|	**Examining the Spatial Distribution of Regional and National Convenience Stores** **By Joseph J. Kerski, PhD GISP,** jkerski@esri.com
Activity	Investigate the distribution of regional and national convenience stores using the Community Analyst web mapping application, considering several scales.
Background	A variety of economic, geographic, and other factors influence a store chain to "stay regional" vs. going national or international. Spatial patterns of where these regional chain stores are located often tell a story about where the headquarters is located, about population trends, demographics, climate, business tax rates, human behavior, and much more. The patterns sometimes overlap competing stores of the same type, and other times are adjacent. This exercise uses a web based Geographic Information System (GIS) as an analytical tool to analyze the locations of regional convenience stores, and to site a new store in a community.
Requirements	Access to Community Analyst, by Esri, 16 questions requiring 1 to 3 class periods (1-3 hours), and broadband connection. Can be run with 1 computer and 1 projector with instructor leading the questions; or (ideally) – run with each student (or team of 2 students) with their own tablet or laptop computer.
Standards Connections	C3 Social Studies Framework: Geographic representations, human population, and change. National Geography Standards: Using maps and geographic tools, physical/human characteristics of place, patterns/functions of human settlement. **Common Core** Math Standards: The number system, measurement, ratios, geometry, statistics. Economics: 2: Decision-making. 3: Allocation. 6: Specialization. 13: Income. 14: Entrepreneurship. 18: Economic Fluctuations. Business Standards: Economic systems, marketing, risk, prices.

⚙️ Analyzing 2 Regional Convenience Stores

➔ **1. Discuss the following:** How does a convenience store chain decide where to locate its stores? What economic, geographic, and other factors influence a store chain to stay only in one region vs. going national or international? What is the spatial pattern of two regional chains of a specific type of store? How does the pattern of convenience stores compare to that of other types of businesses (such as florists or pharmacies) at the local and regional scale? How can GIS tools be used to analyze regional convenience stores, demographics, and to site a new store?


Pilot Travel Center, photo by Joseph Kerski.

2. Access Community Analyst. Go to Community Analyst https://communityanalyst.arcgis.com/esriCA/index.html and log in with your ArcGIS Online credentials.

3. Map the first convenience store chain. On the Maps tab in the top menu bar, select Create Project > for project name enter *Regional Convenience Stores* > Once your project is created > Open your project > from the green bar > Create Maps from Data > Business and Facilities search, as shown below:
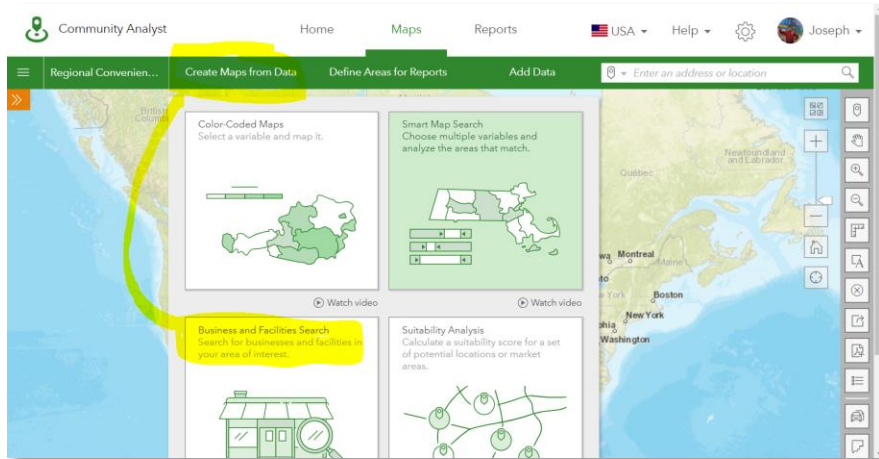

Enter: *Allsup's*. Under Business Name, click on Allsup's Convenience store *only.* Under Industry Description, click on Convenience Stores *only.* This will ensure that you are not getting florists or attorneys named Allsup's, but rather, just the convenience stores. Click Next. Under Style and save search results > Set drawing style Options > change it to a blue square > Set > Save, as shown here. Zoom on the map to the region where most of the Allsup's are located. Describe the pattern that you notice: _____. In which two states are most of the Allsup's located? _____.   Note the map clustering effect, where a number appears where numerous stores are located, and how this number changes as you zoom in and out on the map. Based on the cluster values, in which city do you think Allsup's headquarters is located? _____ Go to the Allsup's page https://www.allsups.com/contact and note the city. Was your headquarters hypothesis correct? ___.   If Allsup's began in their headquarters city and spread from there, hypothesize which three cities were the first three in which Allsup's located a store: _____, _____, and _____. Why did you list these 3 cities? _____.
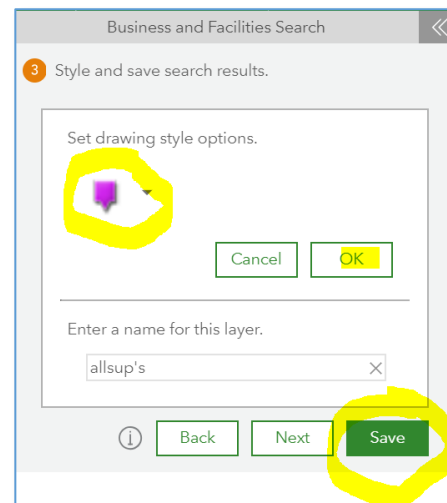
**4. Map the second convenience store chain.** Repeat the above procedures by starting with Create Maps from Data > Business and Facilities search > search for Casey's General Stores, narrowing your search as you did with Allsup's to *only* examine the convenience stores named Casey's. Symbolize Casey's as red squares. When done, click on the Map Legend tool to the right of the map. Your

map should look similar to the map on this page. Why do you suppose the regions adjoin but do not overlap? _____. What would you expect if you mapped a national convenience store chain such as 7

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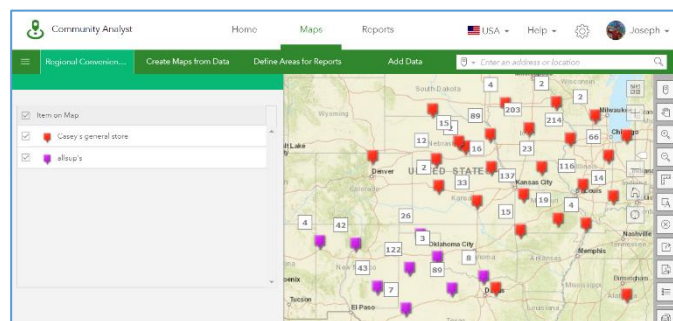
Eleven or Circle K? _____. Name 1 advantage of staying regional, and 1 advantage for going national, for **any** business: (regional) _____ and (national) _____.

5. Compare the two stores. Go to the upper left of the green stripe: > All Projects > Regional Convenience Stores > scroll down to Casey's, and on the right side of the Casey's layer > Open Table. Note the number of stores. Open the table for Allsup's. Which chain contains more stores? _____. Now let's get a sense of how large each store's region is. To the right of the map, use > Add Annotation >
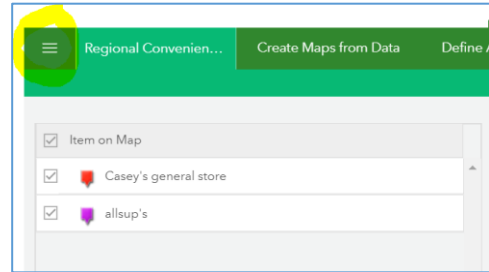

Draw > Freehand [⌐A] , and draw what you believe is the "region" for each store. Be sure to close each polygon and fill with blue for Allsup's and red for Casey's, as shown here.
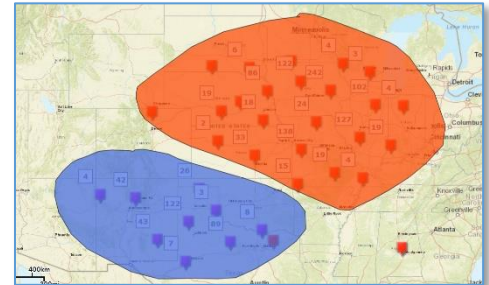
Next, use the Measure Tool [⌐] tool to trace a similar shape for each region. How much larger is Casey's than Allsup's region? _____.

# 🔍 Examining Population and Consumer Behavior

→ **6. Compare stores to population.** Create Maps from Data > Color Coded Maps > Population > 2017 Total Population. Enter Plainview TX in the search box in the upper right. Zoom out until you are examining ZIP code level data (check your geographic level by examining the map legend on left side of map). Note how more Allsup's stores exist in some ZIP codes that have a greater population than the surrounding areas, such as the 6 stores in Plainview, Texas (A). But in larger cities such as Amarillo and Lubbock (B), no Allsup's exist.
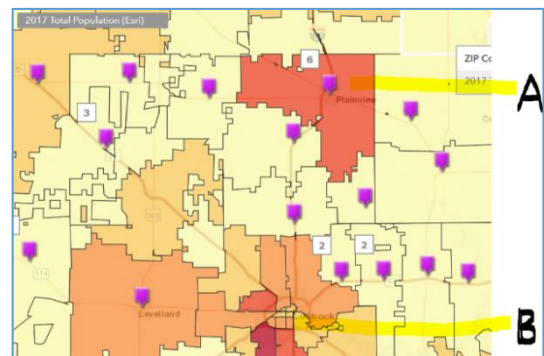

Name 2 reasons why no Allsup's exist in some of these larger cities: _____ Are there any stores in the large city of Dallas? ____ Albuquerque? ____ Zoom to Iowa and examine the pattern of Casey's General Stores. Does Casey's follow the Allsup's model of avoiding some of the larger cities such as Des Moines? ____.

7. Examine Consumer Behavior. Population is not the only variable affecting business locations. Consumer spending is another: Use Create Maps from Data > Color Coded Maps > search on Lottery > Select Index, as shown here. Now, you are mapping two variables, with

the population as a color and the size of the circle as the index (with 100 being the national average)

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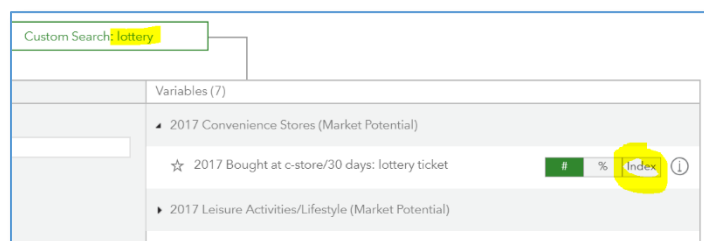
of the amount of lottery tickets purchased in the past 30 days, and convenience stores are the primary location where lottery tickets are purchased.   Search > Ames, IA > zoom to the ZIP code level. Note that Ames and surrounding towns have some ZIP codes of higher population, but people in certain ZIP code areas in Ames have much less propensity to buy lottery tickets. Name 1 possible reason why: _____. Do any Casey's exist in these neighborhoods? ____.   Name one other consumer behavior variable that might have a bearing on a visit to a convenience store: _____ If you have time, map and analyze that variable!
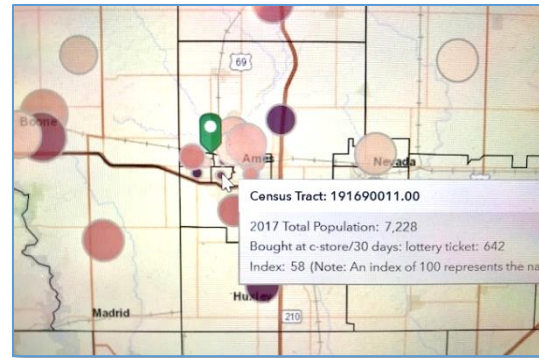

As you are learning, the siting of businesses is complex, and considers population, income, spending habits, mobility, access, land prices, competition, and many other factors, but underlying most of these considerations is geography. Hence, GIS is a valuable tool for understanding business patterns. Next, you will use your knowledge to find the optimal site for a store.

🗨 Find the optimal site for a convenience store

→ **8. Examine sales volume.** Let's say that Casey's management, hearing about your excellent location analytics skills, hires you to determine the optimal site for a new store in Columbia, Missouri, and they want to make sure it achieves a certain sales volume.   You have mapped Casey's locations, but now you want to filter the Casey's by sales volume to determine where the high-volume stores are located. First, turn off the population and lottery ticket layer. Next, in the upper left, go to All Projects > Regional Convenience Stores > select the Casey's map layer > open table.
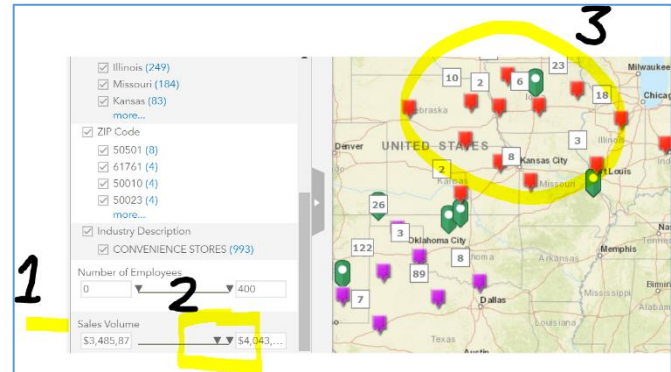
Now, as shown here, use the slider bar to select only the higher sales volume stores. As you slide the bar, pay attention to the large cities shown on the base map. Based on sales volume and other cities, do you think it is reasonable to think that your new store in Columbia could achieve high sales volume? _____.
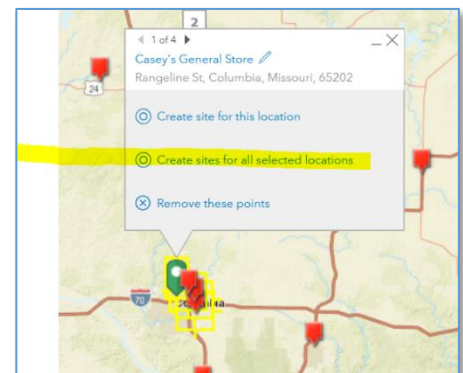
9. Focus on 1 community. Use Search > Columbia, MO to examine this city. How many stores currently exist in Columbia? _____. Use the shift key and draw a box around all of the stores in Columbia, and then create sites for all 4 of them, as shown here.


Next: Select Drive Time, and create 1, 3, 5-minute drive times (because people are not willing to drive a long distance to a convenience store, because otherwise it wouldn't be convenient!) > Apply to 4 sites > Name your new layer Casey's Drive Times in Columbia.   Examine your resulting map.

10. **Calculate Drive Time Polygons.** Note that the drive time polygons are not perfect circles around each store. Name 3 factors that influence the shape of a drive time polygon: _____, _____, and _____.

11. **Consider the optimal site location.** Which of the 4 quarters of the city might be optimal for a new Casey's that does not overlap the 1, 3, and 5-minute drive times to the existing stores: Northwest, Northeast, Southeast, or Southwest? _____.
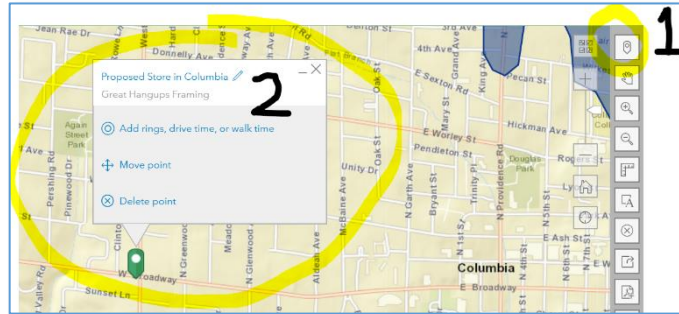

12. Select a site for your store. Use the Pin tool to the upper right of the map to select a proposed location for your store. Why did you select the site that you did? _____. Generate drive time polygons around your point.
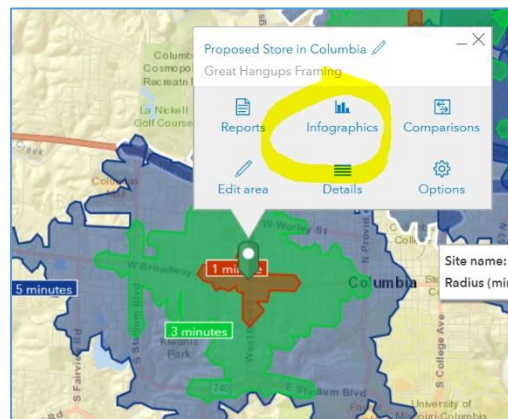
13. Generate reports. Maps don't tell the whole story. Generate 1 report – an infographic - on Key Facts, for your chosen site. What is one piece of information the infographic provides? _____.   Given time, comparing infographics on population and behavior variables for additional proposed locations, and the sites of your competitors, will help ensure that your store succeeds.

☑ **Evaluate**

14. Evaluate your learning. Name the most valuable thing that you learned about the process of studying business locations in this activity. _____.
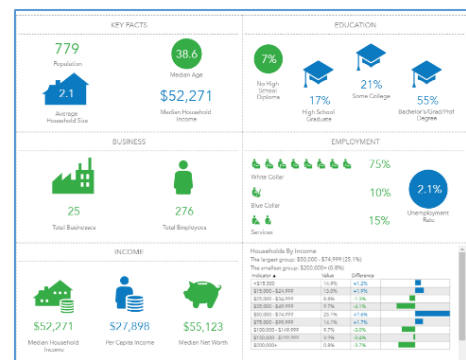
15. Assess Spatial Thinking. How did web mapping GIS tools and data help you in your understanding of the location of convenience stores? _____.

16. Dig Deeper. In this lesson, you considered competition, population, lottery ticket purchases, and drive times in your analysis. Name one data layer or variable that you have not yet considered, but given time in the future, you would like to examine: _____.

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