

Name _____

Spectrum Management Sheet

Today you and your group will investigate the companies that use the electromagnetic spectrum to broadcast in your area. Please go to the following web page.

<https://www.radioreference.com/apps/db/>

Once you go to the address above, you need to click on your state. Then click on your county. Ask your teacher for assistance if you cannot identify your county on the map. Once you click on the correct county, a page with the county spectrum users and links to private users in the county will come up.

Start with the county users. Scroll down the page, and you will see them listed. To find out more about an entry, click on the license or the system name, depending on the table. This will provide you with more information that you can use to fill in the table below.

Once you are finished with the county, users scroll to the top of the page and look for the county quick jumps menu (to the right of the map). Under the heading "Other Agencies," you will see a list. You will have to click on each category one at a time to find all the spectrum users. As you go through the categories, gather information to fill in the table below. If you run out of rows in the table below, you can create an additional table on notebook paper.

Agency	Use	# of frequencies



Aeronautical mobile	Aircraft radios and emergency location transmitters			
Aeronautical radionavigation	Navigation, obstruction warning, instrument landing, and measurement of altitude and range			
Amateur radio	Regular people communicate using radio frequencies. They are often called Ham radio operators or hams.			
Amateur satellite	Regular people launch satellites to collect data or for communications.			
Broadcasting	Radio or tv broadcasts from antennas on Earth			
Broadcasting satellite	Broadcasts radio and tv from space			
Earth exploration satellite	Used for measuring soil temperatures and moisture, which is useful for farming, for communication with radio tags on wildlife, to measure the size of forests and other land features, and takes images used for urban planning.			
Earth Sensing	Scientific apparatus that collect data. For example, radio tracking collars on wildlife.			
Fixed satellite	Communication between two communication stations on Earth which requires the signal to be sent from one Earth station to a satellite and then to the second Earth station.			
Inter-satellite	Communication between satellites			
Land mobile	A mobile communication that involves antennas located on Earth			
Maritime mobile	Ship-to-shore or ship-to-ship communication involving hardware on Earth			
Maritime radionavigation	Ship navigation systems			
Meteorological aids	Weather sensing from a ground station			

Meteorological satellite	Weather sensing from a satellite			
Mobile	Communication or data transfer using devices that can move			
Mobile satellite	Hand-held communication devices that make calls using a satellite. Usually referred to as a satellite phone.			
Radio astronomy	Using radio waves to study bodies in space			
Radiodetermination satellite	A different way to use satellites for communication. It can work for people with mobile devices on land or ships.			
Radiolocation	Using radio waves to determine the location of something using a land-based system.			
Radionavigation	Using radio waves to plot a course using land-based hardware			
Radionavigation satellite	Using radio waves to plot a course using satellites			
Space operation	Radio frequencies dedicated to the communication necessary to launch a spacecraft and for continued communication between the land and the craft when in space			
Space research	Radio frequencies dedicated to scientific data collection in space			
Standard date and time communication	Radio frequencies to broadcast the current time and date			

The federal government allocates spectrum to licensed users based on a complicated system of rules. Read the handout – **How Spectrum is Allotted** – to learn more. However, by analyzing the spectrum chart, you can determine which uses the government is prioritizing based on the amount of spectrum allotted. Go to <https://www.ntia.doc.gov/page/2011/united-states-frequency-allocation-chart> and download the PDF version of the chart. While the writing appears very small at first, remember you can increase the size of the document to make it easier to read. All of the categories from above are represented in this table and are color-coded. For each category, you need to estimate the total percentage of the spectrum allocated to that use. Ask your teacher if you need some help with making this estimation. It is important to remember that this technique is intended to give you an idea of how much spectrum is allocated to each use, not an exact measure. Once you have determined the percentage for each category (Hint: your percentages should add up to 100), give each category a rank. The



one with the highest percentage is #1, representing the category the government thinks is most important.

Category	Description of included uses	%	Ranking
Aeronautical mobile	Aircraft radios and emergency location transmitters		
Aeronautical radionavigation	Navigation, obstruction warning, instrument landing, and measurement of altitude and range		
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Please note: If you look at the chart, you will see a color assigned to Fixed, which refers to the location of the hardware used for that service. For a fixed service, the hardware is on Earth. This is not a category of its own but rather a description of other categories.



Mobile – a base station is on a vehicle that moves. This could be on a plane, ship, etc. This is not a type of user but rather a description of a user.

Conclusions

Compare your rankings to the rankings created from the government table to answer the following questions.

1. Were there any similarities between your rankings and the government's rankings?
2. What differences existed between the two rankings?
3. Why do you think these differences exist?
4. Which use do you think the federal government should allot more spectrum to? Why?
5. Which use do you think the federal government should allot less spectrum to? Why?
6. The government sells the right to use specific frequencies to cell phone companies. In areas with large populations, many companies show interest in purchasing those frequencies because they will likely get a lot of customers. Conversely, because there are so many cell phone companies in the area, the competition for customers is fierce, and the prices remain low. However, fewer cell phone companies are willing to purchase the right to use the frequencies in areas with low populations. Therefore, there is less competition, and the prices are typically higher than in an area with a larger population. How do you think the government could entice companies to provide service in those low-population areas? Are there any additional consequences from that governmental action?

