see the game's main campaign actions.

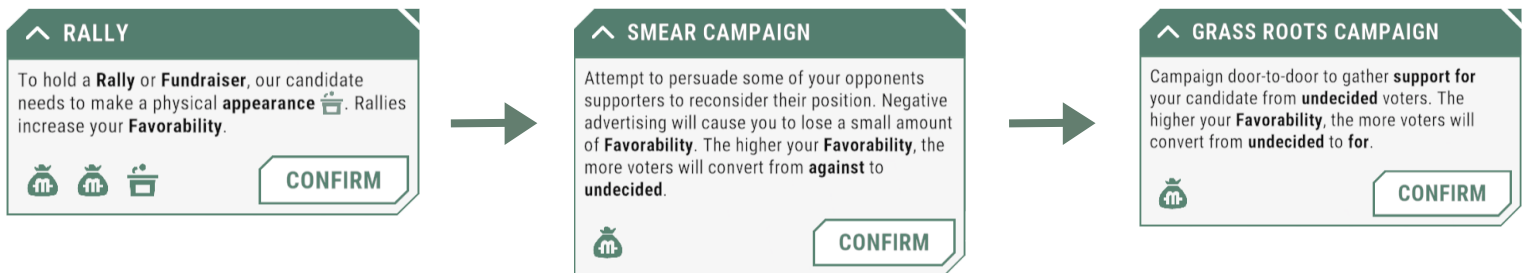


Mission 1



To perform a campaign action, the player should select a district and then select an action from the left column. When they are out of resources or have taken an action within all districts, they can select “end turn” to move on to the next turn.

A basic strategy starts with the player first performing a rally. On the next turn, they can then use a smear campaign to capitalize on the favorability they gained with the rally. On turn three, they can then use a grassroots campaign to capitalize on the undecided voters they gained from the smear campaign. These three actions make up the bulk of the computational thought in this game.

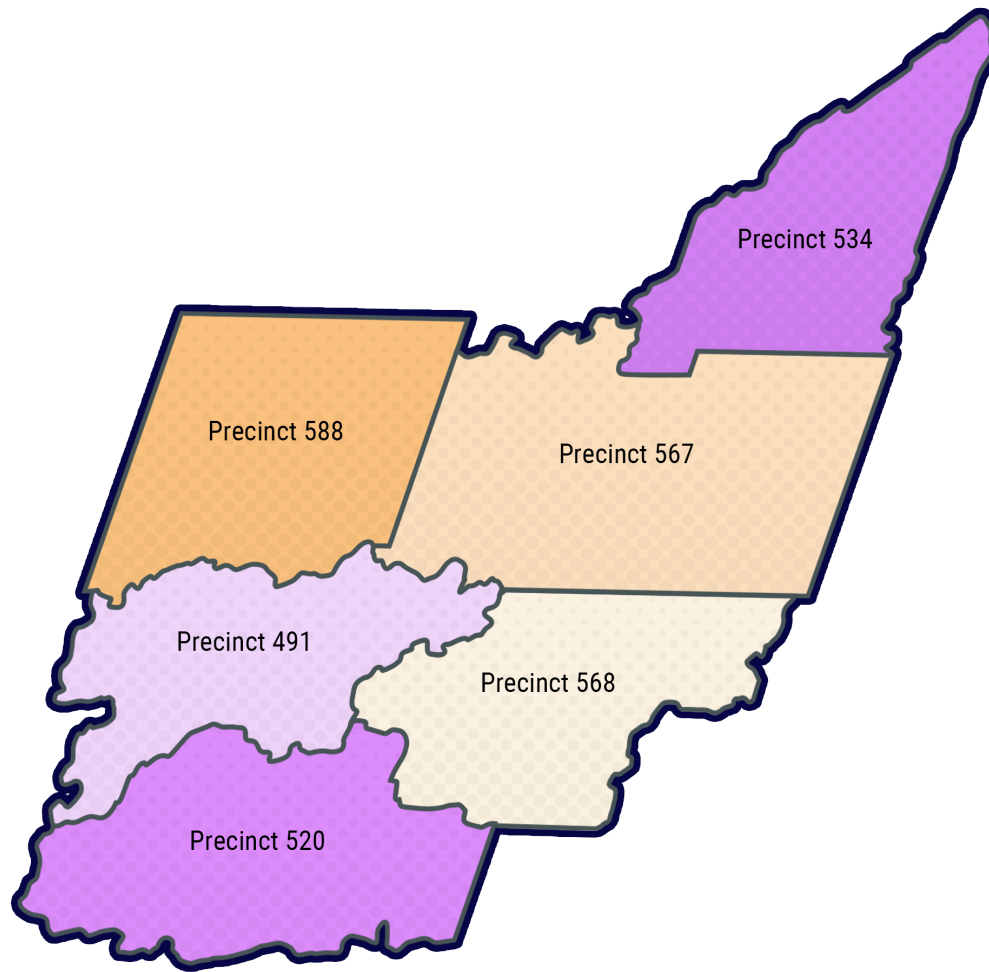


Fundraising can be used to secure additional money tokens. The voter registration drive converts voters from the “unregistered” column to the “for” column. Finally, issues campaigns can convert voters from the “against” column to the “for” column—but only if they appeal to a popular topic. A news event in the second turn of Mission 1 always injects a popular issue to a district to introduce the player to this mechanic.

Encourage experimentation and critical thinking as students face down two districts that are heavily weighted against them. Remind students that they only need to secure a majority of the votes for this race, not all votes.



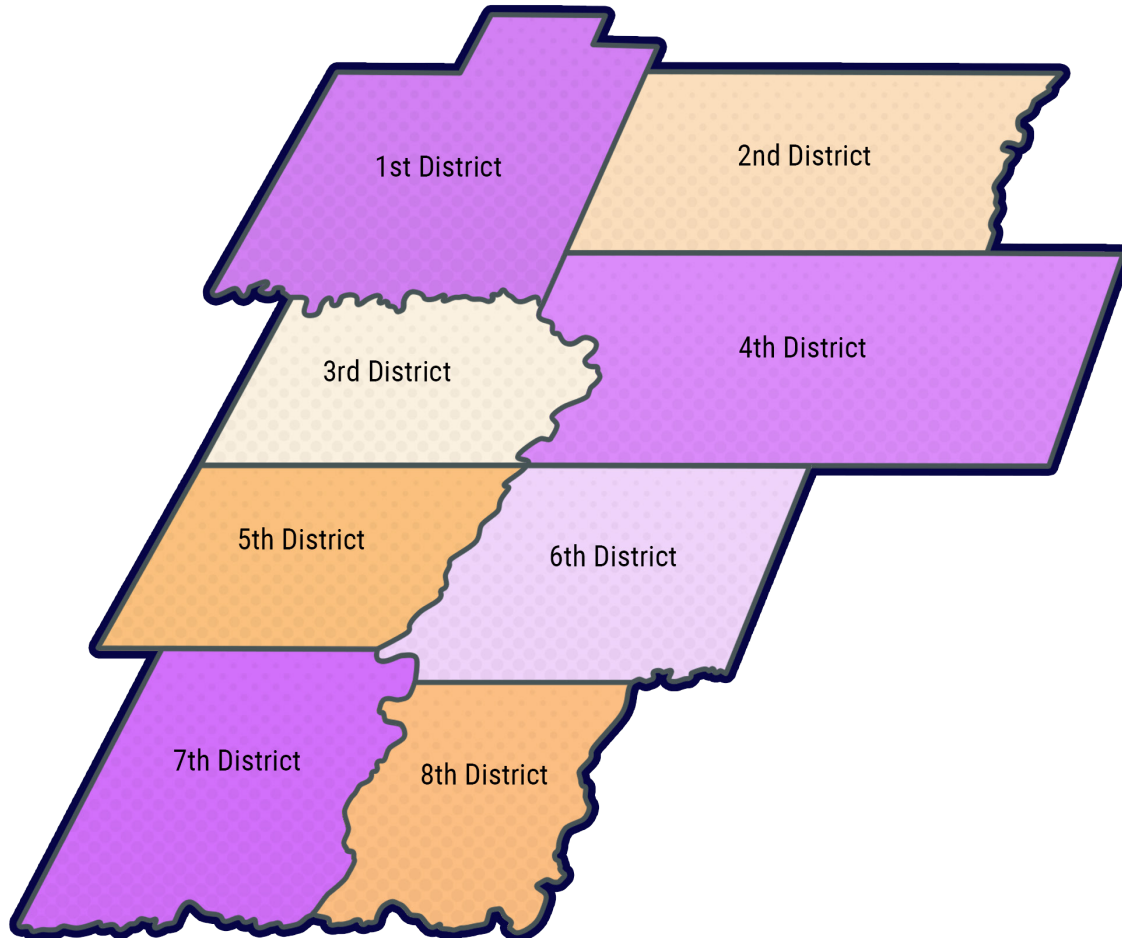
Mission 2



The player proceeds with the strategies they mastered in Mission 1 and tries to conquer a state election by securing a plurality of votes from a total of six new districts.



Mission 3

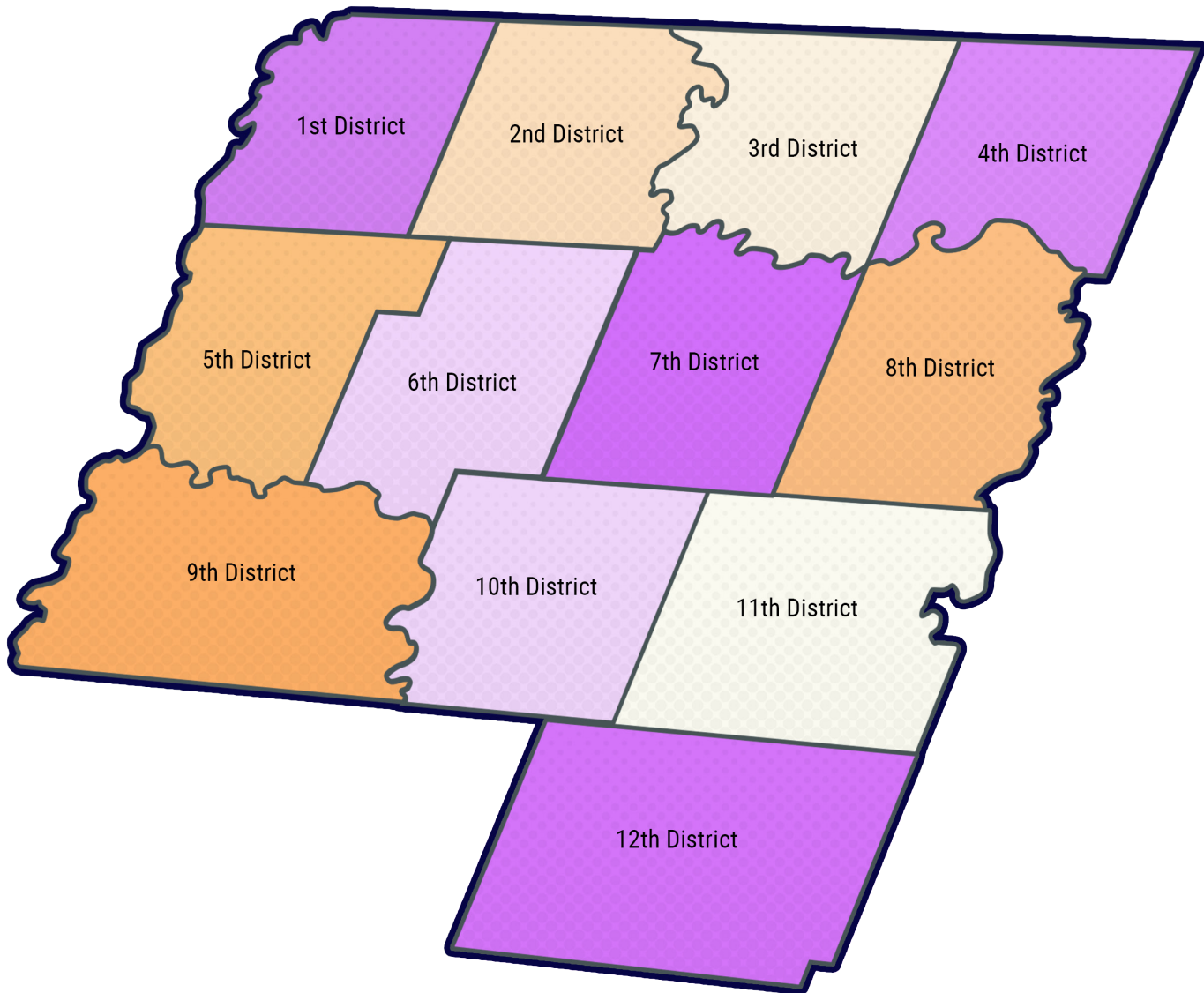


The player proceeds with the strategies they mastered in Mission 2 and tries to conquer a congressional senate election by securing a plurality of votes from a total of eight new districts.

Upon reaching the second week, the player will have an additional appearance token to spend each turn.



Mission 4

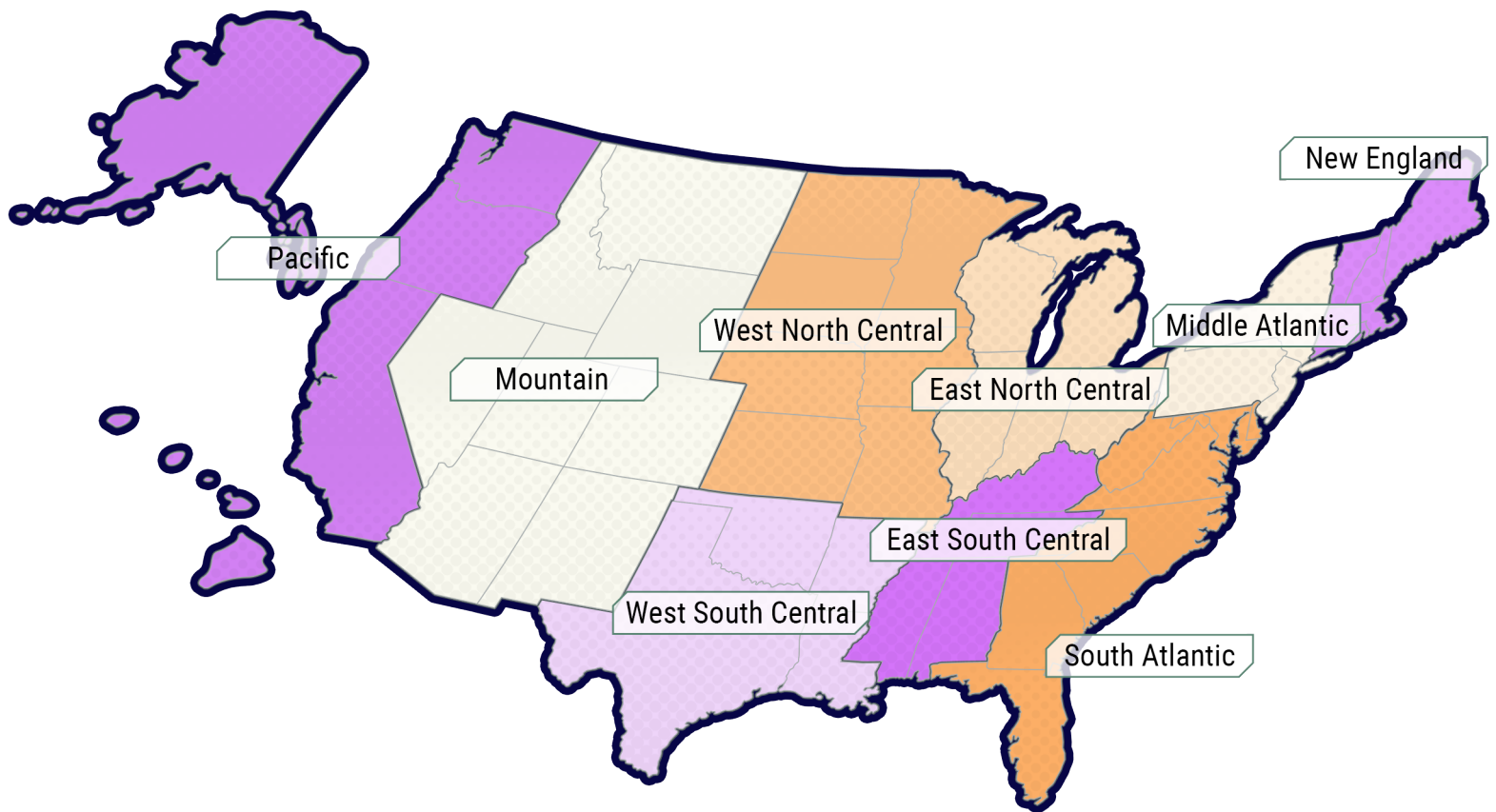


The player proceeds with the strategies they mastered in Mission 3 and tries to conquer a gubernatorial election by securing a plurality of votes from a total of twelve new districts.

The player now has an additional money token to spend each turn.



Mission 5



Finally: the presidential race. The player needs to apply all the strategies they've garnered thus far to secure the presidency for their candidate! This mission features some unique mechanics because this time, the goal is not to secure the most votes overall—the goal is to get more electoral votes than the opponent.

The United States is divided into regions based on the United States Census. If the player manages to win the popular vote in a region, all the Electoral College votes from that region will be granted to them, winner-takes-all style. They will have to carefully edge out the competition in each region to secure as many votes as possible before election day.

For this mission, the player gains one additional appearance token to spend each turn.



General Tips

- Rally often to raise favorability and increase the potency of smear and grassroots campaigns.
- Use fundraisers in districts with the highest number of “for” voters.
- Use issues campaigns only when certain the issue will appeal to voters.
- In districts with a high number of undecided voters, keep favorability high. Your favorability will determine the number of voters who chose your candidate on election day!
- To see which districts are worth investing more campaign resources in, pay attention to the actual population numbers in each district.
- Remember that, in Mission 5, as long as you get at least one vote more than your opponent, you get every elector vote for that region. Focus on a narrow victory in a wider range of regions rather than increasing votes in areas already voting for your candidate.
- If you get stuck, try rallying twice, smear campaigning twice, and grassroots campaigning twice (in that order) in districts heavily weighted against you.





Vocabulary

Caucus: A meeting of the members or leaders of a political party to choose candidates or to decide policy.

City Council: A group of elected individuals that make laws for a city and help govern it

Delegate: A person who is chosen or elected to represent the views of a group of people and to vote and make decisions for them.

Electoral College: A process in which officials known as electors submit votes for a presidential candidate on behalf of the electorate they represent. Each state has a number of electors equal to the number of politicians that serve that state in Congress.

Electorate: The group of people in a country or an area who have the right to vote

Favorability: The extent to which someone or something is liked and approved of by people

Issues Campaign: A campaign with a series of messages used to share an idea or concern. Politicians often use these messages to appeal to voters and gain support.

Political Fundraiser: An event at which guests contribute money to the campaign of a candidate they support.

Popular Vote: The choice expressed in an election by the majority of people who vote (but which may not necessarily determine who wins the election, depending on the system used).

Primary: An election in which people in a particular area vote to choose a nominee or a candidate for an important future election.

Rally: An event at which people gather to show support for a candidate and/or the political party of which the candidate is a member.

Smear Campaign: A campaign in which negative advertising is used to ruin the reputation of a public figure or political candidate.

State Legislature: A group of elected representatives who are responsible for making laws for the state.

Straw Poll: An unofficial vote, often conducted prior to a caucus or primary, which gives a candidate and their campaign staff an idea of how the majority of citizens in a state will vote.

Swing State: A state where none of the candidates can be guaranteed elector support during a U.S. presidential election.

Voter Registration: The process that takes place when an eligible individual meets the necessary conditions within a state to vote.



References

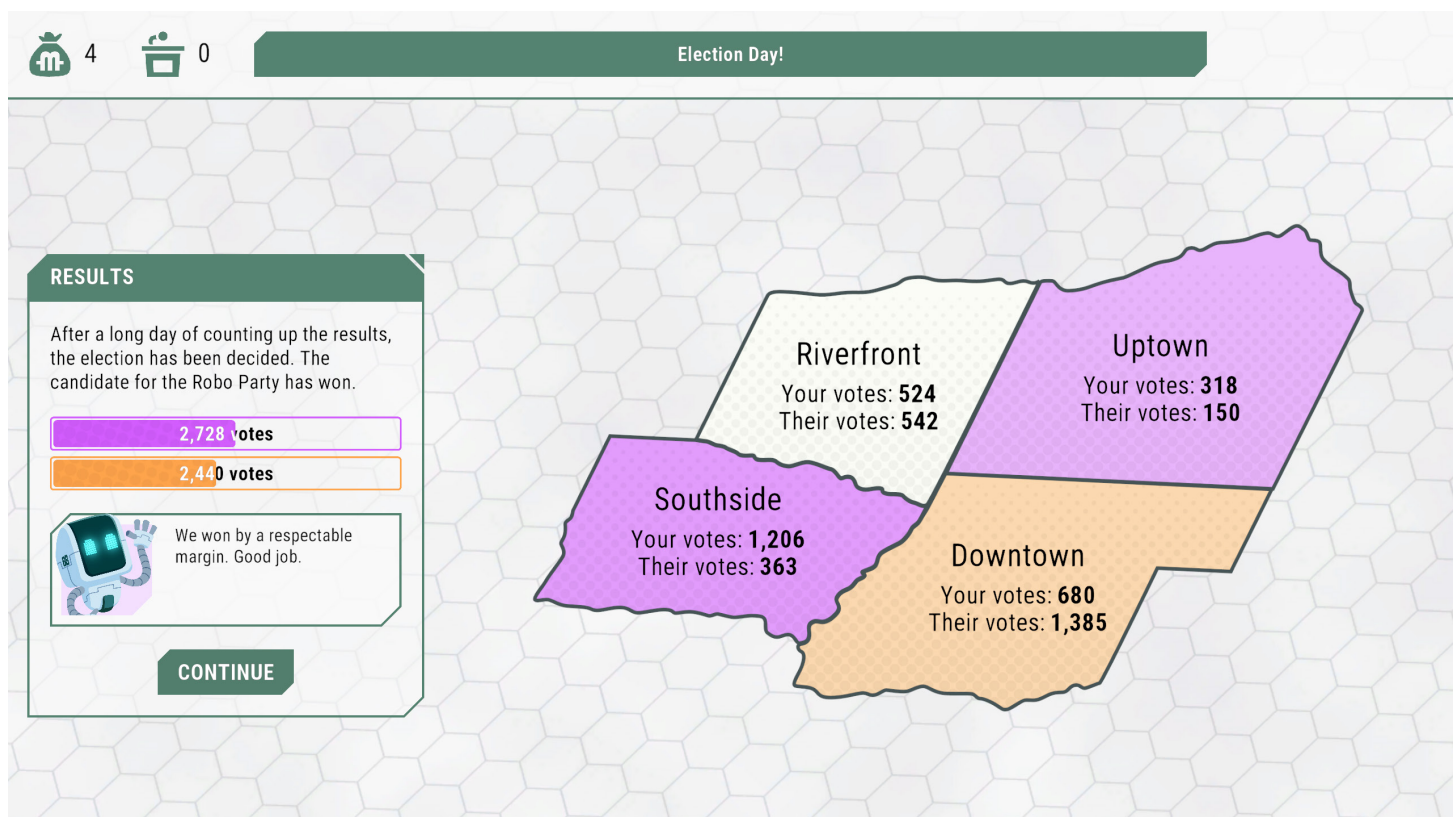
Computer Science Teachers Association (2017). CSTA K–12 Computer Science Standards, Revised 2017. <https://csteachers.org/k12standards/>

Hunsaker, E. (2020). Computational Thinking. In A. Ottenbreit-Leftwich & R. Kimmons (Eds.), *The K-12 Educational Technology Handbook*. EdTech Books. https://edtechbooks.org/k12handbook/computational_thinking

Mindetbay, Y., Bokhove, C., and Woollard, J. (2019). What is the Relationship Between Students' Computational Thinking Performance and School Achievement? *International Journal of Computer Science Education in Schools*, 2(5), 3–19. <https://doi.org/10.21585/ijcses.v0i0.45>

Wing, Jeannette M. (2006). Computational Thinking. *Viewpoint. Communications of the ACM*.

Wing, J. M. (2006). Computational Thinking. *Communications of the ACM*, 49(3), 33–35. <https://www.cs.cmu.edu/~15110-s13/Wing06-ct.pdf>





Contacts

Dr. Scott Wilson

K20 Associate Director of Innovative Learning

405-325-2608 | scott.wilson@ou.edu

Javier Elizondo

GBL Director

(405) 325-1267 | elizondoj@ou.edu

Will Thompson

GBL Senior Instructional Game Designer

(405) 325-1267 | will.thompson@ou.edu