IGNITEMYFUTURE

LESSON TITLE

Can iAccess?

Guiding Question: Is Life Fair?

SUBJECTS

Social Studies
English/Language Arts

COMPUTATIONAL THINKING PRACTICE

Recognizing and Defining Computational Problems

COMPUTATIONAL THINKING STRATEGY

Collecting Data

MATERIALS

Internet Access Survey student capture sheet

Computers with Internet access

Ignite Curiosity

- What kinds of things do you do when you access the Internet, and how would you do these things if you didn't have Internet access?
- What kinds of things are difficult or impossible to do online if Internet service is slow?
- How do you think the Internet improves, or could improve, your life?

In this lesson, students will use the computational thinking strategy of collecting data to develop a density map of broadband access in their state. In **THINK**, students will discuss how the Internet impacts their lives. In **SOLVE**, students will use the Internet to develop a key to denote the range of broadband access across different counties in their state. In **CREATE**, students will use their key to create a broadband access density map and identify areas of low to no access for their state. In **CONNECT**, students will extend the concepts of this lesson to the role they can play in expanding Internet access in their communities. Students will identify careers such as social workers, civil engineers, and communications technicians who help people use the Internet and develop the infrastructure that provides Internet access.

Students will be able to:

- **Understand** how Internet access impacts an individual's quality of life,
- **Analyze** maps to discover possible areas with no Internet access in their home state, and
- **Create** a visual display of broadband access for their home state.

Students will discuss the impact of the Internet on their lives and how their lives would be different if they did not have easy access to the Internet.

1 **Read** the following information to students:

The Internet helps people accomplish many things. Increasingly, people rely on online platforms to do everyday tasks like shopping, researching, working, learning, and communicating. However, not everyone has access to the Internet. Many individuals and families do not have computers, smartphones, or other technological devices. Research shows that individuals without regular access to the Internet are susceptible to "digital readiness gaps," or a lack of technological literacy. As a result, these individuals may not have access to the education and career opportunities that those with Internet access have. Let's see how you, your family or friends, and others use the Internet!

2 **Students will carry out** a multistep experiment on Internet activities by taking measurements that indicate the time saved or wasted by using the Internet.

Teacher Note: Encourage students to consider how they personally use the Internet. If students do not use the Internet outside school or for purposes other than school assignments, ask them to survey someone they know who uses the Internet for many purposes. The purpose of this activity is to gain experience in collecting data and analyzing results.

- Distribute the Internet Access Survey student capture sheet and ask students to read through the directions. Provide assistance as needed, but make sure students understand this multistep survey process.
- Allow students time to complete the survey process (up to one day, depending on their ability to gather data).
- Once students have completed their data tables, allow them to share the results of their experiment with the class.
- Provide a final analysis (Part D) by combining the results of all student surveys.

3 **Introduce** students to the results of the Pew Research Center's study on Digital Divides.
- If you have Internet access in the classroom, allow students to look through the findings of the Digital Divides presentation. If you do not have Internet access in the classroom, print the graphs displayed in the Digital Divides presentation to share with the class.
- Ask students to make personal observations about the findings in this study as they view the information.
- As a class, discuss the observations students made about the presentation.

Teacher Note: If possible, during the final discussion, ask students to support their responses to the following questions with the visual displays found in the Digital Divides presentation:
- How important do you think it is to have Internet access?
- Who benefits by having Internet access?
- Who gets left behind because they do not have Internet access?
- Should everyone have the right to Internet access? Why or why not?
- Is there a way to make Internet access available to everyone? If so, how?

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Students will collect data on broadband access in their home state.

1 **Ask** students to collect data on broadband access in their home state using the Federal Communications Commission (FCC) 2016 Broadband Progress Report.

2 **Instruct** students to find a Maps section by scrolling down the page.

3 **Allow students to identify** the dataset they need to build a broadband access map of their home state based on the information in one (or more) of the maps from the FCC website.

4 **Ask students to identify** a key to denote the range of the data they will collect for the different counties in their home state. For example, students can collect data about whether any broadband access is available and, in counties that have broadband access, the speed of access that is available.

5 **Assist** students as necessary in interpreting the data given by the maps on the FCC website.

Teacher Note: Tips on using the FCC website:
- Access the Federal Communications Commission (FCC) 2016 Broadband Progress Report.
- Scroll approximately two-thirds of the way down the page to locate "Maps."
- Click on a link for one of the maps.
- Enter your address in the "Enter Address" bar above the map and click on the magnifying glass.
- The map automatically goes to your desired area.
- There are notes with each map to show what you are looking at to help with interpretation.

Students will create a broadband access density map for their state to highlight areas where Internet access is prevalent and identify areas of low to no access.

1 **Distribute** a state map with counties. Maps can be obtained from the U.S. Census Bureau webpage.

2 **Allow time** for students to complete their maps according to the dataset they collected during Solve.

3 **Allow students to discuss** the information they gathered by completing their maps. For example, where is Internet access prevalent? Where is there low or no access in their area? What areas of the state need Internet access or faster Internet access?

4 **Allow students time to research** ways to expand broadband access. Possible sources for research include the following:

- http://www.tn.gov/assets/entities/tacir/attachments/2016December_Tab3BroadbandMemo.pdf
- https://risebroadband.com/2017/06/4g-lte-leveraged-fixed-wireless-broadband-rural-communities-rcr-wireless-news/
- http://agecon.unl.edu/cornhusker-economics/2017/broadband-availability-improving

5 **Finalize** the activity by brainstorming ways students can help expand Internet access to members within their community.

Select one of the strategies listed below to help students answer these questions:

- **How do this problem and solution connect to me?**
- **How do this problem and solution connect to real-world careers?**
- **How do this problem and solution connect to our world?**

1 **Write** the three questions on PowerPoint or flip chart slides and invite students to share out responses.

2 **Display** pieces of chart paper around the room, each with one question written on it. Ask students to write down their ideas related to the questions on each sheet.

3 **Assign** one of the questions to three different student groups to brainstorm or research, and then share out responses.

4 **Invite** students to write down responses to each question on a sticky note, and collect them to create an affinity diagram of ideas.

How does this connect to students?

Today, Internet access provides many benefits, and it can easily be taken for granted. Students will connect the concepts in this lesson to their communities and brainstorm ways they can promote or enhance Internet access in their own communities.

Developing possible solutions for problems empowers students to become active, productive citizens.

How does this connect to careers?

Social Workers deal with improving the quality of life for many groups of people, including families, the elderly, and children. The digital divide is a form of social exclusion that social workers can help correct.

Civil Engineers promote Internet access and work to bridge the digital divide. The rationale behind their proactive approach to improve Internet access is because their field requires people who are computer literate. Internet access is one way to build a computer-literate society.

Communication Technicians work directly with Internet access. They are responsible for installing, building, and maintaining the equipment that delivers access to the Internet.

How does this connect to our world?

Fixed and broadband Internet services enable people around the world to connect and collaborate quickly in real time. This provides opportunities for progress on a global scale.

The ability to quickly and easily communicate with other cultures and across our own continent is an advantage for those who have Internet access. However, it can present a barrier to the concept of equal rights for those without Internet access.

Helping students understand how the lack of Internet access can be a barrier for individuals promotes equal rights and opportunities. In this lesson, students discover how to seek information using reputable websites to locate areas of technological need within society.

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National Standards

Key Ideas and Details:
CCSS.ELA-LITERACY.RST.6-8.3
Follow precisely a multistep procedure when carrying out experiments, taking measurements,
or performing technical tasks.

Integration of Knowledge and Ideas:
CCSS.ELA-LITERACY.RST.6-8.7
Integrate quantitative or technical information expressed in words in a text with a version of that
information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-LITERACY.RST.6-8.9
Compare and contrast the information gained from experiments, simulations, video, or
multimedia sources with that gained from reading a text on the same topic.

C3 FRAMEWORK

D2.Geo.3.6-8
Use paper based and electronic mapping and graphing techniques to represent and analyze
spatial patterns of different environmental and cultural characteristics.

K-12 COMPUTER SCIENCE FRAMEWORK

Practice 3. Recognizing and Defining Computational Problems
The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over
time and is central to computing. Solving a problem with a computational approach requires defining the problem,
breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

Internet Access Survey

Part A: Create the Recording Instrument

1 Construct a table with 4 columns and 11 rows.

2 Label row 1, column 1 "Internet Activity."

3 Label row 1, column 2 "Time on Task."

4 Label row 1, column 3 "Optional Method."

5 Label row 1, column 4 "Saved or Wasted Time."

Part B: Conduct a Survey

One row equals one test. Conduct a survey by one of the three following methods to include 10 tests for your survey data.

1 **Method 1:** Use 10 things you have completed by using Internet access.

2 **Method 2:** Use 10 things you or a family member has completed by using Internet access.

3 **Method 3:** Use 10 things you, a family member, or a friend has completed by using Internet access. Make sure your friend is not completing this survey, too.

Part C: Survey Guidelines

Complete the table you have created as follows:

Internet Activity: Provide a brief description of the type of activity completed using Internet access. For example, writing an email, researching a topic for a school project, playing a game.

Time on Task: Estimate how much time each activity took to complete. Time does not need to be exact, but include a time as close as possible.

Optional Method: Identify how the task could have been completed without Internet access. For example, an alternative to writing an email would be to make a phone call or write a letter through regular mail.

Saved or Wasted Time: Estimate how much time was saved (or wasted) as a result of using the Internet. For example, by writing an email instead of writing a letter, 2 or 3 days may have been saved in delivering the message. This would be noted as a positive number for saved time: +2 days. If the person would have called instead of writing an email, it is likely they would have wasted time by discussing other things that weren't in the email. This would be noted as a negative number for wasted time: −20 minutes. Some activities, like playing a game, might take the same time with Internet access as without. For these activities, write 0 in this column.

Part D: Analyze the Data

1 Add all Time on Task results to create the Total Time Spent on the Internet results for your survey.

2 Add all positive numbers, or Saved Time, to create the Total Time Saved results for your survey.

3 Add all negative numbers, or Wasted Time, to create the Total Time Wasted results for your survey.

4 Create some type of visual display, such as a pie chart or a bar graph, to share your results with others.