DIGITAL DIVIDE SCAVENGER HUNT

Digital Divide
Lesson 4 of 4

Overview

The FCC broadband coverage map uses the information provided by different ISPs (Fixed-line and mobile broadband Internet service providers) to illustrate the broadband coverage status in the US. The information provided by the ISPs can often be inaccurate. Such inaccuracies can be detrimental to our efforts to identify and fight the digital divide.

This activity will teach the students to collect measurement data, e.g., speed or bandwidth, of the available Internet connection(s) at various locations and identify places where the digital divide might exist.

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Standards

Standards are based on fifth-grade learning standards unless otherwise specified.

Computer Science
CSTA 1B-NI-04 AZ 5.NI.NCO.1 CSTA 1B-IC-18
CSTA Standards: https://www.csteachers.org/page/standards AZ Computer Science: https://www.azed.gov/sites/default/files/2018/10/Arizona%20Computer%20Science%20Standards_3_5_Final%2006.24.2019.pdf?id=5bc90a611dcb2510102f55b8

Social Justice
JU.3-5.14
Learning for Justice: https://www.learningforjustice.org/sites/default/files/2021-11/LFJ-2111-Social-Justice-Standards-Anti-bias-framework-November-2021-11172021.pdf

English Language Arts
AZ 5.W.1 AZ 5.W.8
AZ English Language Arts: https://www.azed.gov/sites/default/files/2016/12/5th%20Grade%20ELA%202016%20Final.pdf?id=585aa90eaadebe12481b8443

Math
AZ 5.MD.A.1 AZ 5.MP.2 AZ 5.MP.3

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AZ Math: https://www.azed.gov/sites/default/files/2016/12/Math%20Final%2005Fifth%20Grade%20Standards%2042_2018.pdf?id=58546f66aadebe13008c1a31

Social Science
AZ 5.G1.1 AZ 5.G2.1 AZ 5.G3.1
AZ History and Social Studies: https://www.azed.gov/sites/default/files/2018/10/3-5%20Grade%20Band%20Standards%20at%20a%20Glance%206.10.19.pdf?id=5bd772a61dcb250b94e916ef

Learning Outcomes

By the end of this lesson, students will be able to:

- ☐ Use tools to collect Internet measurement data
- ☐ Compare the collected data with the data obtained from official sources, e.g., the FCC broadband map
- ☐ Estimate the accuracy of the FCC broadband map
- ☐ Interpret the data to identify places where the digital divide might exist, especially in Arizona

Background

Big Ideas

- ☐ An important first step to improving the digital divide is understanding the data that we have about it
- ☐ The digital divide exists in Arizona, especially in rural places like the reservation
- ☐ Maps of the Internet help us see places impacted by the digital divide more clearly
- ☐ The official maps that we have of the digital divide in Arizona are not very accurate

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Pre-Lesson Prep for Teachers

Explore the FCC Broadband Map:
https://broadbandmap.fcc.gov/#/location-summary?version=dec2020&place_name=Flagstaff,%20Arizona,%20United%20States&lat=35.199500&lon=-111.651400&tech=acfosw&speed=25_3&vlat=35.1992661178427&vlon=-111.65155722074621&vzoom=15.193447313018835

Lesson Plan

Total time: **58 minutes (Part-1: 30 minutes, Part-2: 28 minutes)**

Part-1			
Time	**Teacher is…**	**Students are…**	**Materials needed**
7 minutes	Leading students in a exploratory talking circle by asking the following questions: ☐ *Last week, we talked about the digital divide. Can you remind us about what that means?* ☐ *Do you think people in Flagstaff (Arizona, United States) experience the digital divide? Why or why not?*	Answering the teacher's questions and building on each other's responses.	A space for students to sit in a circle

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10 minutes	Have students go into groups OR have them stay in the circle. If in groups, students can use the iPad to go to: https://broadbandmap.fcc.gov/#/location-summary?version=dec2020&lat=35.208521&lon=-111.610108&tech=acfosw&speed=25_3&vlat=36.541117129431654&vlon=-111.711321671601078&vzoom=6.555395883118555 [You can also show this to everyone at once on a projector] *This is a map created by the Federal Communications Commission–a special government team that is in charge of making sure all citizens in the US have Internet access. This map is used to see who has Internet access and how they access the Internet.* Figure 1 shows a screenshot of the map when I search for Flagstaff. You can search for Flagstaff, too. It can be good to point out some familiar landmarks on the map to students Walk through the	Opening FCC Broadband Map on their iPad and answering the check for understanding questions.	A space for students to sit in a circle Or breaking students into groups to look at map as a group. iPads

	legend of the map with students so they understand what the different parts of the legend mean. Explain that the darker colors mean there are more options for people and light colors mean there are fewer options for people. Note the different types of technology that are represented in the legend–and note the absence of fiber optic cable in Flagstaff! Check student's understanding through a few quick questions about the map: ☐ *Where is there a place in Flagstaff with 6 or more options for data links to the Internet?* ☐ *Where in Flagstaff is there no ethernet data link to the Internet?* ☐ *How many different Provider options are there at Killip Elementary School?*		
10 minutes	Have students explore the map in their group. To help guide their exploration, have them	Exploring the map and answering a few questions using the map.	iPads Student groups

	see if they can find the following: ☐ *Are there more data link options in Flagstaff or on Navajo Nation?* ☐ *Is there any fiber or ethernet in Polacca, AZ (First Mesa Village in Hopi)?* ☐ *What are the Internet options available at your home?*		
3 minutes	Posting a question to Nearpod for students to respond to: ☐ *What are some things we can learn by looking at the FCC broadband map?*	Responding to Nearpod prompt	Nearpod
Part-2			
Time	**Teacher is…**	**Students are…**	**Materials needed**
3 minutes	Explaining to students that they have been working really hard to understand the FCC Broadband Map and now it is their chance to take the same steps that science heroes take to begin taking next steps to improve the digital divide–making hypotheses about where it exists, *even if the maps do not seem*	Listening to the teacher and getting ready to take the first step as data analysis heroes	A space for students to sit in a circle

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	to show that the digital divide is there. After providing this interface, you can hand out the following scavenger hunt checklist (you can print this out or use it as a guide for a different format, like NearPod)		
12 minutes	Providing instructions to students about how to do the scavenger hunt based on the FCC Map Scavenger Hunt Activity. For example, the teacher might: ☐ Tell students to find a team or a partner or work solo ☐ Walk through the example given on the activity page ☐ Start a timer for how long everyone has to complete the scavenger hunt (10-15 minutes) ☐ Let students know that there are some special prizes at the end of the scavenger hunt		
10 minutes	Bringing the students back together to see who got the most items checked off the scavenger hunt list or who completed the list first. To help with the		

	competition, you might want to draw up a leader board on the whiteboard ☐ Ask students to tally up the number of items they checked off ☐ Who checked off the most? [Speediest Searcher Award] ☐ Who looked at the largest number of different states ? [Internet Explorer Award] ☐ Who found the place with the slowest speeds (could be calculated as a place that offers a maximum/"fastest" speed that is the lowest of all the other places)? [Digital Divide Detective Award]		
3 minutes	Guiding students to complete an exit ticket: ☐ How does understanding the map make us digital divide heroes?		

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Figures

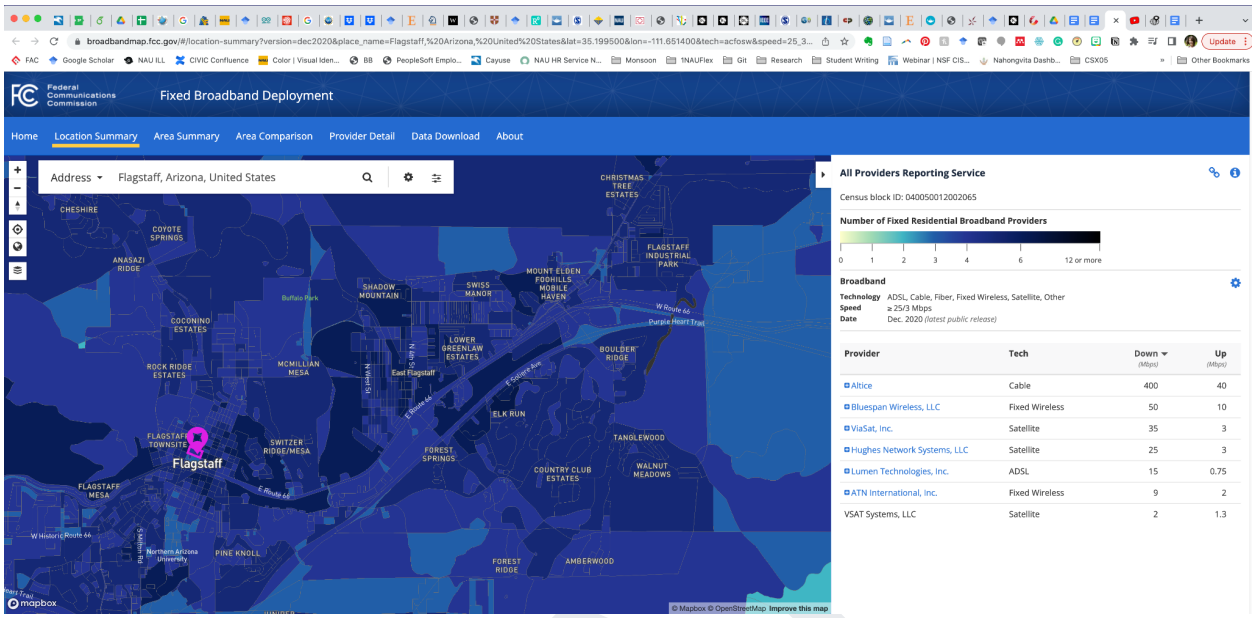

Figure 1. Screenshot of the FCC Broadband map that shows the city of Flagstaff. The color of the map represents the number of "Providers" are available in any given place. The darker colors mean there are more options to choose from. "Providers" are companies that own the data links that connect buildings to the Internet. The "Tech" is the data link technology used to connect places to the Internet. Cable and ADSL both use Ethernet cables (electricity) for data links. Fixed Wireless and Satellite are both radio wave data links. Note that there are no fiber optic cables in Flagstaff!

The "Down" speed is the speed that bits can be downloaded from the Internet to a device over the data link. The "Up" speed is the speed that bits can be uploaded from a device to the Internet over the data link.

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Assessment Ideas

Quiz Questions and Answers

Use these questions in whatever format you use in your class to check for understanding, including Kahoot, iClicker, or Google Classroom quizzes.

Q: What tools or software did you use to collect the Internet speed data?
A: I used …… to collect the data.

Q: What do the minimum and maximum Internet speeds available at someplace might mean to someone?
A: They mean the highest and lowest range of Internet speeds someone might experience while using the Internet at that particular place.

Q: In how many places does the measured data differ significantly from the FCC broadband map data?
A: In ..... places.

Q: Which of the followings can be used in addition to the FCC broadband map to decide if the digital divide exists somewhere?

A. Real-life Internet measurements collected by someone
B. How many houses have puppies in an area
C. None of the above

Reflection Questions

You can use these in whatever format you use in your class for reflection, including science journals, Near Pods, exit tickets, or in Exploratory Talking Circles.

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FCC Map Scavenger Hunt Activity

Name:_____ Date:_____

Use the FCC Broadband Map to check off as many of the items as you can:

Report the state, geocoordinates, highest available speed, and number of providers for each entry that you check off.

Here is an example:

- ☑ ~~Somewhere near a river~~

State: New Mexico
Geocoordinates: 36.218357, -105.873352
Highest download speed: 50 Mbps
Number of providers: 8

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- ☐ Somewhere in Flagstaff
- ☐ Somewhere on Navajo Nation
- ☐ Somewhere with more than 10 providers
- ☐ Somewhere with only 1 provider
- ☐ Somewhere where you believe the map is accurate
- ☐ Somewhere where you think the map is not accurate
  - ☐ Bonus point if you can give a reason why you do not believe the map in this place
- ☐ Somewhere in a big city
- ☐ Somewhere in Cameron, AZ
- ☐ Somewhere in the desert
- ☐ Somewhere on the Hopi Reservation
- ☐ Somewhere by the ocean
- ☐ Somewhere near a lake
- ☐ Somewhere in Kayenta, AZ
- ☐ Somewhere near the mountains
- ☐ Somewhere with lots of trees
- ☐ Killip Elementary School
- ☐ Somewhere in Leupp, AZ
- ☐ Somewhere in a National Park
- ☐ Somewhere where you want to live one day
- ☐ Somewhere where your family lives
- ☐ Somewhere in Washington, D.C.
- ☐ Somewhere on an island