

Mapping My Community

Overview

Your mental map is a representation of your own personal geography that you carry around with you and draw on as you make everyday decisions about where to go and how to get there. Everyone's mental map is different. Mental maps reflect the spatial information we use in our daily lives, like where we know and where we don't know, and they are influenced by things like personal experiences, transportation, safety, and accessibility.

Maps are *models* of the world around us. Creating a map requires selecting what information is important, filtering out what is not important, and simplifying how things are represented. Our mental maps do the same thing, whether we realize it or not.

Mental maps also vary based on social differences. For example, people of different races and ethnicities may have different perceptions of the same neighborhood, women have different travel patterns than men at night, and queer communities historically congregated in spaces under the radar that other people might not know about.

In this lesson, you will discover your own mental map of your community by sketching it by hand. Then you will create your mental map using GIS and compare it with other maps to understand how they each represent just one model of reality.

Your Mental Map

First, sketch your own mental map on a piece of paper. Include the locations you visit the most (e.g., your home, school, parks, restaurants, friend/family homes) and routes you take when you go places (e.g., train and bus lines, walking paths, driving routes).

Next, use ArcGIS Online to create a digital version of your mental map. With your group, have everyone pick a color that they will use to symbolize features on their own map (your options are black, blue, green, orange, purple, red, and yellow). On your own, add Map Notes in the form of *point*, *line*, and *polygon features* to represent the locations, routes, and areas you drew in your mental map.

Take a look at your sketched mental map and your digital mental map and consider the following questions:

- How easy was it to translate your sketched mental map to your GIS map? How well do you think the map features capture the subject matter of your map?

- Is there anything that is left out in the GIS map? On the other hand, is there anything that you can more easily see or understand in the GIS map?
- What types of places did you choose to include in your map? Now that you have thought about these places, how do you feel about them?
- If you were to show this map to someone who is unfamiliar with where you live, what impression would they have of the community shown in the map? Would they be correct?
- Open Google Maps, and zoom into the area you mapped. What features are shown on Google Maps that are also on your personal map? What features did you leave out? Why?
- How do you decide what places to go to and how to get there?

Compare Mental Maps

Next, get together with your group and combine each of your map layers together into a single map. Consider the following questions:

- What spaces and places are most important to you? To your community? Why?
- Are there certain areas of the city you tend to visit and others you do not? What do you think influences this? (Think: transportation, activities, familiarity)
- In what ways are your group members' mental maps similar? How are they different?
- Why do you think they are different? Try to find at least three different factors that lead people to have different mental maps.

Storymap

Finally, work with your group members to create a storymap that showcases your mental maps as well as your groups' analysis and conclusions.

Mapping My Community

Implementation Guide

Learning Objectives

In this lesson, students will discover their own mental map of their community by sketching it by hand. They will then use GIS to create a digital mental map. In small groups, students will compare mental maps to consider how they differ and what factors (e.g. access to transportation) may shape what areas they know and do not know. They will then work in small groups to create a storymap that presents their digital mental maps and their analysis and conclusions about why mental maps differ. During this lesson, students will learn GIS skills such as: adding different types of spatial features as map notes (points, routes, and polygons, as well as text), changing symbology, creating and sharing feature layers, integrating map layers from different sources, and creating storymaps.

Standards

- CCSS.ELA-LITERACY.RST.9-10.4 / CCSS.ELA-LITERACY.RST.11-12.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Lesson Structure

Overview

The lesson starts with a teacher model of the GIS techniques needed for the lesson. The technical skills are detailed in this implementation guide for you to use as a resource.

Getting Started

Provide a brief introduction to mental mapping, including inspirational examples. Working independently, students create a sketch map by hand that represents their personal mental map of their community. Have students take a picture of their map.

Have each student get a computer and log in to their ArcGIS account. Students can then open and preview the lesson materials. Designate a hashtag for students to tag the map layers they create so they can be searched for by other students in the class.

Lesson Introduction and Model

Provide a brief introduction to the GIS portion of the lesson and answer questions. Before students begin working, model the GIS techniques they will draw on during the lesson (see below for details). At this stage, don't introduce storymaps. You will preview those right before the storymap activity.

Work Time

Students will create a digital mental map in GIS. Assign each student a color to use when creating their map notes. As they work on their individual maps, encourage students to collaborate to figure out how to apply the GIS techniques to their projects. Provide support and answer questions as needed.

After completing their individual GIS maps, students will form groups of 2-3 and compare their maps. Make sure that students in each group used different colors for their GIS map. Help students get into groups, and provide discussion questions to guide the group.

Storymap Activity

Before the storymap activity, model the process of creating a storymap. Students will work collaboratively in their small groups to create a storymap. The storymap will present each member's individual map or they will compile all group members' data layers into a single map. Storymap presentations should conclude with the insight they gathered from group discussion.

When they are done, have students share their storymaps with the class. This can involve either a whole class presentation or small group discussion.

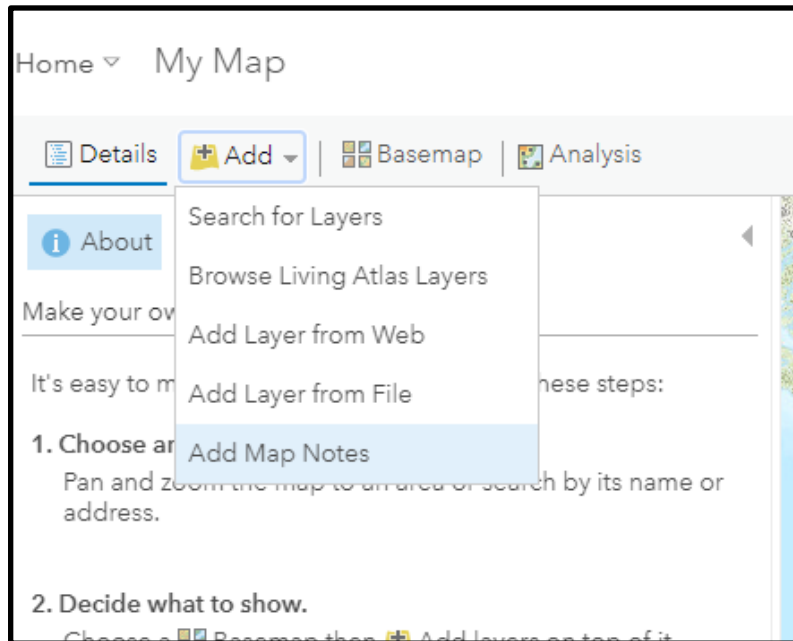
Modeling GIS Skills

At the beginning of the lesson, model the GIS techniques that students will use in the inquiry activities. Step-by-step instructions for the GIS skills that are needed for this lesson are outlined below.

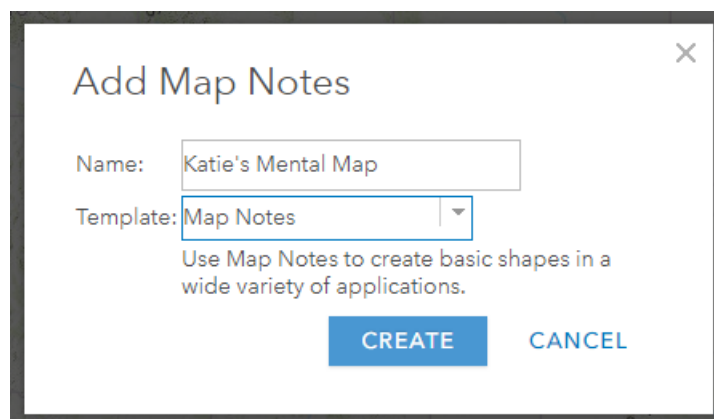
GIS Analysis

Adding Map Notes (Points, Lines, Polygons) and Changing Symbology

In a new blank map, zoom in to the area you drew in your mental map. Create a digital version of your mental map by adding Map Notes for the different features you drew.

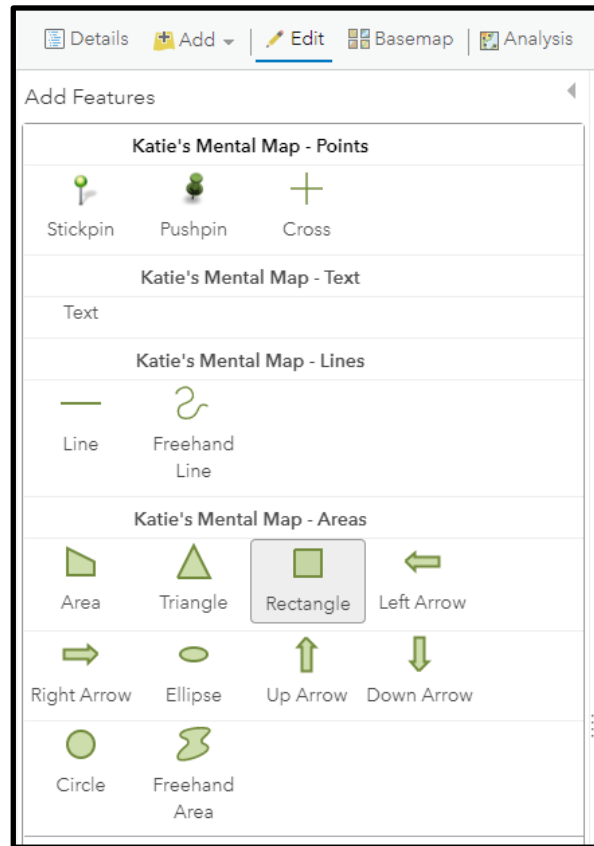


Name the layer. This layer will contain all the different map notes you create, so give it a general name. Use the Map Notes template.



The Add Features window will be displayed. Select the appropriate feature type for what you are adding to the map.

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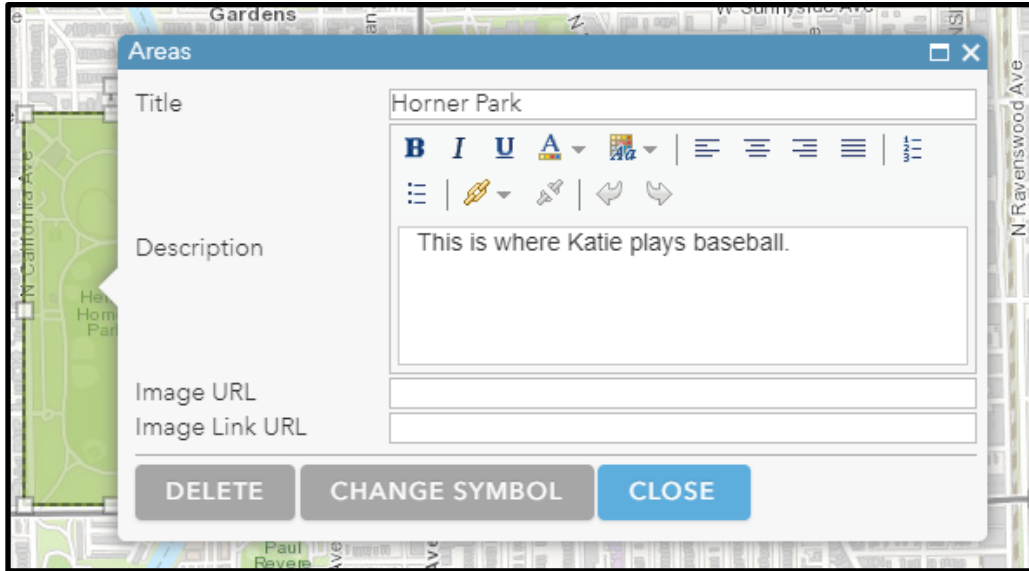


Pay attention to the popup instructions for how to create each type of feature.

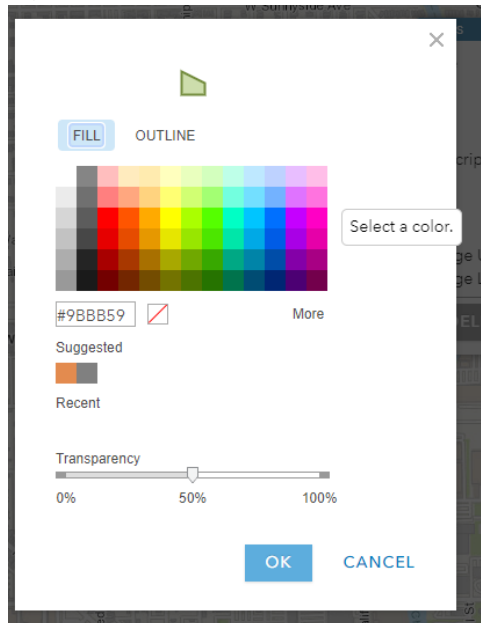


After creating a feature, you will give it a title and an optional description for more detail.

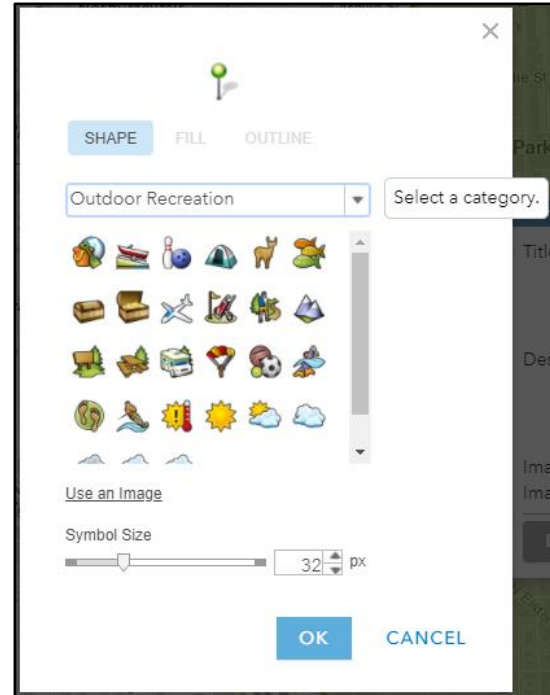
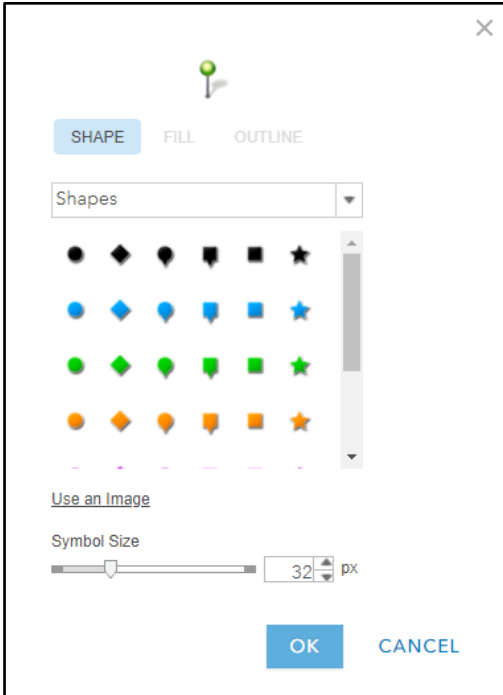
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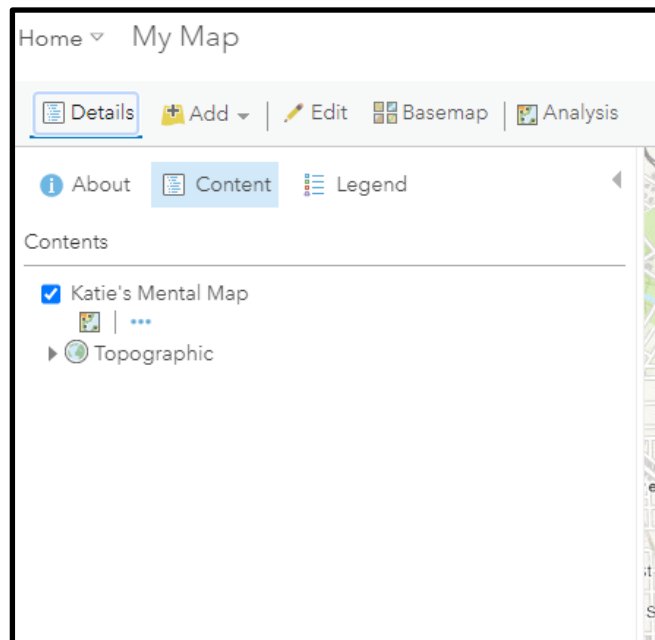
Click Change Symbol and select the color you chose for your map. For line features, you will also be able to change the thickness of the lines.



For point features, we are using the default “Shapes” category so that students can color-code their map features. However, they may also choose to explore other symbol categories to be more creative with their maps.

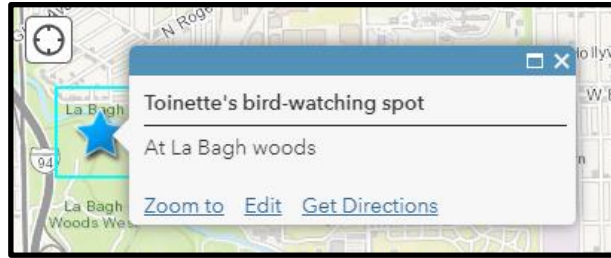


When you have finished adding your Map Notes, click Details to return to the table of contents view. If you want to return to adding Map Notes, just click Edit and you will see the Add Features window again. You can also edit existing Map Notes by clicking them while in Edit mode.

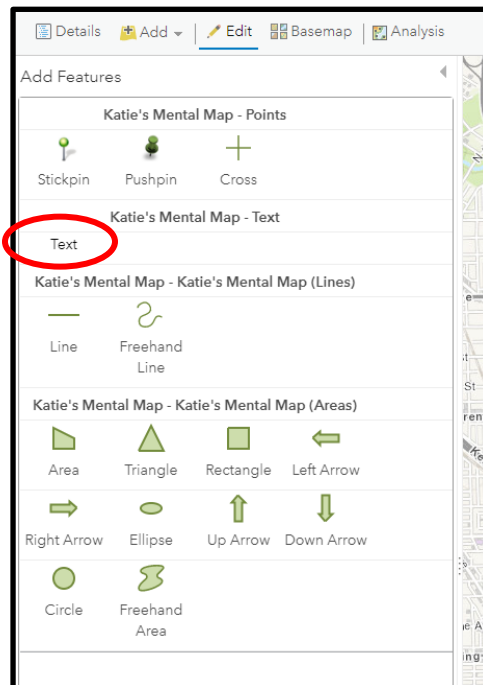


You can view the label and description for map note features by clicking on them.

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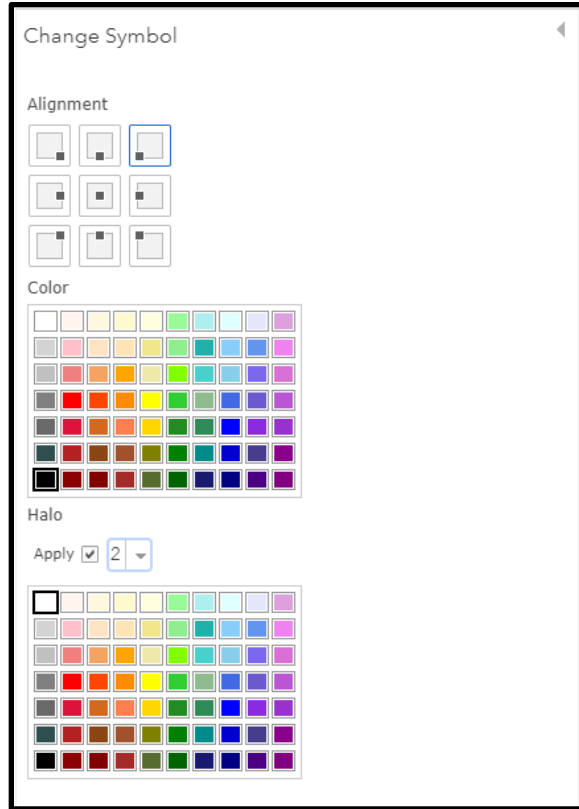


If you want to see labels displayed on the map without clicking, you can add a text map note. This is one of the options in the Add Features window when you are editing.



Adding a halo to your text is a good way to make sure it's visible.

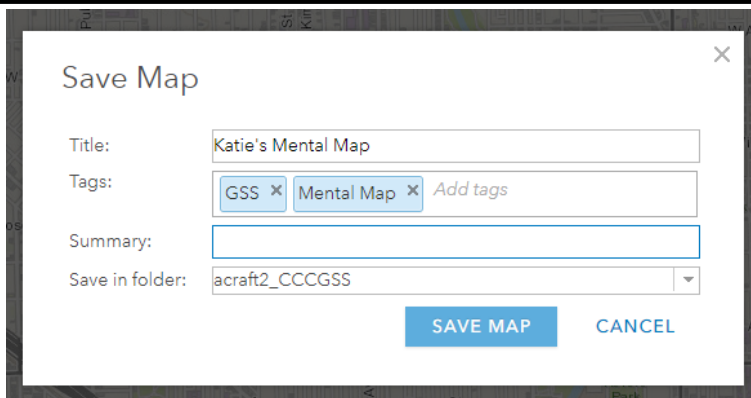
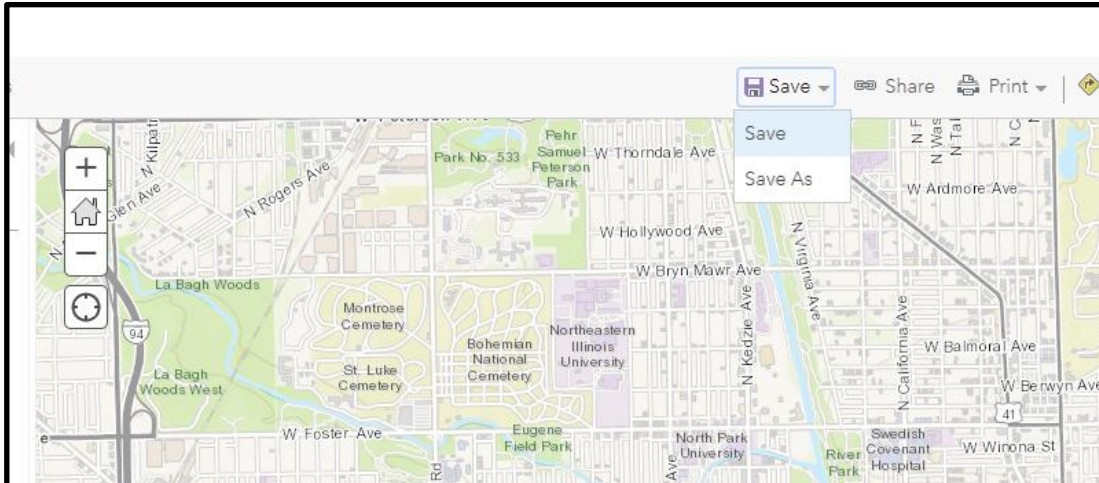
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You can also change the direction of text by clicking the top center box encircling the text when it's selected.



Save your map, tagging it with the class hashtag.

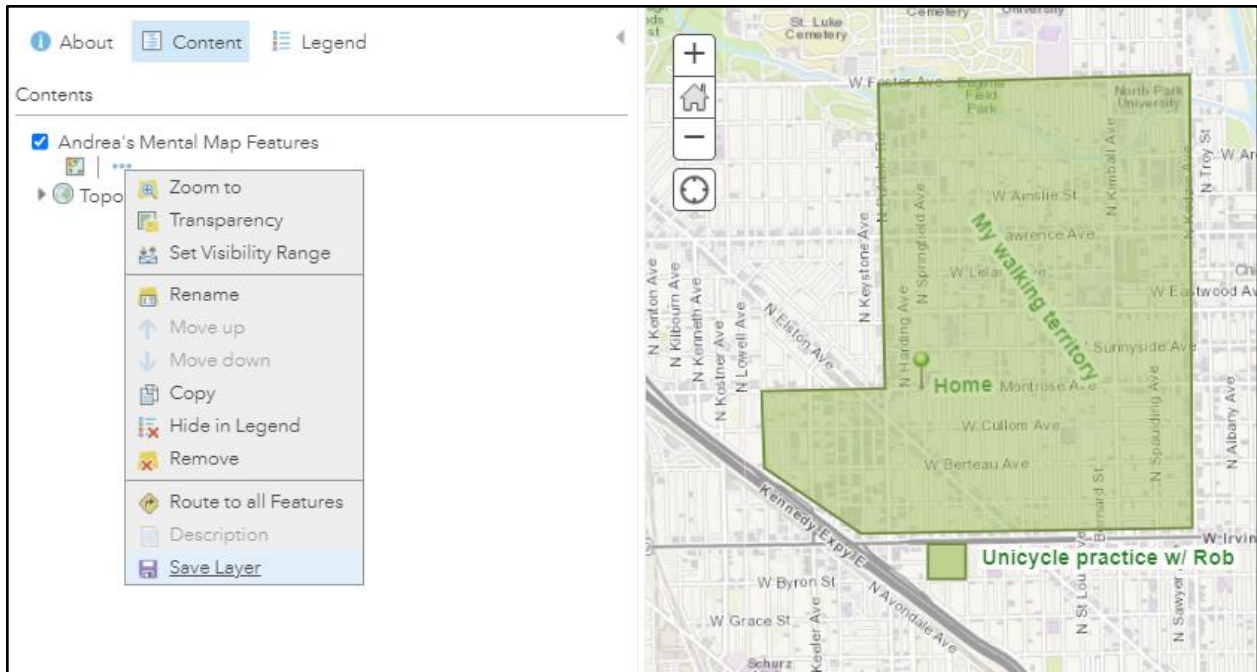


Combining map layers into group map

After you have finished adding your map notes, save your collection of map notes as a Layer. You will need to give it a title and add at least one tag. The teacher should designate a hashtag for the class to use.

*If you do not save your map notes as a layer, they will be stored only within your map.

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The 'Create Item' dialog box is shown with the following fields and values:

- Title: Andrea's Mental Map Features
- Tags: Mental Map, GSS
- Summary: These are the map features I created for my mental map assignme
- Save in folder: acraft2_CCCGSS

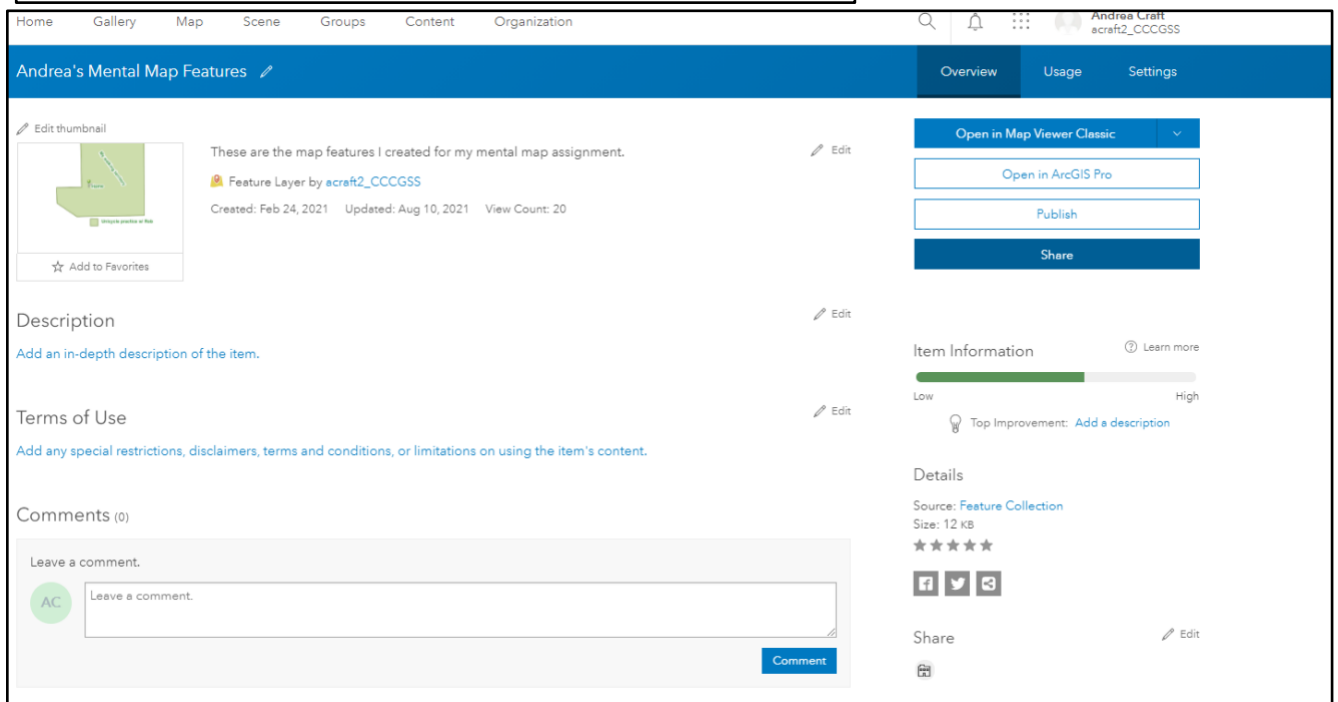
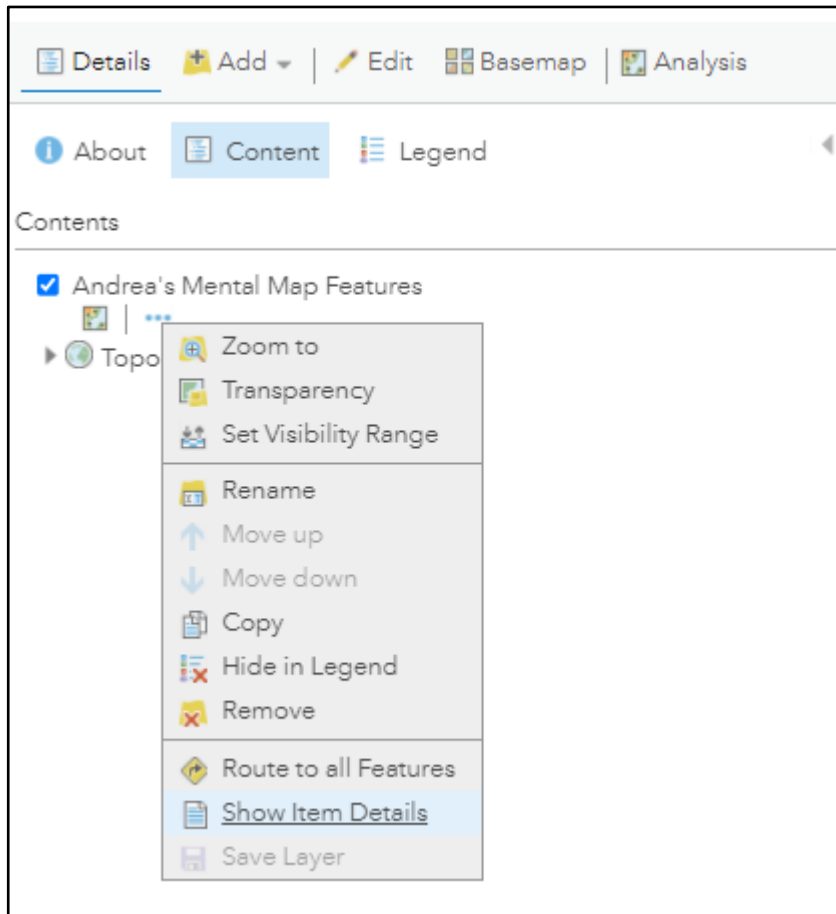
The 'CREATE ITEM' button is highlighted in blue.

You will now have this map layer as a published feature layer in My Content. By default, the sharing level is set to Owner, which means that other people cannot find it.

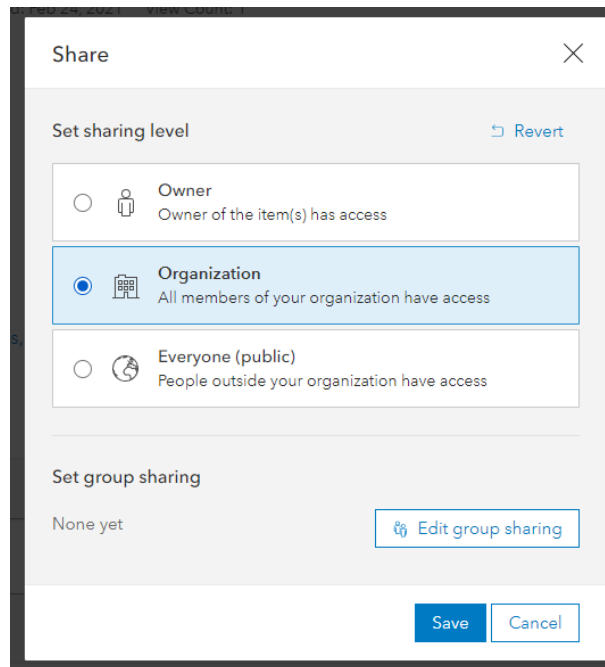
You must also change the sharing level to "Organization" so your classmates can access your layer.

Under the layer options, select Show Item Details. Then on the details page, click Share, and set the sharing level to Organization.

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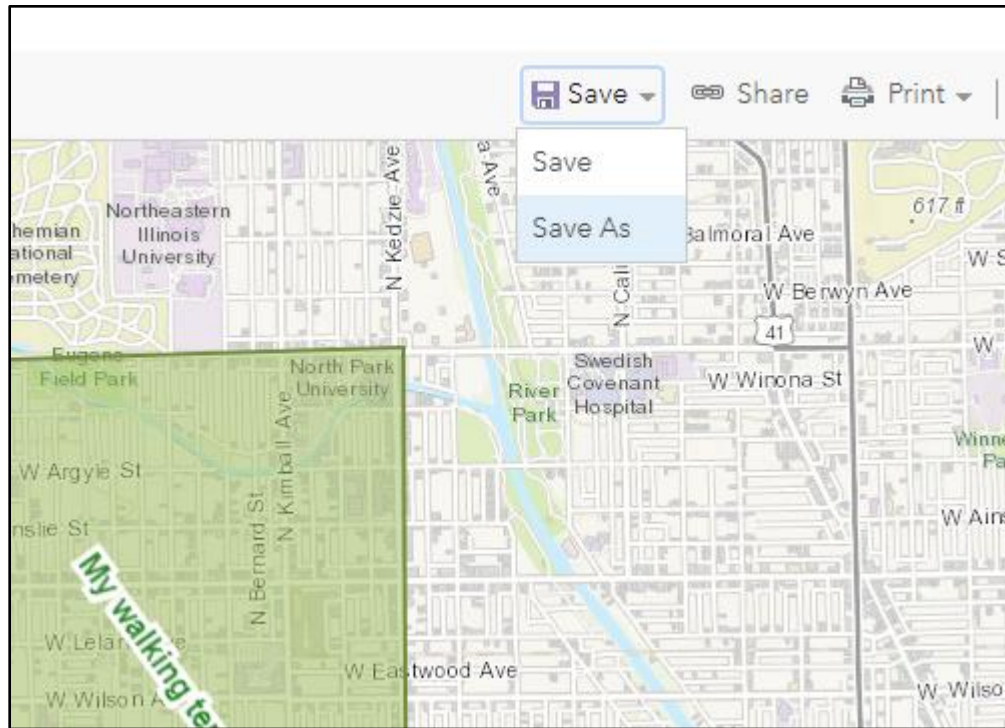
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Choose one group member to be in charge of hosting the group's collaborative map.

They will save a new copy of their map using "Save As" and giving it a new name.

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Save Map

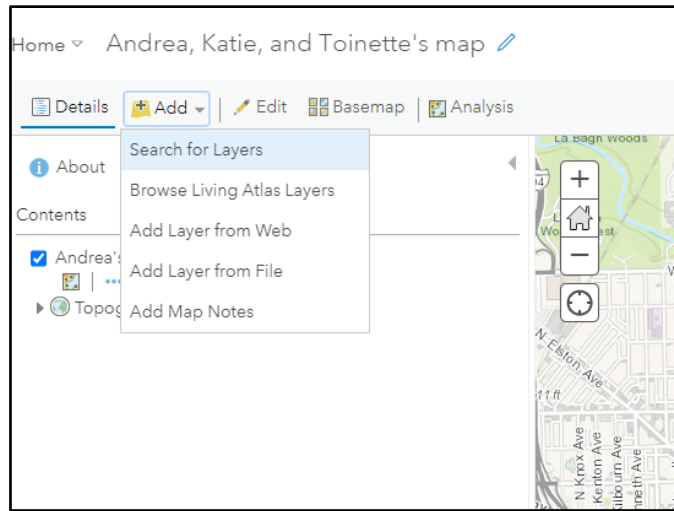
Title:

Tags:

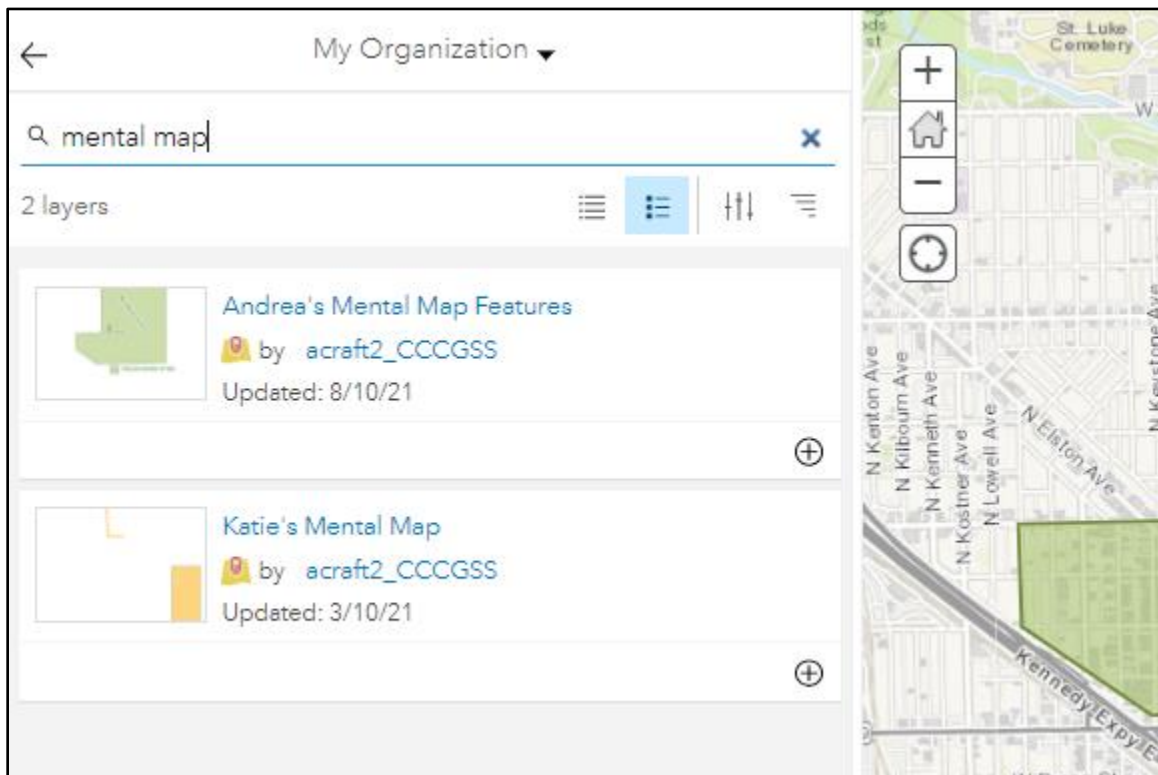
Summary:

Save in folder:

Add the map feature layers created by the other group members.

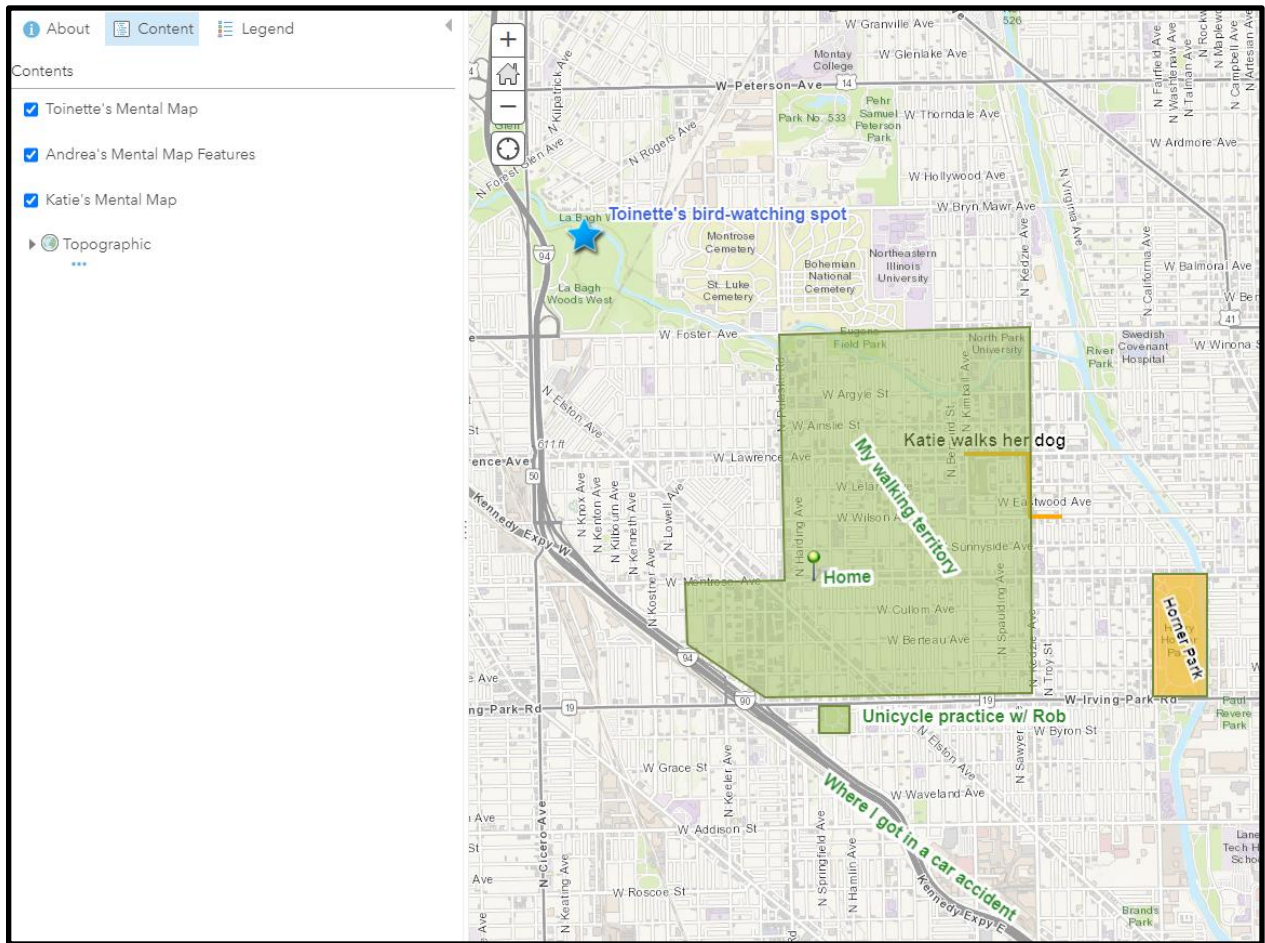


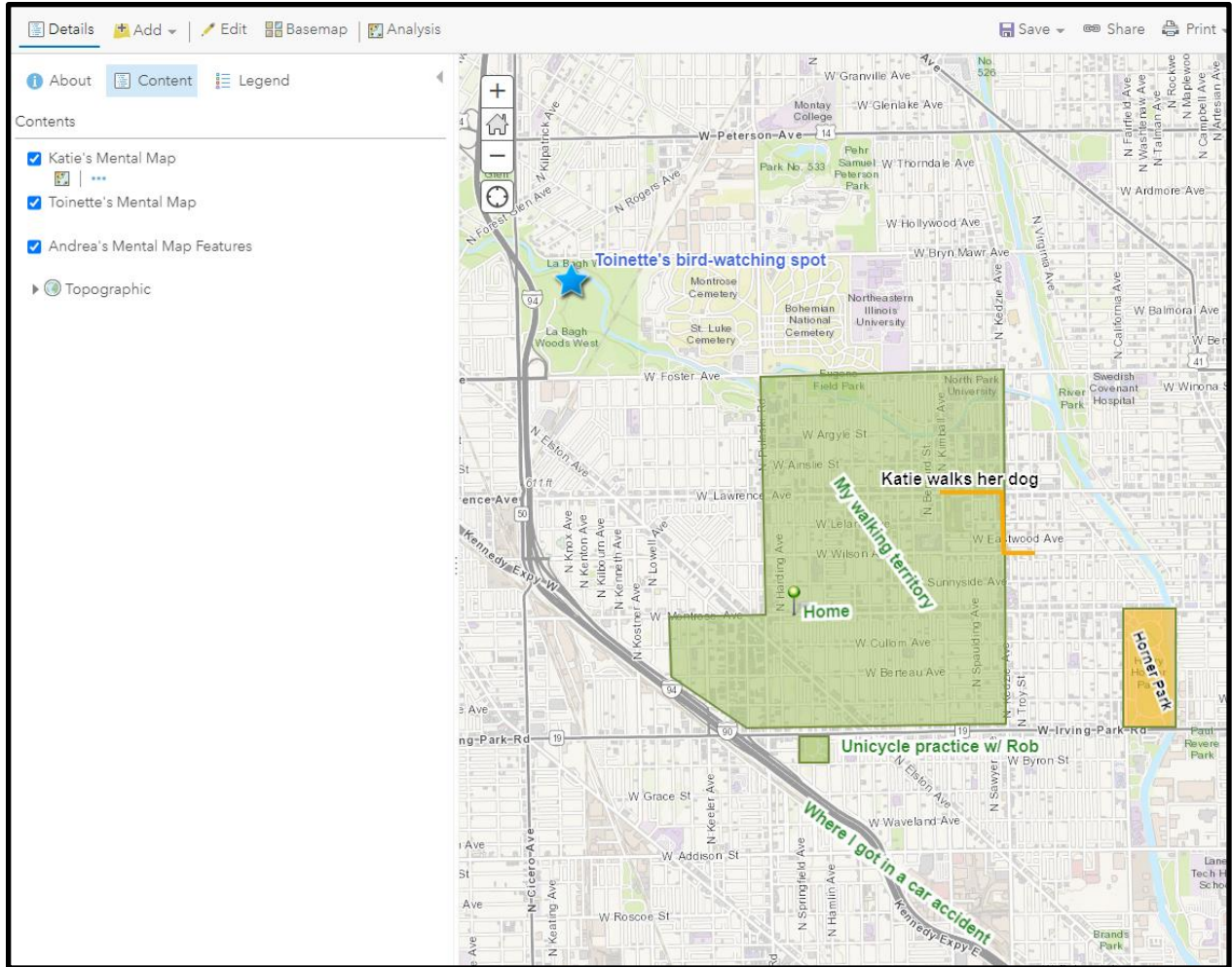
Search for the name of the layer or the class hashtag within My Organization, and add it to the map.



If you have any features that overlap, you can drag them to change the order in the table of contents, to improve visibility.

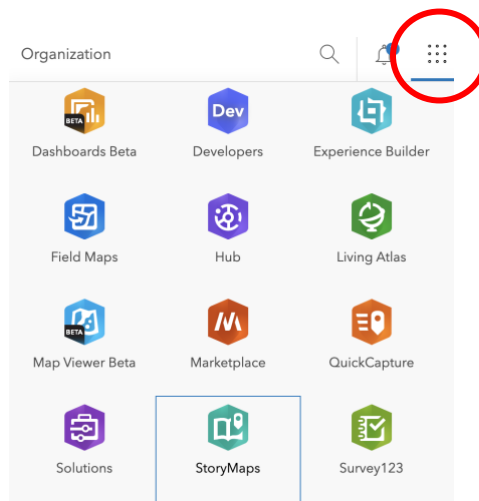
Chicago Geospatial Semester Project



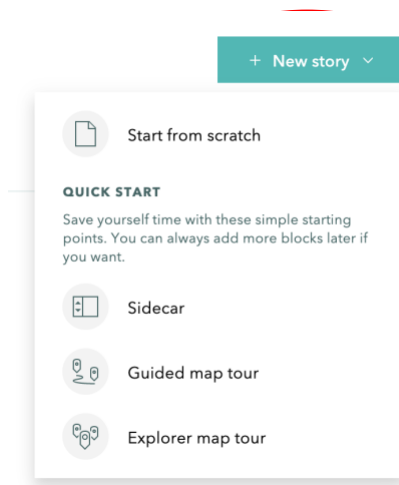


Create a Storymap

In the home menu, click on the app builder icon and select the "StoryMaps" app.



Click “New Story” and select the type of StoryMap you want to create. If you want the most flexibility, try “start from scratch.” If you want a pre-set structure, try the other options.

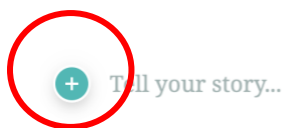


Follow the prompts to add information to your storymap. Click the green plus sign to add other media, such as maps and videos, or more text to your story. When you are ready to share your story, don't forget to click publish!

Title your story

Start with a short introduction or subtitle

Katie James | Draft



Food Access in Chicago

Overview

In this lesson, you will use Survey123 (a mobile data collection app) and GIS to gather and analyze data related to food access in Chicago. You will collect local data related to food access in your community, use GIS to analyze spatial patterns and relationships in your data, and share your analysis and answers to your research question with the class. The goal of this project is to better understand inequities in access to healthy foods that exist across Chicago and develop an action plan to help improve them.

Food Access

Issues of food access occur all around the world. Take a look at the resources below to learn more about food access in Chicago and Memphis.

- The Food Desserts of Memphis: [Memphis Grocery Stores](#)
- The Food Desert (*Chicago Magazine*): <https://www.chicagomag.com/Chicago-Magazine/July-2009/The-Food-Desert/>

With a partner, discuss the following questions:

- Were you surprised by anything in the article and video?
- What was something you already knew about food access and something new you learned from the article and video?

For this lesson, you will collect data about the places people buy food in your community to help you answer the following research questions:

1. Do issues of food access exist in your community?
2. Are there differences in access to healthy foods as income levels vary within and across Chicago?
3. Are there spatial patterns and relationships between food access and the races and ethnicities of people living in those communities?

Survey123

First, you will work as a class to design a survey that will enable you to collect data to answer the research questions. To get started, consider the following questions and share your answers first with a partner and then with the whole class:

- Where do people buy food in your community?
- How would you characterize the different types of stores where people buy food?
- Do the stores sell fresh produce?

- What other data do you need to collect to address the research questions?
- What survey questions do you need to ask to collect that data?

Data Collection

Use the survey your class designed and the Survey123 app to collect this data within a ½ mile of your home.

GIS Analysis

Next, you will use GIS to analyze spatial patterns and relationships in the data you collected to understand and explain differences in food access in Chicago. As you analyze the data, think about how your findings could be used to improve your community and develop an “action plan” to put these improvements into action. As you work on your action plan, consider the following questions:

- How could the results of your GIS analysis be used to improve access to healthy food in Chicago?
- What actions would you recommend based on your analysis?

As you analyze your data, consider the following questions:

- What trends, patterns, or relationships do you see in the data?
- What do you think is causing these patterns?
- How does the data change as you look at different locations in your community?
Across the entire city?

Next, begin researching and adding additional data from ArcGIS Online and The Living Atlas that could help you understand and explain the issue you are investigating, the patterns and relationships you see, and, most importantly, answer the research questions. Examples of relevant data include age, race and ethnicity, crime, landscape, socioeconomic status, census data.

Storymap

Finally, you will create a storymap to showcase your analysis, findings, and action plan. Your storymap should focusing on addressing these questions:

- What issue(s) did you examine? Why are they important?
- What insights has your analysis provided?
- What is your action plan for using your findings?

Share your storymap with your classmates and make a plan to share your work with relevant community members.

Food Access in Chicago Teacher Implementation Guide

Learning Objectives

In this lesson, students will use mobile data collection technologies and geographic information systems (GIS) to gather and analyze data related to food access in Chicago. Spatial patterns and relationships in the data, including the type of food available to purchase and the location and number of stores selling food, will be examined spatially across agreed upon geographies. The overall goal of the project is to promote student collaboration and integrate collected data into ArcGIS online for mapping, display, and analysis purposes. Findings and results will be communicated through the creation of storymap presentations *OR* other assessment strategies determined by the instructor.

Common Core Standards

- CCSS.ELA-LITERACY.RST.9-10.4 / CCSS.ELA-LITERACY.RST.11-12.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.IMP-1.A Identify types of maps, the types of information presented in maps, and different kinds of spatial patterns and relationships portrayed in maps.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

AP Standards

- IMP-1.A Identify types of maps, the types of information presented in maps, and different kinds of spatial patterns and relationships portrayed in maps.
- IMP-1.B.1 Data may be gathered in the field by organizations or by individuals.
- IMP-1.B.2 Geospatial technologies include geographic information systems (GIS), satellite navigation systems, remote sensing, and online mapping and visualization.
- IMP-1.B.3 Spatial information can come from written accounts in the form of field observations, media reports, travel narratives, policy documents, personal interviews, landscape analysis, and photographic interpretation.
- IMP-5.B.3 Challenges of feeding a global population include lack of food access, as in cases of food insecurity and food deserts; problems with distribution systems; adverse weather; and land use lost to suburbanization.

General Lesson Structure Overview

Students will be introduced to data collection, focusing on examples of data that exist (related to food access issues) in their communities and Chicago. Next, students will use esri's Survey123 to collect and report data on the number, type, and offerings of various food stores. (*Work with students to clearly define quantitative and qualitative variables*). GIS can be used to look for patterns and relationships within the collected data and start the process of finding solutions to food access issues in Chicago.

NOTE: This lesson can be done individually by each student or in student groups of various sizes depending on the individual needs and circumstances of the classroom where this lesson will be conducted.

Lesson Introduction

Begin by asking students to explore the provided resources. Next, students will discuss food access in their community and define what variables to measure/observe/collect and plan collection strategies. *NOTE: teachers should prepare for this lesson by creating the Survey 123 Survey to be used by the class FIRST, it can then be shared with all students or student groups.*

Instructors should provide a brief overview of Survey123 and its workflow, Arcgis Online and the relationship between the software/technology and the lesson's goals.

Modeling Survey123 use and Arcgis Online Techniques

Demonstrate how to access the previously created survey for the lesson via Survey 123.

Review the survey with the class and solicit feedback and suggestions on how to improve the survey before it is used.

Students should also be familiarized with the use of Arcgis Online's mapping tools, particularly the use of a map note to mark a specific location on a map, and a buffer tool to identify areas within a ½ mile of a specific location on a map.

Work Time

Recommendation: demonstrate survey creation ONLY and then collectively use the class-wide data collection survey previously created. This will provide for a more robust analysis of potential food equity / food access issues. Parameters for data collection should be monitored by the teacher and can be scaled up or down depending upon the amount of allocated time and the size of the defined geography students plan to examine.

Students will then collect data and from Survey 123, import into Arcgis Online for GIS analysis. Potential relationships and patterns in the collected data will be analyzed using GIS and compared/coupled with other data from differing sources (Arcgis Online and or esri's Living Atlas).

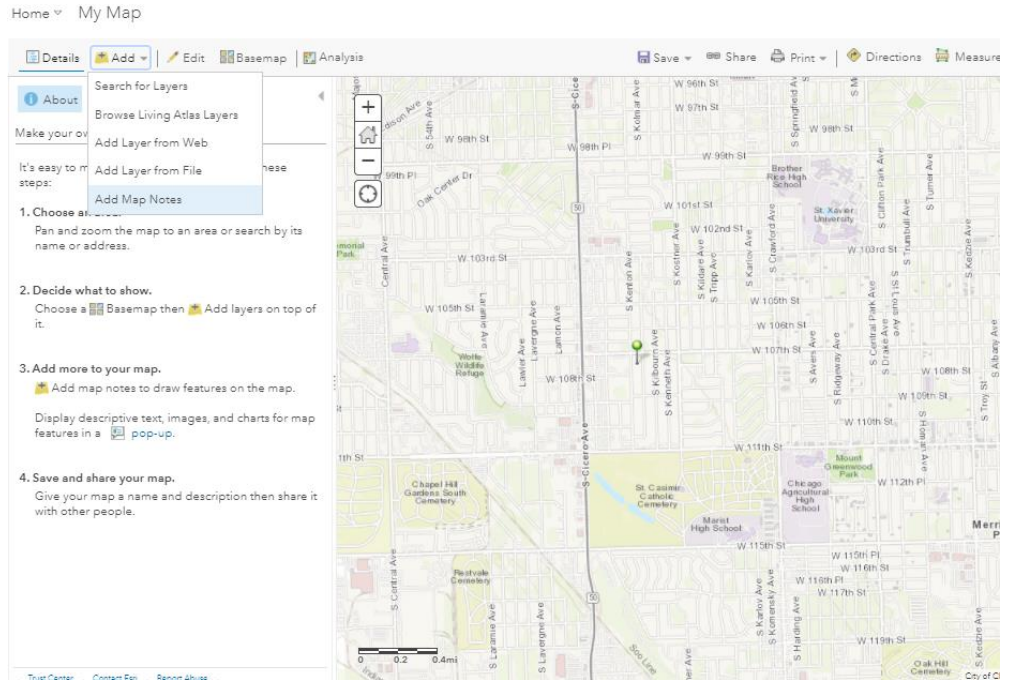
Introductory GIS Skills

If needed, students should be introduced to (or spend time reviewing) the steps needed to ADD a MAP NOTE and run a ½ mile BUFFER around a point using specific tools in the Arcgis.com ecosystem.

Once a map note has been added to a map, a ½ mile BUFFER can be placed around the location identified by clicking on Analysis and the "Use Proximity" option. "Create Buffers" is the tool needed to establish the specific geography related to this investigation.

Storymap Activity

Before the storymap activity, model the process of creating a storymap. Students will work collaboratively in their small groups (or individually) to create a storymap that includes their maps, analysis, and research question answers.



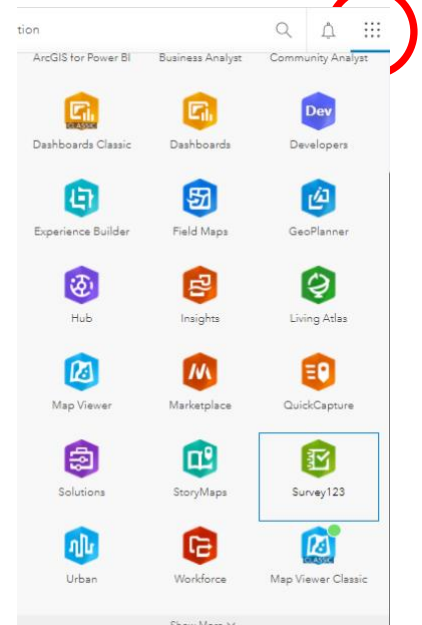
When they are done, have students share/present their storymaps with the class. This can involve either a whole class presentation or small group discussion.

Modeling GIS Skills At the beginning of the lesson, model the data collection techniques (using Survey123) that students will use in this lesson. Step-by-step instructions for the data

collection/survey use, and GIS skills that are needed for this lesson, are outlined with the following:

Instructions for the TEACHER Survey 123 USE: Survey Creation and deployment.

Creating a survey begins with accessing Survey123 within the Arcgis Online ecosystem. The “waffle” icon on the top right of the screen provides access (RED CIRCLE on RIGHT)

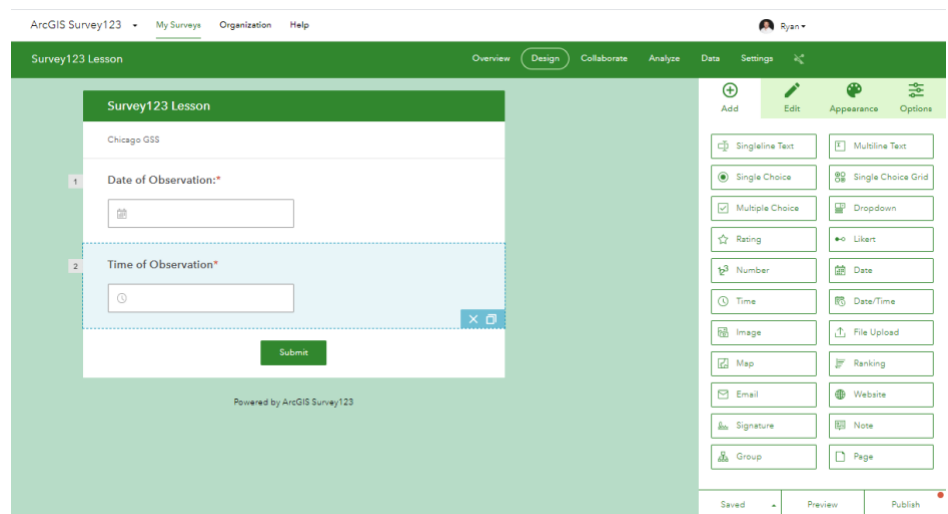


Follow the prompts related to “create a new survey”, the option related to blank surveys provides the most flexibility in choosing how data will be collected.

Modifying Surveys

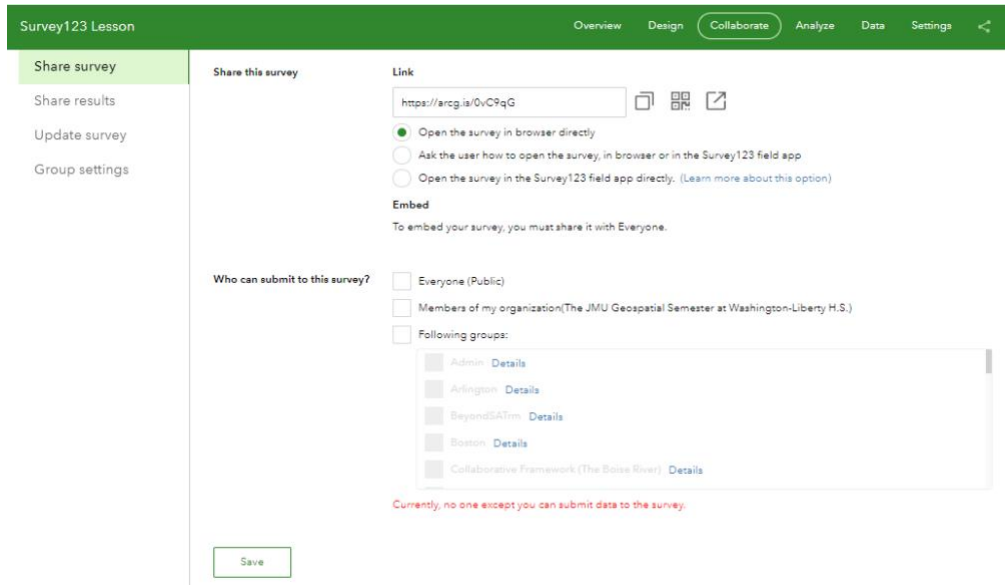
Demonstrate how to insert questions and adjust visible parameters based upon the preference of the survey designer. Modifications can be made following provided prompts. Important: stress to students the need to ask appropriate and related questions that help to potentially answer their proposed research questions.

Examples of the page where modifications to the survey are provided in the image to the right:



IMPORTANT: survey results for this lesson will be dependent upon the location where data is taken. The MAP feature will need to be added to the survey to collect location data. It is in the list of parameters in the image to the right.

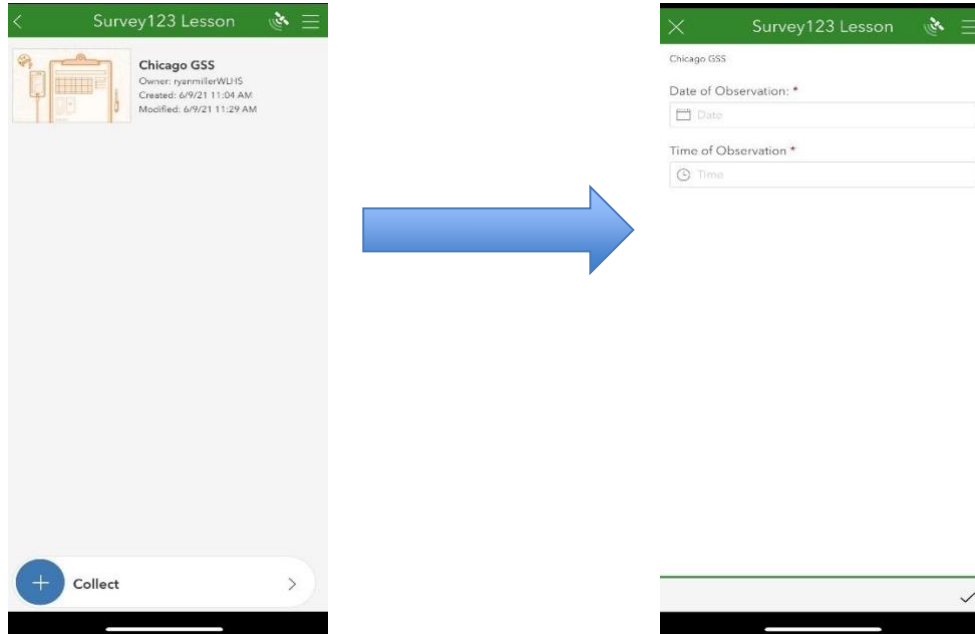
Saving and publication are the last steps in the protocol, if other people will be collecting data for the survey, it is important to grant access, **Collaborate properties** must be adjusted. The survey can then be sent/shared with other collaborators.



Distributing Survey for Data Collection

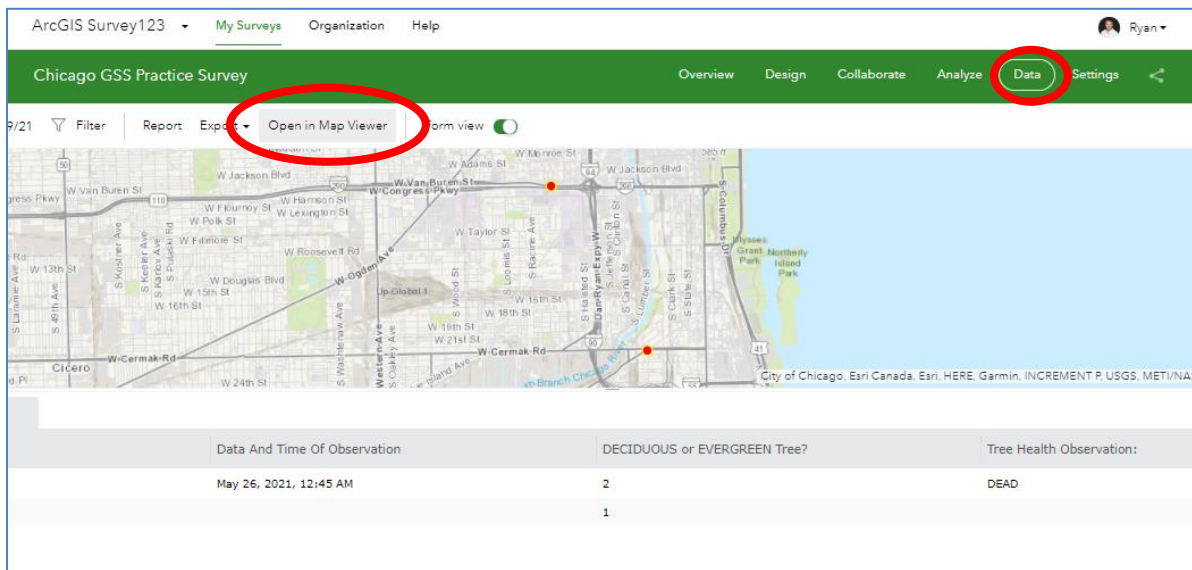
Two options exist for Survey123 users when collecting data. Action can be taken using a URL to access the survey OR a user may download the Survey123 APP onto a mobile device. Both

will require Arcgis Online log-in credentials for use. Searching in the APP for your survey needs to be done first, then the survey can be added to the app for use.



Using GIS to analyze collected data

Students can be directed to log into their Arcgis Online accounts once data collection is complete and return to the Survey123 section. Access the survey, click on Data in the green menu bar and “Open in Map Viewer” to begin using GIS for analysis work.



Opening and displaying the data in the map viewer will allow users to add data relevant to the process of answering the research. Upon the completion of the GIS analysis, Web Maps

must be SAVED and then SHARED (user sets the properties) to proceed to the final lesson objective: creating a Storymap Application that presents the results of each survey's data analysis and answer(s) to the proposed research question.

Suggested GIS Analysis Tools - Data Enrichment, Hot Spot Analysis, Density Analysis, Create Buffers, Predominant Mapping, Tessellations

Suggested Data Analysis Questions for Students - Optional guidance questions that can be provided to students

1. How many food stores are located in your neighborhood? Near your school? (Use the zip code for your home and/or school for this analysis)
2. What are the racial and ethnic profiles of each of these neighborhoods?
3. What is the average household income of each of these neighborhoods?
4. How would you categorize the types of food stores in each of these neighborhoods?

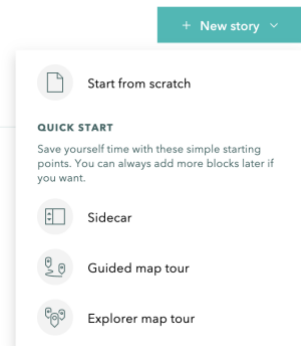
Final Lesson Deliverable: Storymap Application Development OR

Other Suitable Product

Open the map that was created and used in the analysis section above. Hit "SHARE," select "CREATE A WEB APP," and then "BUILD A STORYMAP" to commence work on the final lesson deliverable, the storymap application that displays the collected data, the GIS analysis via created maps, and subsequent discussion of results and research question answers. OR, once logged into Arcgis Online:

Click "New Story" and select the type of StoryMap you want to create. If you want the most flexibility, try "start from scratch." If you want a pre-set structure, try the other options.

Follow the prompts to add information to your storymap. Click the green plus sign to add other media, such as maps and videos, or more text to your story. When you are ready to share your story, don't forget to click publish!



Mapping CTE Career Opportunities

Overview

In this lesson you are going to use Geographic Information Systems or GIS to identify the best location to live for the career you want to pursue. To make informed choices about your future, it is important to consider the type of job you are interested in and research the best areas to live to achieve those goals. In this assignment, you will conduct research and analysis to help you weigh all of the factors and options available and to help you make an informed decision.

Career Research

First, create a list of the careers that you are interested in learning more about. If needed, narrow down your list to your top 1 or 2 career options.

Next, use Google and ArcGIS Online to research relevant locations for those careers. For example, if you are interested in healthcare you could search for the locations of hospitals. If you are interested in a technology career (e.g., software engineering) you could search for the locations of technology companies, such as Apple, Google, Microsoft, T-Mobile US, Verizon, PayPal, Comcast, and AT&T.

Based on your research, create a .csv spreadsheet that includes the address or latitude/longitude of the relevant locations you identified. In your research, you may find a data spreadsheet of relevant locations for the career(s) you are interested in. If you do, download it. You can also add your own data as you research.

Finally, add your data to ArcGIS to create your own career map.

GIS Analysis: Heatmap

Next, use GIS to identify the best regions or metropolitan areas for the career you are interested in. Based on your heatmap, what conclusions can you draw about where your career is most prevalent in the U.S.?

Choose the best location for your career to focus on in the rest of your analysis (If you want to, you can compare two of the best locations).

Quality of Life Analysis

To better understand what life is like in the area you selected, you are going to add some additional data layers to the map. First, search for “2020 County Health Rankings” and add the data layer to your map.

Look at the County Health Rankings data for the area you selected and consider the following questions:

- What do you notice about the data for that county and the surrounding counties?
- How does it compare to other places you might live?

Search the living atlas to find at least one other data layer that would help you understand if this is the best location to live for your desired career. You can search for anything you are interested in. If you don't find a data layer you are interested in, you can also find or create your own .csv spreadsheet with the relevant data and upload it.

Examples of factors you might consider include:

- **Educational Opportunities:** Are there colleges or technical education centers with relevant programs near your chosen location?
- **Personal Security/Crime:** Is the location safe?
 - Violence, Burglaries, Accidents, Murders, etc.
- **Work/Life Balance:** Will the location enable you to have a good work/life balance? Work/life balance influences your overall welfare, contributes to your overall productivity in the workplace, and helps you to be healthy and happy.
 - Cost of living (search “location affordability index”), access to your favorite activities (e.g. museums, sports arenas, movie theatres, your favorite store), etc.
- **Cultural Factors:** What is the culture and population of the area?
 - Political affiliation, Demographics, Unemployment Rate, Education Levels, Age, etc.
- **Salary Range:** What is the typical salary range for the career you are interested in near your chosen location?

Look at the data and consider the following questions:

- What do you notice about this data?
- What does the data mean to you?
- How does this data help you understand whether this is the best location?
- Is there anything else you need to know before making your decision?

Explain Your Findings

Next, write a paragraph that summarizes what you found. Please use information from the map and your analysis to explain why the location you selected is the best location for the career you want to pursue.

Create a Storymap

Finally, create a storymap that includes your map(s) and your explanation of the best location for your chosen career.

Share your storymap with your classmates and discuss the following questions:

- What did you learn from each other's storymaps?
- Do you agree that they identified the best location? Why or why not?
- Is there anything they could add to improve their map or explanation?

Optional: Advanced GIS Analysis

Your teacher may choose to incorporate additional advanced GIS analysis options into this lesson. If you complete those options, be sure to include your maps and analysis in your Storymap and use them as additional evidence to explain the best location for your chosen career.

Mapping CTE Career Opportunities Implementation Guide

Learning Objectives

Students will use GIS to analyze the best location to live for their desired career. Through this lesson, students will learn GIS skills including searching the living atlas, adding data layers, heatmaps, and storymaps. They will engage in spatial reasoning and analysis with maps to understand the best location for their desired career. They will also use their maps and analysis to create an explanation of the best location for that career, which they will share with their classmates through a storymap.

Standards

- CCSS.ELA-LITERACY.SL.9-10.2 / CCSS.ELA-LITERACY.RST.11-12.7: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- CCSS.ELA-LITERACY.RST.9-10.4 / CCSS.ELA-LITERACY.RST.11-12.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- CCSS.ELA-LITERACY.WHST.9-10.8 / CCSS.ELA-LITERACY.WHST.11-12.8: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

Lesson Structure

Overview

The lesson starts with a teacher model of the GIS techniques needed for the lesson. The technical skills are detailed in this implementation guide for you to use as a resource. The main lesson has several parts: Career and Education Research, GIS Analysis: Heatmap, Quality of Life Analysis, Explain Your Findings, and Create a Storymap.

Advanced GIS Analysis Options: If you have more time and want to challenge your students to build more complex technical skills, you can also incorporate the Advanced GIS Analysis options included at the end of this document. In Advanced Option I, students identify the best area to live in the city/metro area they are focusing on. In Advanced Option II, students compare commute times from local colleges to their chosen location. If you choose to incorporate the advanced options, you can model them for the whole class or provide the instructions directly to individual students who are interested in an additional challenge.

Getting Started

Have each student get a computer and log in to their ArcGIS account. Students can then open and preview the lesson materials.

Lesson Introduction and Model

Provide a brief introduction to the lesson and answer questions. Before students begin working, model the GIS techniques and meaning making they will draw on during the main lesson (see below for details). At this stage, don't introduce storymaps. You will preview those right before the storymap activity.

Work Time

As they work on their project, students should collaborate to figure out how to apply the GIS techniques to their projects and conduct their analyses. Students should talk with a neighbor to discuss the questions that appear throughout the lesson. Provide support and answer questions as needed.

Storymap Activity

Before the storymap activity, model the process of creating a storymap.

Have students share the career and location they chose. Help them form groups of 2-3 to work on their storymaps. If possible, create groups of students who chose the same career or location.

When they are done, have students share their storymaps and discuss the provided questions. This can involve either a whole class presentation or small group discussion.

Modeling GIS Skills

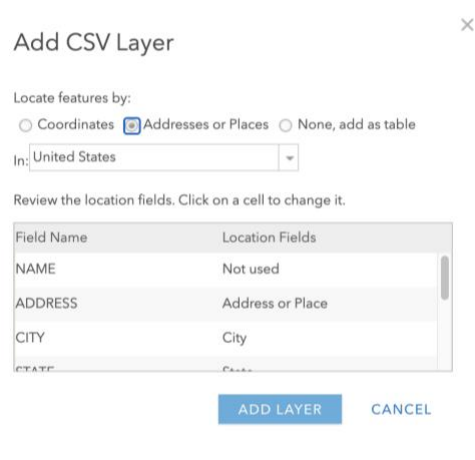
At the beginning of the lesson, model the GIS techniques that students will use in the inquiry activities. Step-by-step instructions for the GIS skills that are needed for this lesson are outlined below. They are organized by the section of the lesson they apply to: GIS Analysis: Heatmap, Quality of Life Analysis, Storymap, and Advanced options.

GIS Analysis: Heatmap & Quality of Life Analysis

Importing Data from CSV

You can import external data into GIS to create a map. First, find a dataset that includes a spatial component (e.g. address, latitude/longitude). A good source for local data is the Chicago Data Portal (<https://data.cityofchicago.org/>), which includes a wide range of data from public safety to health and human services.

Next, save your data as a .csv file. In ArcGIS online, click on “map” to open a new map. Drag and drop your CSV file on the map. In the dialog box that opens, indicate whether your data uses coordinates (latitude/longitude) or addresses/places. Then click “add layer” to create your map.



Add CSV Layer

Locate features by:

Coordinates Addresses or Places None, add as table

In: United States

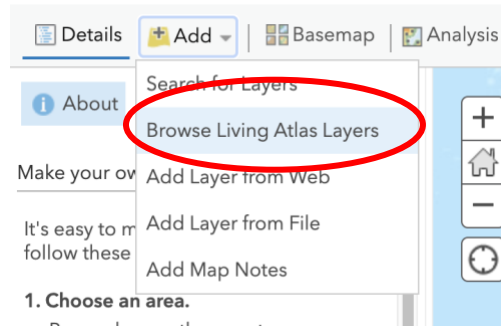
Review the location fields. Click on a cell to change it.

Field Name	Location Fields
NAME	Not used
ADDRESS	Address or Place
CITY	City
STATE	State

ADD LAYER CANCEL

Searching Living Atlas & Adding Layers

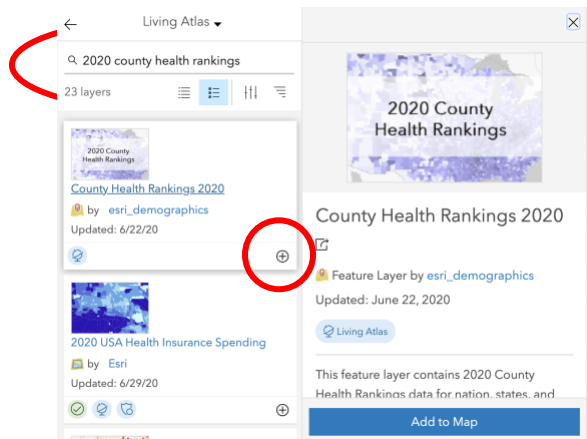
To find data layers, go to the add menu and select “Browse Living Atlas Layers.” You can then search for layers.



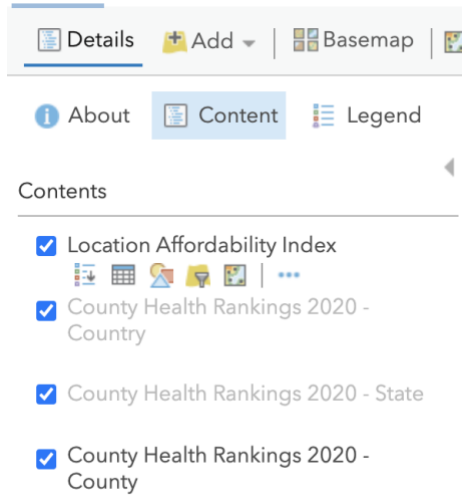
First, enter keywords the plus sign (+) or data layer to your to look at the

layer to learn more about what the data are showing you. Click on the name of the data layer to show the description.

in the search. Then click “add to map” to add the map. You may also want description of the data

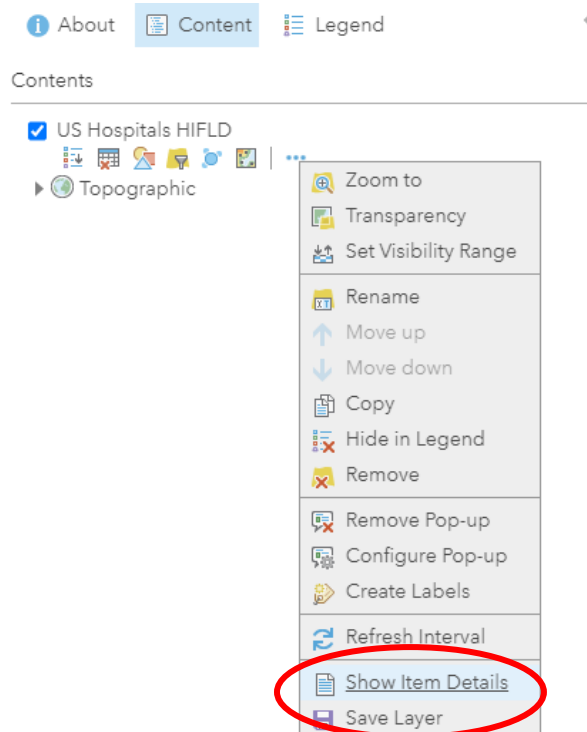


Layers will display on the map in the order they appear in your content list. You can reorder layers by hovering over the layer you want to move and dragging it to a different position in the list.

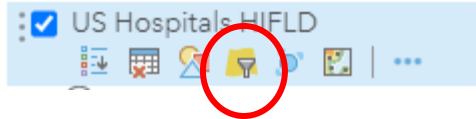


GIS Analysis: Heatmap

Before you start working with your data layer, click “Show Item Details” to read a description of the data source.



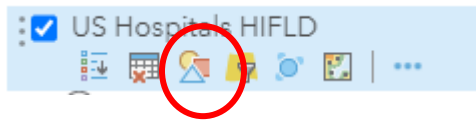
Show the attribute table for your data layer.



Scroll through to find out what attributes are available for each data point. For example, in the attribute table below, each hospital has one row in the table, and the columns represent different descriptive attributes available for the hospitals.

US Hospitals HIFLD (Features: 7596, Selected: 0)				
ID	NAME	ADDRESS	CITY	STATE
0005793230	CENTRAL VALLEY GENERAL HOSPITAL	1025 NORTH DOUTY STREET	HANFORD	CA
0053391362	LOS ROBLES HOSPITAL & MEDICAL CENTER - EAST CAMPUS	150 VIA MERIDA	WESTLAKE VILAGE	CA
0011190023	EAST LOS ANGELES	4060 WHITTIER	LOS ANGELES	CA

Now that you are familiar with the data layer, change the symbology to display it as a heat map. A heat map allows us to visualize where points are clustered, which will indicate what areas have a higher concentration of the targeted career than others.



In the Change Style pane, select the "Heat Map" drawing style. Since we are just interested in locations, there is no need to choose an attribute.

Change Style

US Hospitals HIFLD

1 Choose an attribute to show

Show location only

2 Select a drawing style

Location (Single symbol) ✔

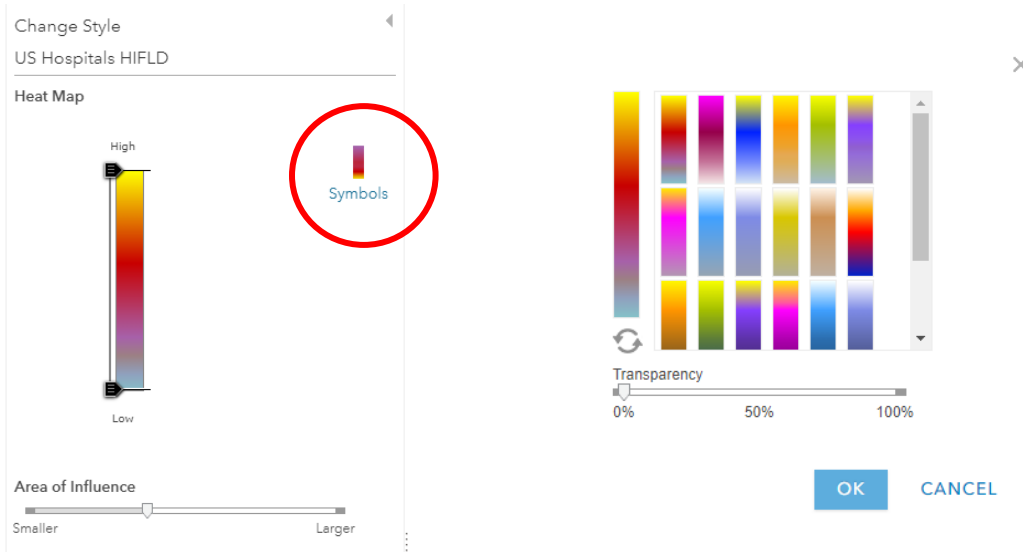
OPTIONS

Heat Map

SELECT

Show areas of high activity with stronger colors that appear to glow hotter.

Click Options to adjust the symbology of the heat map, then click Symbols to see other options for the color ramp. Select a color ramp that best represents the spatial pattern you want to see.

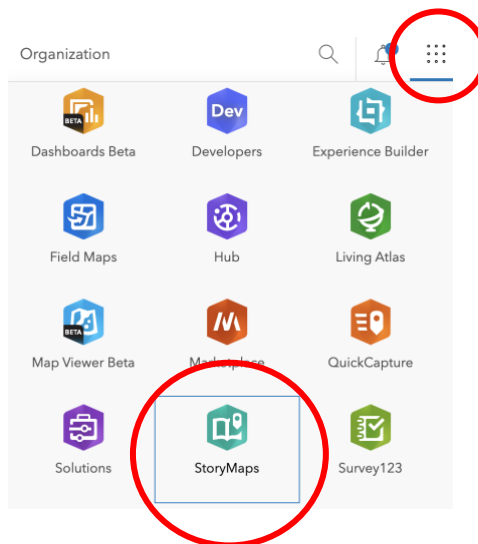


You also have the option to invert the color ramp, if that would be a better choice for visualizing the clustering of hospitals on your heat map.

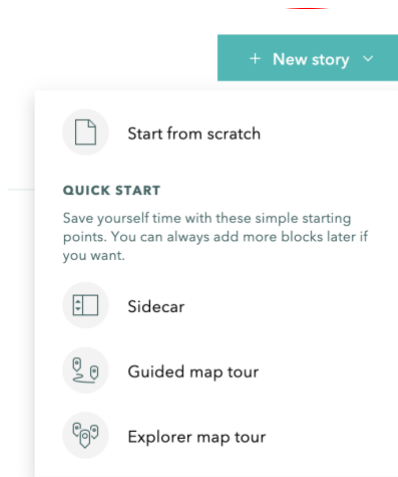
You can also experiment with changing the “Area of Influence” slider to see how that changes what the map communicates. You can come back and adjust this again if needed.

Create a Storymap

In the home menu, click on the app builder icon and select the “StoryMaps” app.



Click “New Story” and select the type of StoryMap you want to create. If you want the most flexibility, try “start from scratch.” If you want a pre-set structure, try the other options.

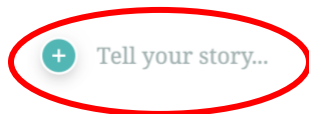


Follow the prompts to add information to your storymap. Click the green plus sign to add other media, such as maps and videos, or more text to your story. When you are ready to share your story, don't forget to click publish!

Title your story

Start with a short introduction or subtitle

Katie James | Draft

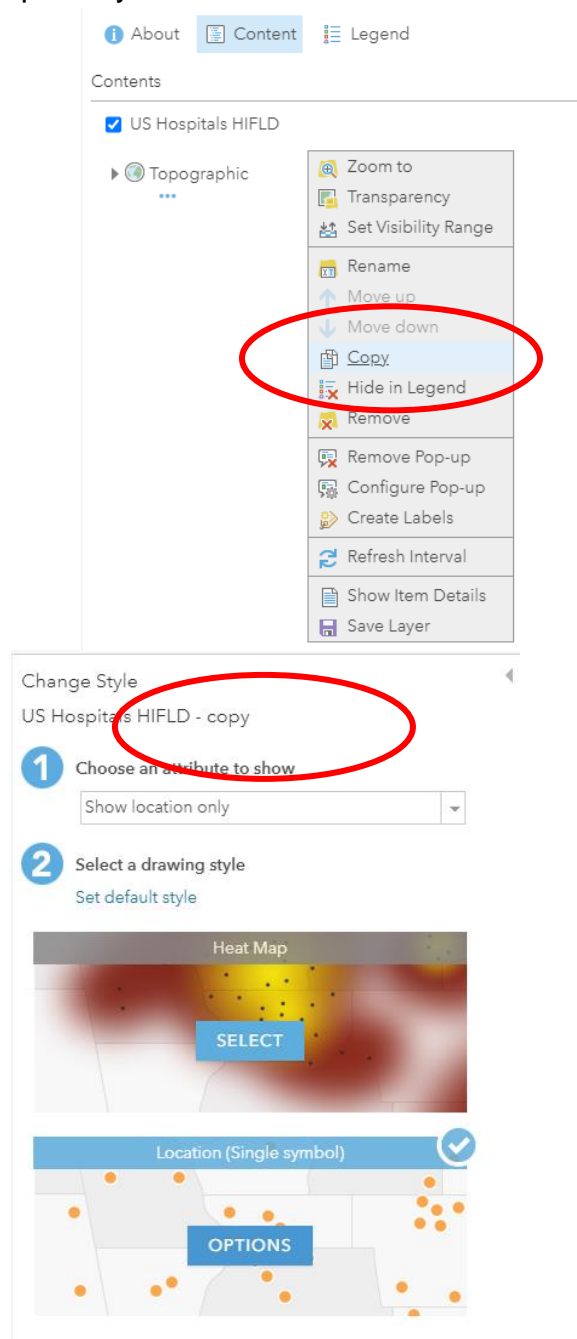


Optional: Advanced GIS Analysis

Advanced Option 1: Identify the best areas to live for your career

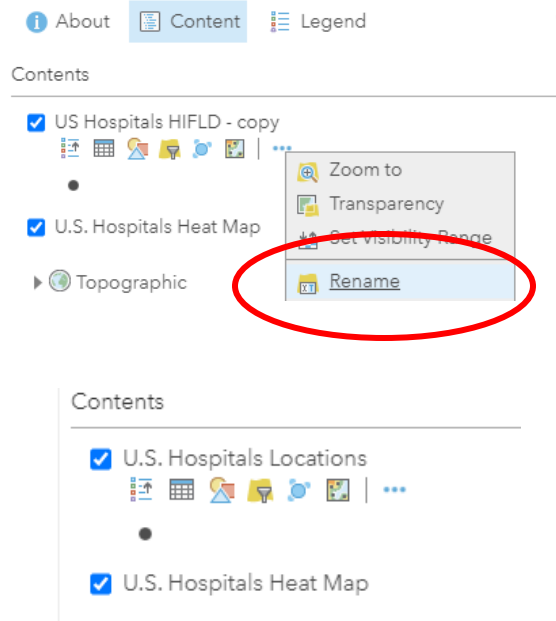
In this advanced GIS analysis option, your students will identify the best area to live for their career in the city/metro area they have chosen to focus on. This example focuses on the Chicago metro-area, since my heat map showed that it is a high-density area for hospital locations.

Create a copy of the data layer you used to make your heatmap and change the style to show locations as a single point symbol.

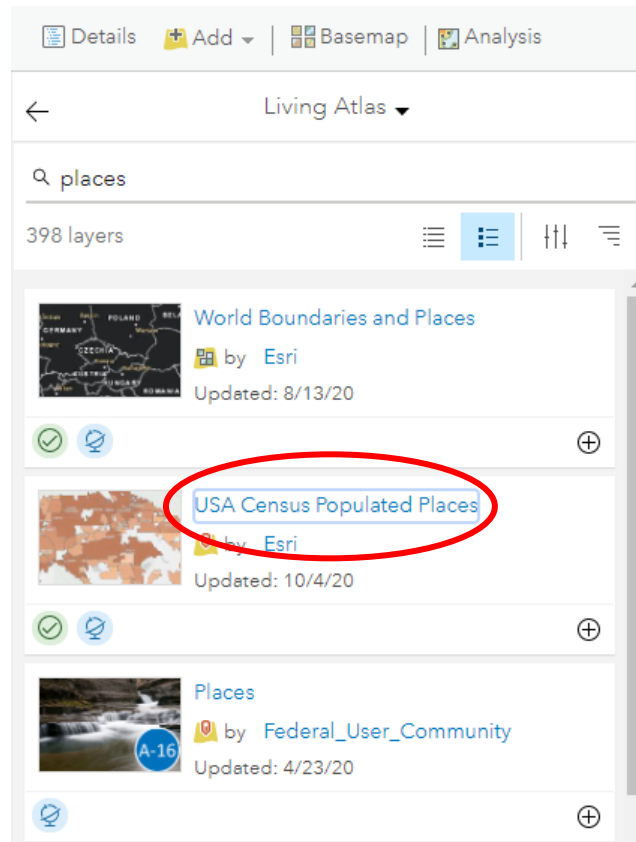


You may also want to rename the layers so you can tell them apart in the table of contents.

Chicago Geospatial Semester Project

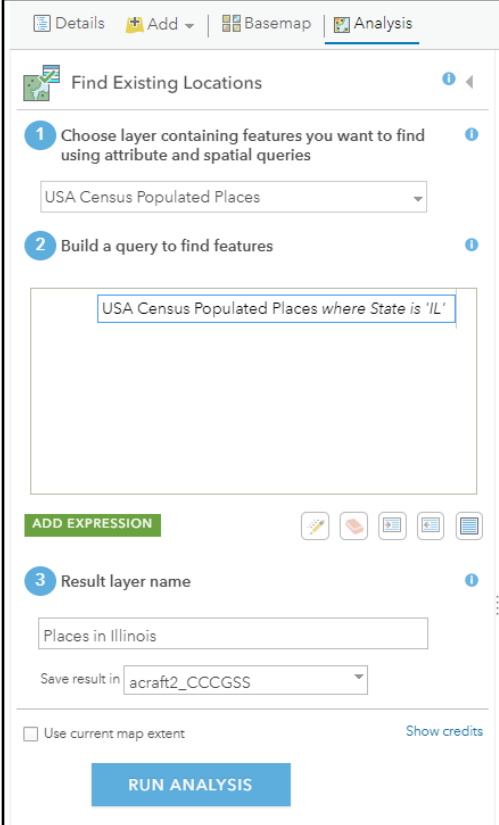


Find a layer representing a local geography, such as municipalities, in the area you have selected. The Living Atlas layer “USA Census Populated Places” includes all cities, towns, and incorporated places designated by the U.S. Census Bureau



Filter the Places layer to just the region you are interested in. (The Places layer has over 29,000 features. Reducing the size is recommended to help the analysis run faster, and will prevent us from “comparing apples to oranges” when grouping results in the map.)

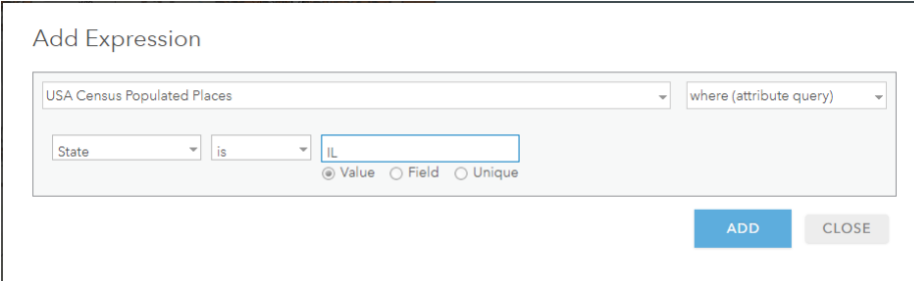
To do this, select “Find Existing Locations”, under “Find Locations” in the Analysis tab. Since the attribute table for the Places layer has a field called STATE, I can build an attribute query to select only the hospitals where STATE = IL.



The screenshot shows the 'Find Existing Locations' tool in the Analysis tab. It is configured with the following settings:

- Step 1: Choose layer containing features you want to find using attribute and spatial queries. Layer: USA Census Populated Places.
- Step 2: Build a query to find features. Query: USA Census Populated Places where State is 'IL'.
- Step 3: Result layer name. Name: Places in Illinois. Save result in: acraft2_CCCGSS.

Additional options include 'Use current map extent' (unchecked) and 'Show credits'.



The 'Add Expression' dialog box shows the following configuration:

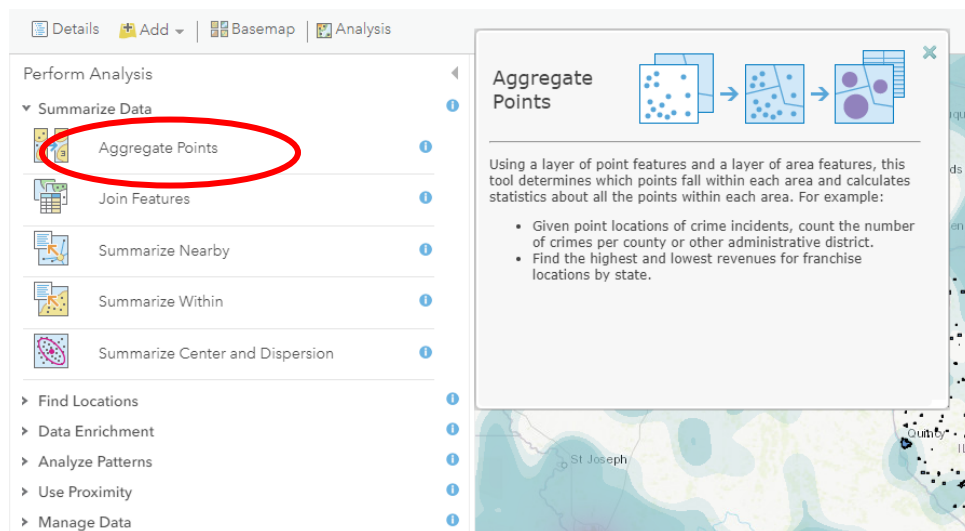
- Layer: USA Census Populated Places
- Query type: where (attribute query)
- Field: State
- Operator: is
- Value: IL
- Radio buttons: Value (selected), Field, Unique

Buttons: ADD, CLOSE

Run the analysis to get a layer of just the 1,307 Places in Illinois.

Note: In all steps, do not check “Use current map extent”.

In the Analysis tab, select the “Aggregate Points” tool under “Summarize Data”.






Fill in the parameters shown below, then Run Analysis. It’s also a good idea to click the Information icon next to each option so you understand what they mean. (For example, if your dataset has different types of features, such as hospitals *and* nursing homes, you can make those separate groups using Option 4.)

In this example, I added a statistic for summarizing the total number of hospital staff in each place, to provide some information about potential employment demand.

Chicago Geospatial Semester Project

Details Add Basemap Analysis

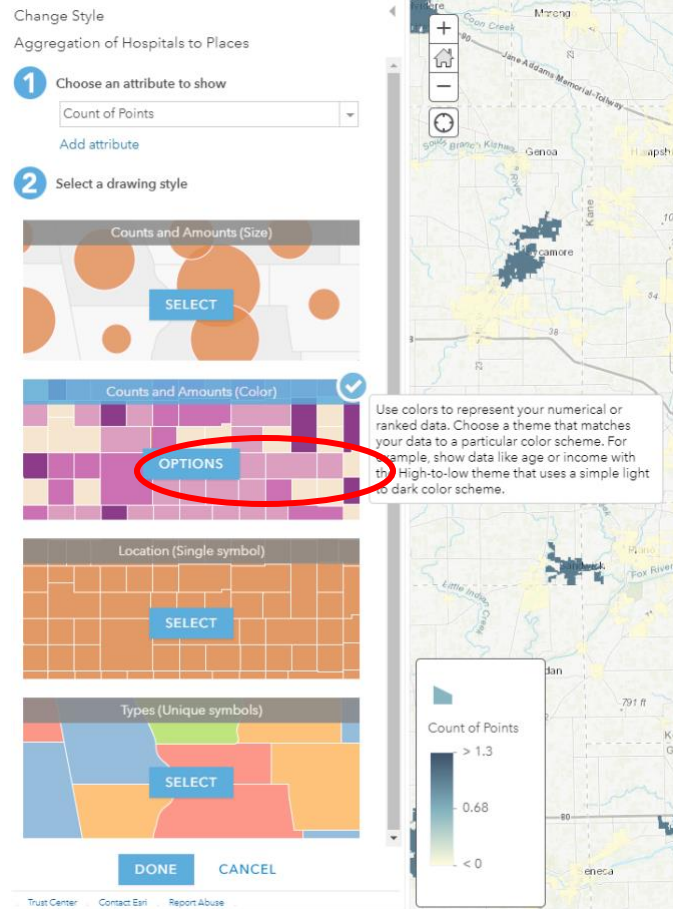
Aggregate Points

- 1 Choose layer containing points to aggregate into areas**
U.S. Hospitals Locations
- 2 Choose layer containing aggregation areas**
  
Polygon Square Hexagon
Choose the polygon layer
Places_in_Illinois
 Keep areas with no points
- 3 Add statistics (optional)**
TTL_STAFF Sum
Field Statistic
- 4 Choose field to group by (optional)**
Field
 Add minority, majority
 Add percentages
- 5 Result layer name**
Aggregation of Hospitals Locations to Places_in_Illino
Save result in acraft2_CCCGSS

Use current map extent [Show credits](#)

RUN ANALYSIS

When the analysis is finished, change the style of the new layer to create a choropleth map by selecting “Counts and Amounts”.



Go into the options, classify your data, and select an appropriate color ramp.

Experiment with classification method and number of classes to create a map that is the most useful for you.

For example, I started by selecting “Natural Breaks” classification method. Then I opened my attribute table and sorted the Count of Points in descending order, and found that Chicago is an outlier with 42 hospitals, and the places with the next highest number of hospitals had only 4. I decided to manually adjust the break point (by clicking and dragging the sliders) so that Chicago is in a class by itself, and the next class is places with 2-4 hospitals.

Chicago Geospatial Semester Project

Aggregation of Hospitals to Places (Features: 1367, Selected: 0)				
Count of Points	Sum ttl_staff	STATEFP10	PLACEFP10	PL
42	-41,958	17	14000	00
4	-3,996	17	59000	02
4	-3,996	17	65000	02
4	-3,996	17	72000	02
3	-2,997	17	01114	02
2	-1,998	17	54885	02
2	-1,998	17	24582	02
2	-1,998	17	35307	02
2	-1,998	17	48242	02
2	-1,998	17	50244	02

Change Style
Aggregation of Hospitals to Places

Count of Points

Divided By: None

42
5
0

Count of Points

Classify Data

Using Manual Breaks

With 4 classes

Round classes: Select an option

Draw features with out of range or no value.

Symbol: [square]

Transparency

Overall

0% 50% 100%

Per feature

Set from Attribute Values

Visible Range

World Room

OK CANCEL

The “Count of Points” in the legend refers to the number of hospitals that are located within the boundary of each place.

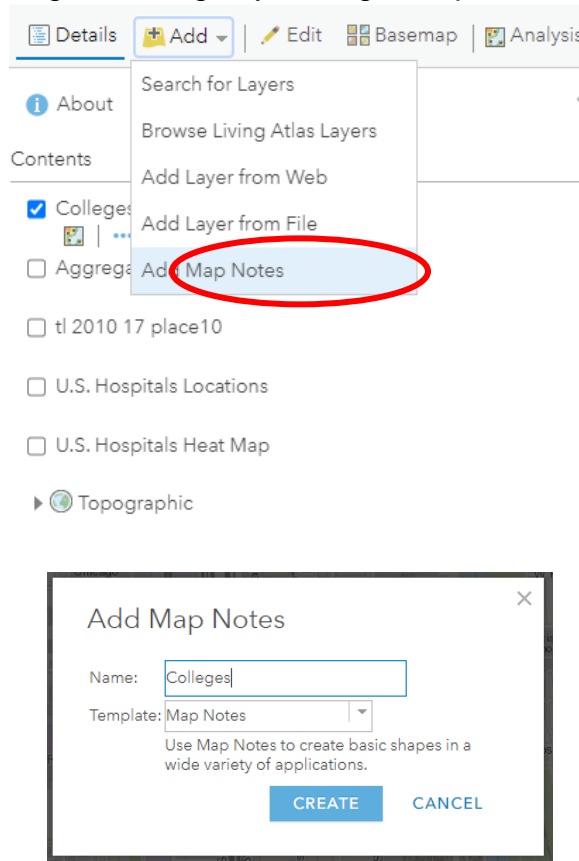
The places with the highest number of hospitals might be good choices for where to live and/or go to school for a career in healthcare.

Option II: Compare commute times

After Option I, students could also research what educational opportunities are located in or nearby the municipalities with the highest number of hospitals. After identifying ~3 colleges that are located in their area of interest and offer degree programs in their career choice, they can calculate the commute times between those colleges and places to live, and compare them with their choices from Option I.

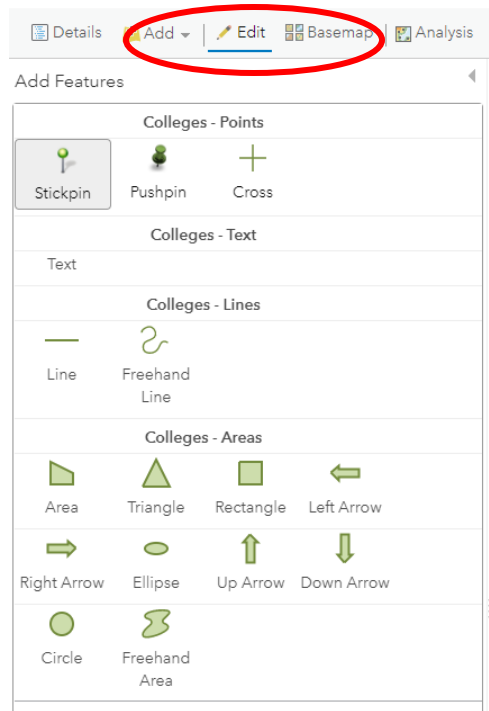
For this example, I am using the University of Illinois at Chicago.

Create a point representing the college by adding a map note.

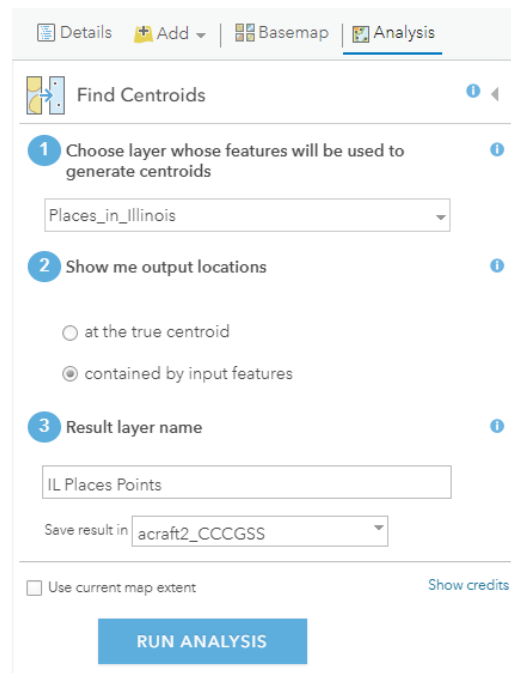


After creating this point, you can continue to add more points using the Edit tab:

Chicago Geospatial Semester Project

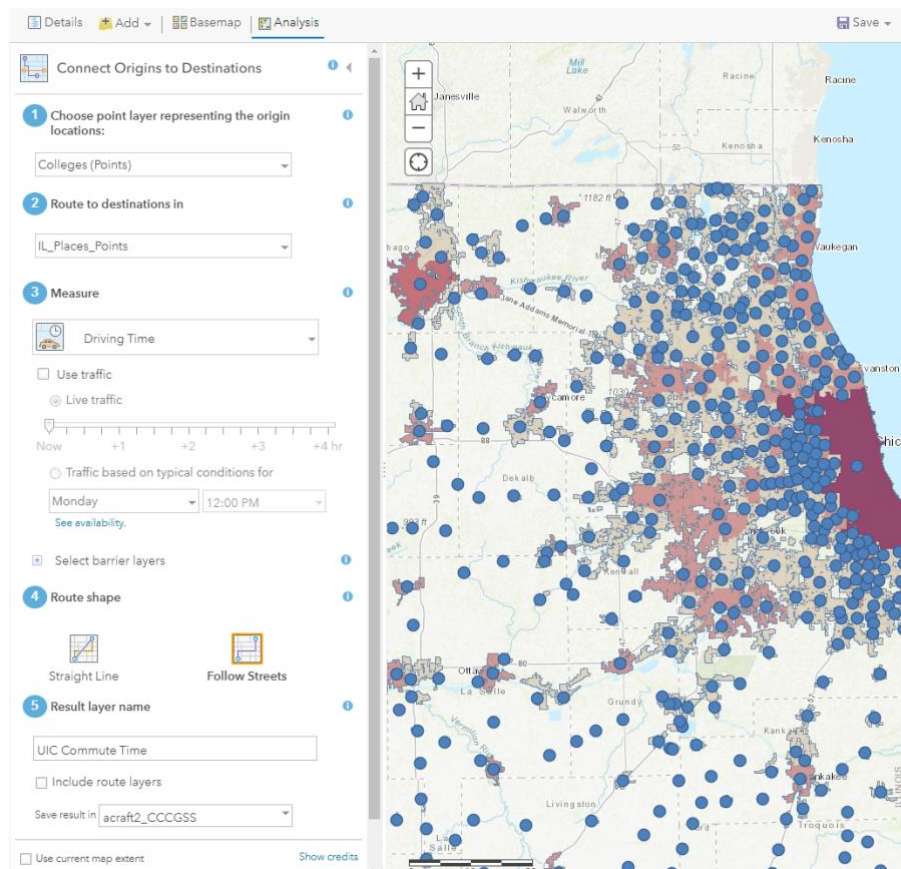
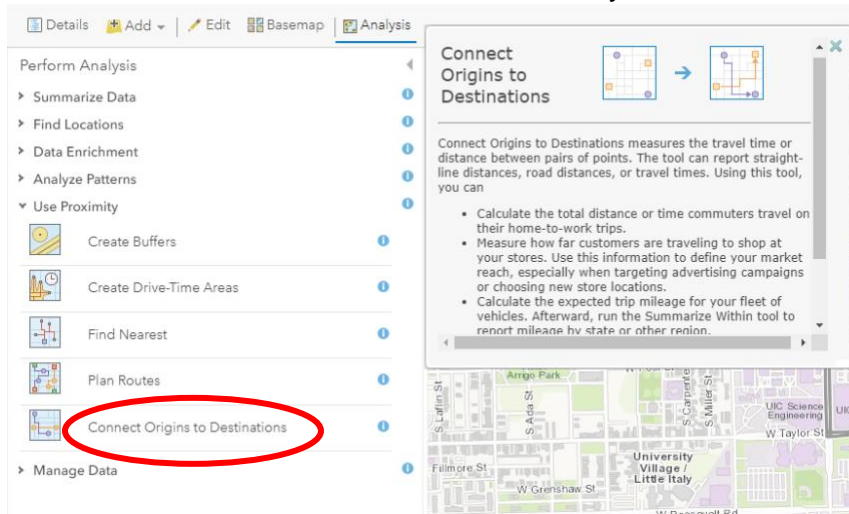


We are going to use the tool “Connect Origins to Destinations” to calculate the commute time. However, this tool only works when connecting point features with point features. The Places layer is polygon, so we need to convert it to points by using the Find Centroids tool, which is under “Find Locations” in the Analysis tab.



Now you can proceed with calculating the travel times.

In the Analysis tab, under “Use Proximity”, select “Connect Origins to Destinations” and fill in the parameters as shown below, then Run Analysis.



Chicago Geospatial Semester Project

In the attribute table of the resulting layer, you will find a field showing driving time between UIC and all Places in Illinois.

UIC Commute Time (Features: 1367, Selected: 0)			
Route Name	Driving Distance (Miles)	Driving Distance (Miles)	Driving Time (Minutes)
Route 1362 - UIC - 1362	3.69	5.95	13.86
Route 915 - UIC - 915	6.47	10.42	21.10
Route 841 - UIC - 841	8.99	14.48	22.31
Route 809 - UIC - 809	10.10	16.26	22.40
Route 850 - UIC - 850	9.58	15.42	23.03
Route 797 - UIC - 797	12.82	20.64	25.16
Route 815 - UIC - 815	8.05	12.95	25.31
Route 866 - UIC - 866	11.27	18.14	25.22

Scroll to the right to see the place names. Identify the locations with the shortest commute to your chosen college.

Safe Routes to School

Overview

In this lesson you will use Geographic Information Systems (GIS) to develop a WebApp for your school's website. Your WebApp will help new students find the safest ways to get to and from school, based on your research and experiences as upperclassmen. You will use GIS to analyze data, such as traffic and crime, provide your own information about safest spots nearby, identify the best routes, and develop a webapp to communicate your findings to other students.

My School

First, think about the area around your school and discuss the questions below with a partner.

- How do most students get to and from your school?
- What issues have you encountered or heard about that cause problems in getting to and from school?
- Are there places around your school where you feel the safest?
- What would make getting to and from school more safe for you and other students?

Based on your conversation, identify the top 2-3 transportation stops (e.g., bus or El stop) or starting points (e.g. home) students use to travel to and from your school (by taking the bus, el, or walking, etc). You should also list 2-3 of the issues and safe spots you talked about and would like to investigate further.

Transportation Stops/ Starting Points	Common Issues	Safest Spots

GIS Analysis: Safe Routes to School

Next, you will add data to a map to help you understand and identify the safest routes to and from your school.

Log into your ArcGIS.com account and open a new map. Locate your school on the map and add a map note for it.

Chicago Geospatial Semester Project

Pick one of the main transit locations (e.g., bus stop, El stop, home) that people travel to and from to get to school to focus on. Add that transportation stop to your map using map notes. Add other map notes as needed to represent issues and safest spots nearby that stop.

After you've created your first map note, you can edit it, or add additional features, by clicking "Edit". Your map notes can be points, lines, or areas.

Choose at least two different data layers to explore that are relevant to the safety issues you identified. To find the suggested data layers listed below, search for layers with the tag #ChicagoGSS, and limit your search to "My Organization." You may find other layers from ArcGIS Online or Living Atlas that you think are relevant. You can also add data to your map based on your own experiences. Some layers that might be useful are:

- Public transit (CTA rail and bus lines)
- Traffic
- Car Accidents
- Crime (e.g., robberies)
- Toxic industrial sites
- Favorite community places (e.g., Libraries, Places to eat, Parks)
- Layers or data points related to the issues and safe spots you identified

Take a look at your map(s) and consider the following questions with a partner:

- Are there any areas that are especially safe around your school?
- Are there particular areas that students should avoid?

Finally, add the data layer "CPS -Safe Passage Routes SY1718". This shows the routes that have community members monitoring them before and after school.

- How does your map compare with the routes CPS has identified as a "safe passage?"
- Does your map overlap with the existing safe passages?
- Are there ways you can connect existing safe passage routes and your safe route?

With a partner, discuss the question below based on your findings.

Based on your analysis, what is the safest possible route to school from the main transportation stop?

Create your safe route to school in your map. Use map notes to draw the route, and use your symbology options to make it stand out.

Presentation and Discussion

Share your map with your classmates. Be sure to use your map to explain why that is the safest route.

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Optional: Advanced Web Design

Your teacher may choose to incorporate additional advanced options into this lesson.

Safe Routes to School Implementation Guide

Learning Objectives

Students will use Geographic Information Systems (GIS) to explore relevant data and determine the safest route to and from their school. They will then use GIS to create a WebApp that can be added to the school website to share their findings with other students. Through this lesson, students will learn GIS skills including searching the Living Atlas and ArcGIS Online for layers, adding data layers, creating map notes, creating WebApps, sharing and embedding WebApps.

Standards

- CCSS.ELA-LITERACY.SL.9-10.2 / CCSS.ELA-LITERACY.RST.11-12.7: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- CCSS.ELA-LITERACY.WHST.9-10.8 / CCSS.ELA-LITERACY.WHST.11-12.8: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

Lesson Structure

Overview

The lesson starts with a student discussion about the area around their school, focusing on the main transportation stops students use to get to and from school, common

issues students experience traveling to and from school, and possible solutions to common issues. They will add the school and their choice of transportation stop (e.g. bus stop, El stop) to a map as map notes. They will then add relevant data layers (e.g. crime, traffic, etc) that interest them to the map. Next, they will analyze the data layers to identify the safest route to school, which they will add to their map as a mapnote. Finally, they will create a WebApp to communicate their map and analysis, which can be added to the school website.

Lesson Introduction and Model

Have students discuss the “my school” section in pairs then share their insights with the whole class.

Next, have each student get a computer and log in to their ArcGIS account. Provide a brief introduction to the GIS portion of the lesson and answer questions. Next, model the GIS techniques that they will be using during the lesson. The techniques are detailed in lesson order below. At this stage, don’t introduce WebApps. You will preview those right before the WebApp activity.

Work Time

Students will add layers and data points to their maps to analyze the safest routes to and from school. They can explore any layers in the Living Atlas or ArcGIS Online library that they find interesting and relevant (examples are provided in the lesson). They can also add data based on their own experiences.

As they work on their maps, encourage students to collaborate to figure out how to apply the GIS techniques to their projects. Provide support and answer questions as needed.

Presentation and Discussion

Have students share their maps and analysis with the class. This can be done through whole group presentations or small group discussions.

Advanced Options: WebApps

To take the lesson a step further, you can have students create WebApps with their maps and analysis. These webapps can be added to the school website to share their safe routes with other students.

There are three advanced options, which vary in level of difficulty.

Advanced Option 1:

Advanced Option 2:


Advanced Option 3:

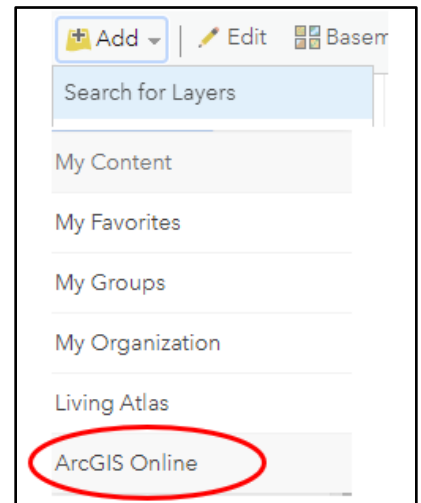
Modeling GIS Skills

At the beginning of the lesson, model the GIS techniques that students will use in the inquiry activities. Step-by-step instructions for the GIS skills that are needed for this lesson are outlined below.

Searching & Adding Layers

To search for layers, go to "Add" and "Search for Layers" and select either the Living Atlas or ArcGIS Online from the menu. Each data library has different data layers available so if you don't find what you're looking for in one, you may want to search the other. (Note: The default is "My Content" which will only search maps you have saved in your account.) You can search within My Organization to find layers that have been created by other GSS instructors, students, and mentors.

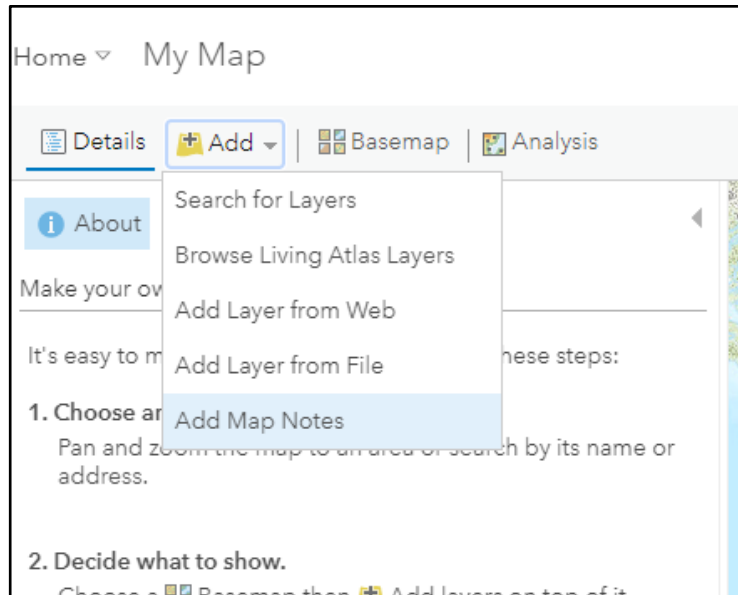
Select a data layer to add to the map by either clicking the plus sign (+) or "add to map." If you would like to see what information is given for the layer, hover the cursor over the layer name, click on More Options  and go down to "Show Item Details".



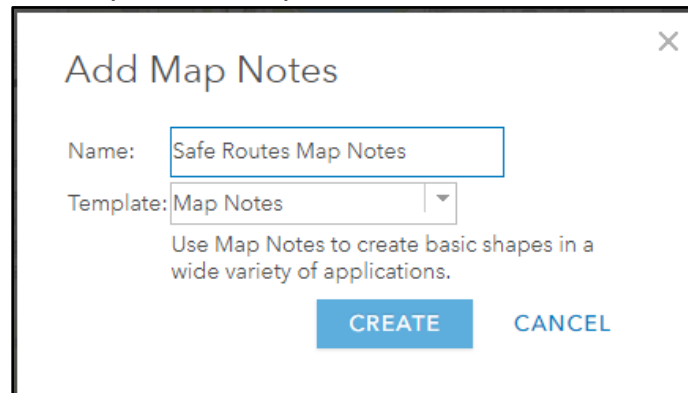
Adding Map Notes and Changing Symbology

Use map notes to add points, lines, or areas representing: school, traffic stops, issues encountered when traveling to school, safe places, and when creating the final safe route to school.

Start by going to the "add" menu and selecting "add map notes."

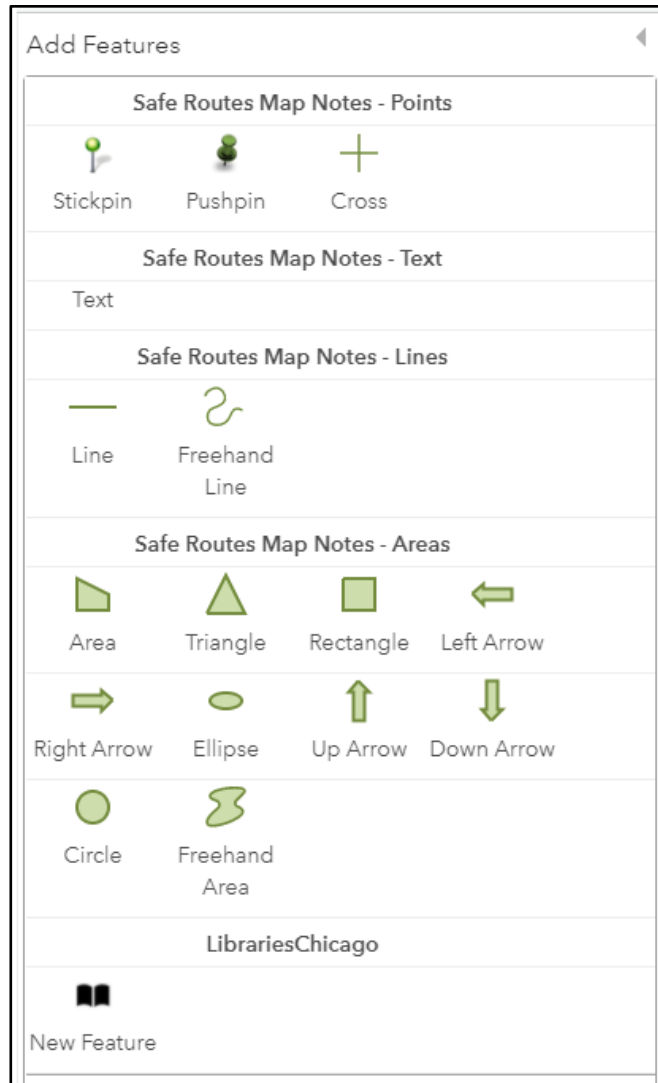


Name the layer. This layer will contain all the different map notes you create, so give it a general name. Use the Map Notes template.



The Add Features window will be displayed. Select the appropriate feature type for what you are adding to the map.

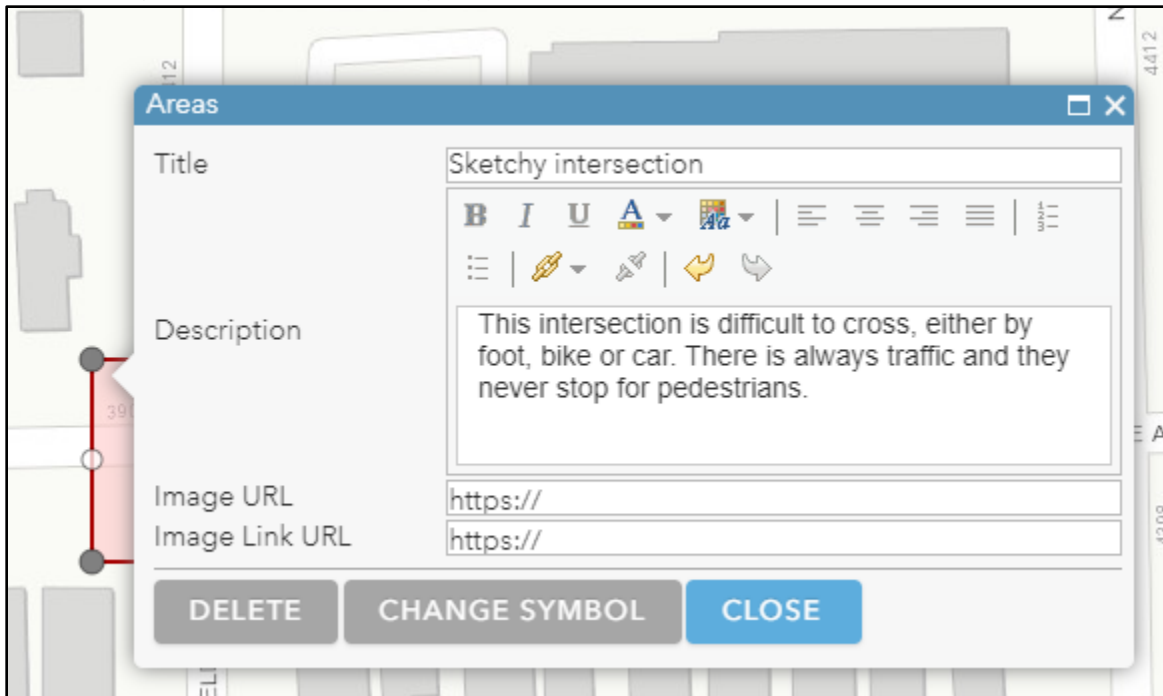
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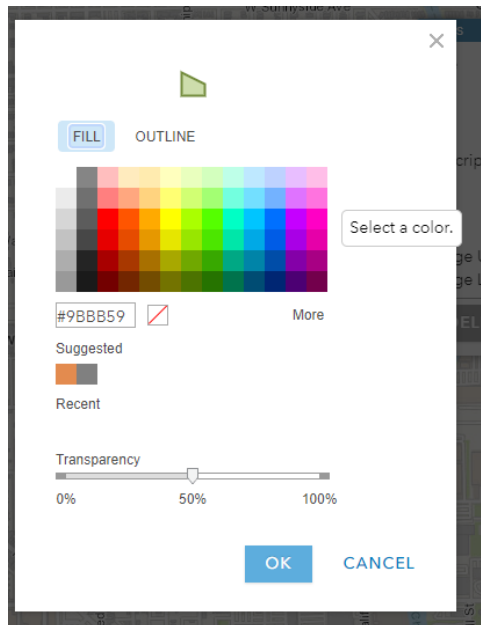
Pay attention to the popup instructions for how to create each type of feature.



After creating a feature, you will give it a title and an optional description for more detail.



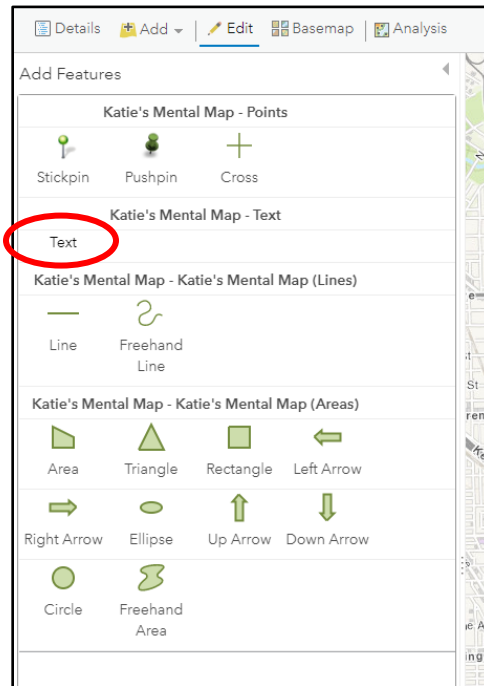
Click Change Symbol to select a color and symbol. For line features, you will also be able to change the thickness of the lines.



When you have finished adding your Map Notes, click Details to return to the table of contents view. If you want to return to adding Map Notes, just click Edit and you will see

the Add Features window again. You can also edit existing Map Notes by clicking them while in Edit mode.

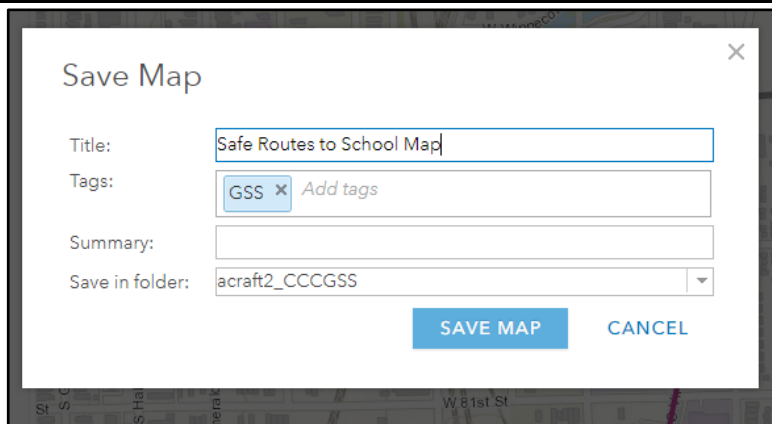
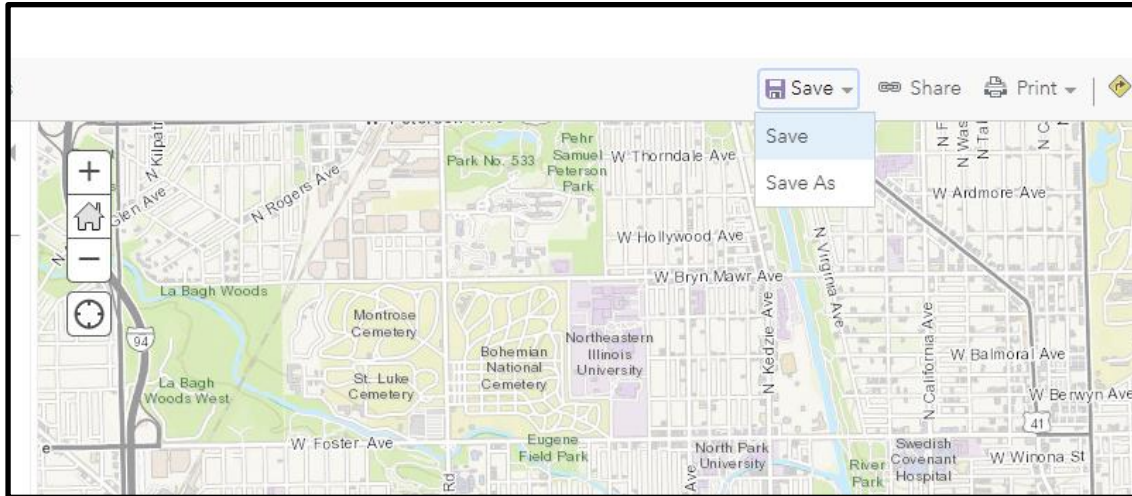
Tip: If you want to see labels displayed on the map without clicking, you can add a text map note. This is one of the options in the Add Features window when you are editing.



Adding a halo to your text is a good way to make sure it's visible.



Save your map, tagging it with the class hashtag.
NOTE: ArcGIS Online does not save automatically!



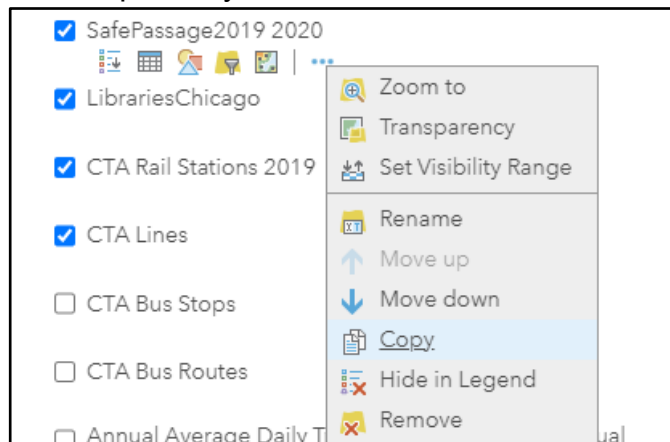
Add data layers from ArcGIS Online

These are some potential data layers we have identified that can be used for this lesson. They are tagged "ChicagoGSS". They are shared within our organization, and you can add tags for your class.

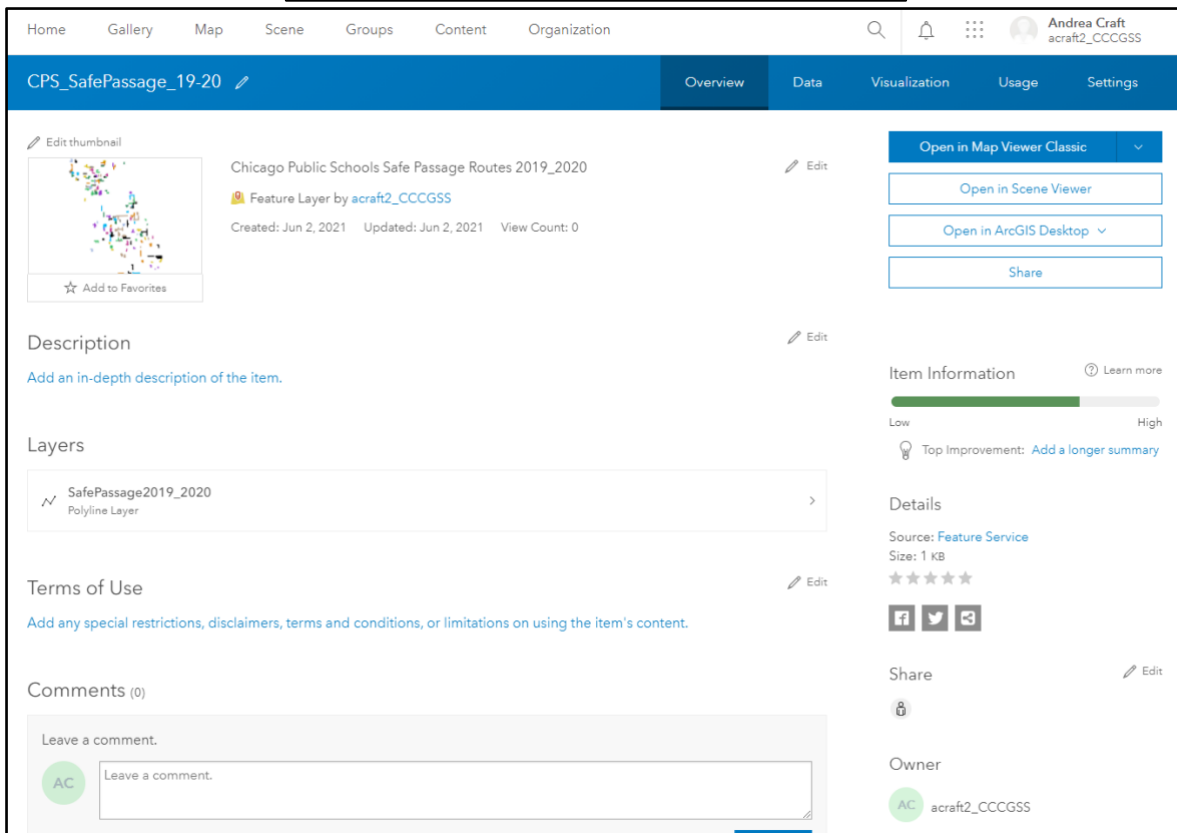
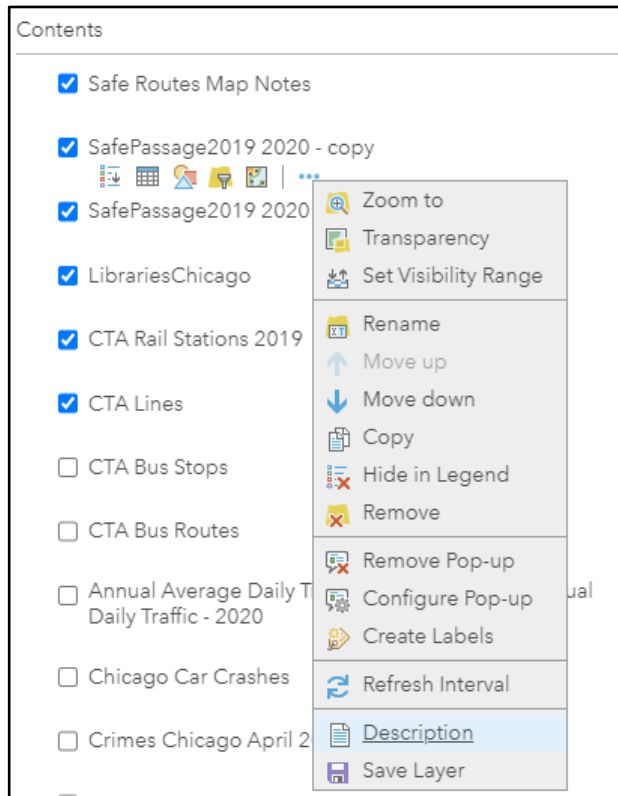
- Public transit
 - CTA rail and station:
 - CTA_Lines*
 - CTA Rail Stations 2019*
 - CTA bus lines and stops
 - CTA Bus Lines*
 - CTA Bus Stops*
- Crime
 - Reported crime points:

- *Crimes Chicago April 2020 to 21*
 - Crime index areas
 - USA Property Crime*
- Traffic
 - Car crashes
 - Chicago Car Crashes*
 - Average daily traffic
 - Annual Average Daily Traffic - 2020 - Average Annual Daily Traffic - 2020 - GSS copy*
- Biking
 - Bike routes
 - Chicago Bike Routes 2021*
- Pollution
 - Industrial sites releasing toxic waste
 - Chicago TRI Facilities*
- Police interactions
 - Stop & frisk incidents
 - CPD_ISR_2018_19*
- Safe places, teen hangout places
 - Libraries
 - ChicPubLibraries*
 - Places to eat/get coffee/fun activities near your school?

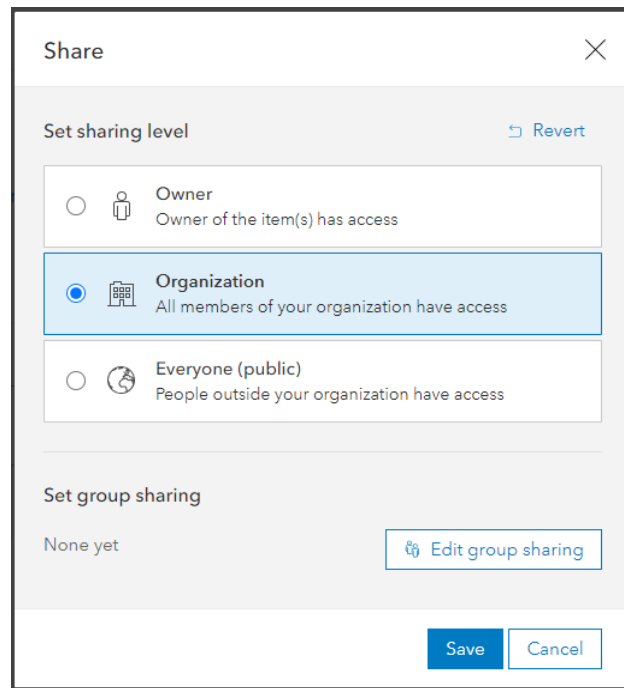
If you find a data layer in ArcGIS Online or Living Atlas, you can save a copy, tag it for your class, and add a description if you'd like.



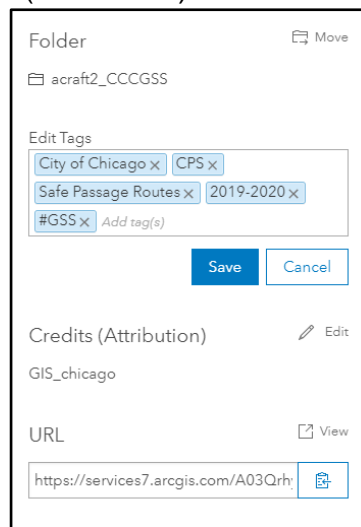
Once you have made a copy, go to Description to change the title, add a description and tag, etc.



Change the sharing level to “Organization”. This is necessary for your students to be able to search for it.



Once you have saved a new copy, you are the owner of this layer. Make sure you list the original source under Credit (Attribution)



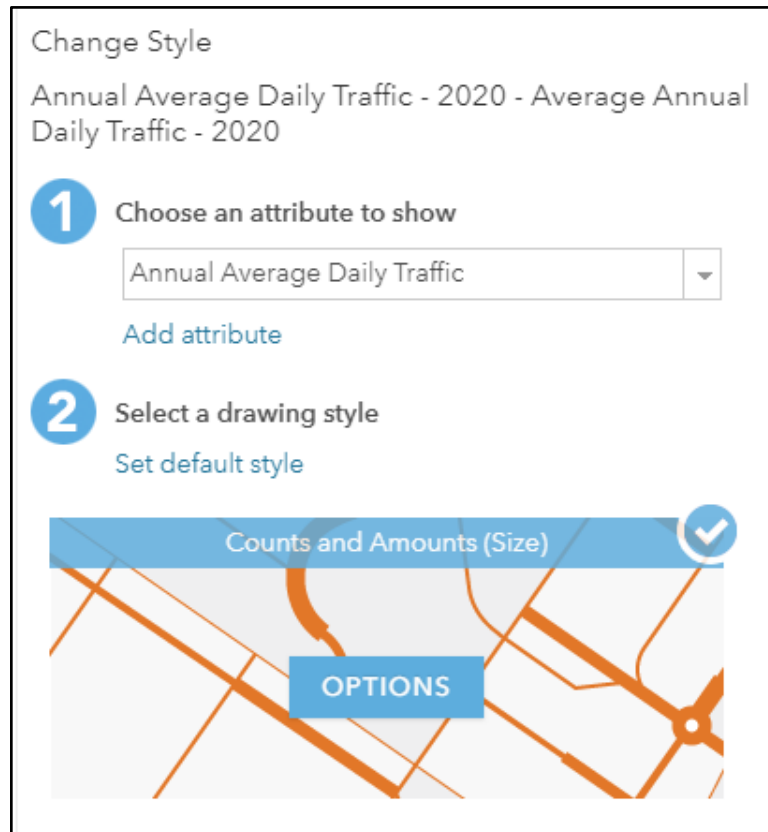
GIS Analysis - How to make use of the data

Some data layers, such as rail lines and stops, can be symbolized by simple shape and color choices. With others, such as traffic and car crashes, we can learn more about patterns in the data by using some additional symbology options.

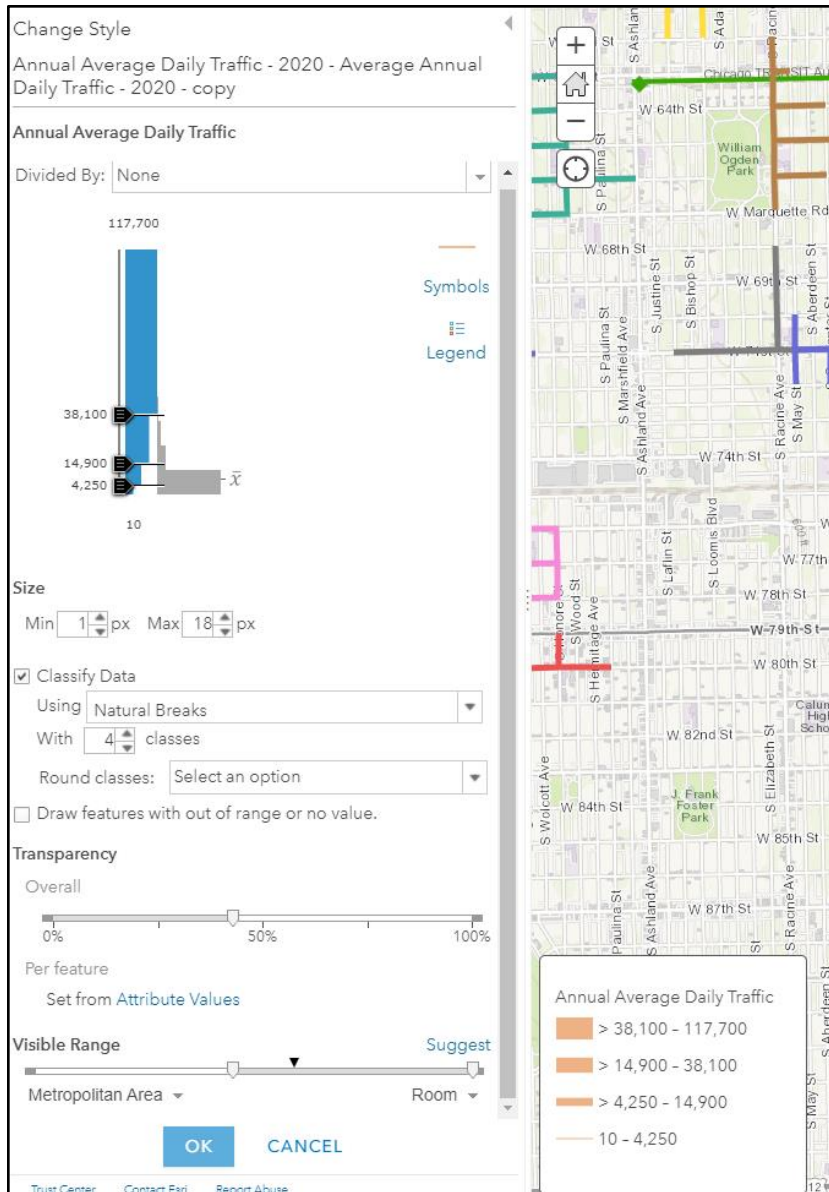
How to symbolize street traffic levels:

Search ArcGIS Online and add: Annual Average Daily Traffic - 2020 - Average Annual Daily Traffic - 2020 - GSS copy

- Change style to show Counts and Amounts (Size) of Annual Average Daily Traffic



- Classify data using Natural Breaks



How to show high density point layers as clusters:

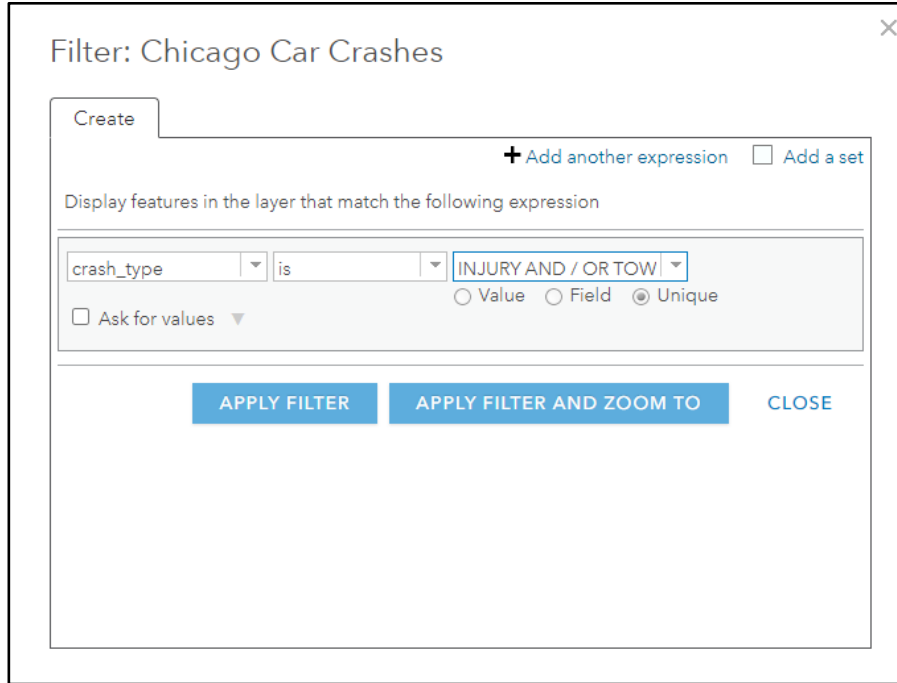
When you have very large datasets with lots of points, you may want to simplify it by grouping the points into clusters.

Search ArcGIS Online and add “Chicago Car Crashes”

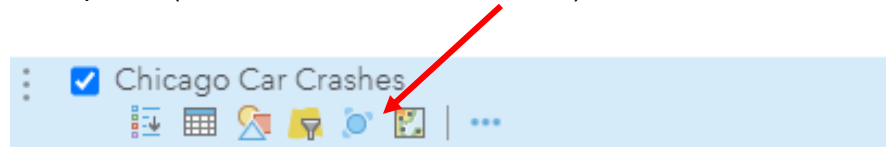
- Create a filter to identify the types of crashes that are most important in assessing a safe commute to school.

- Crash type (injury or not)
- Time of day
- Day of week

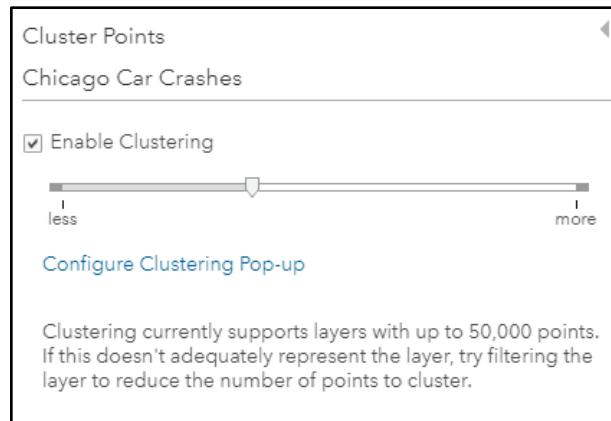
Example:



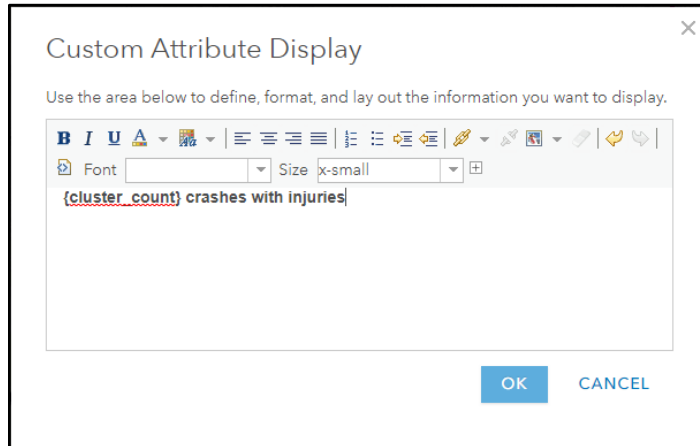
- Then cluster points (it's the 5th icon, the blue circle):



- Use the slider to set level of clustering:



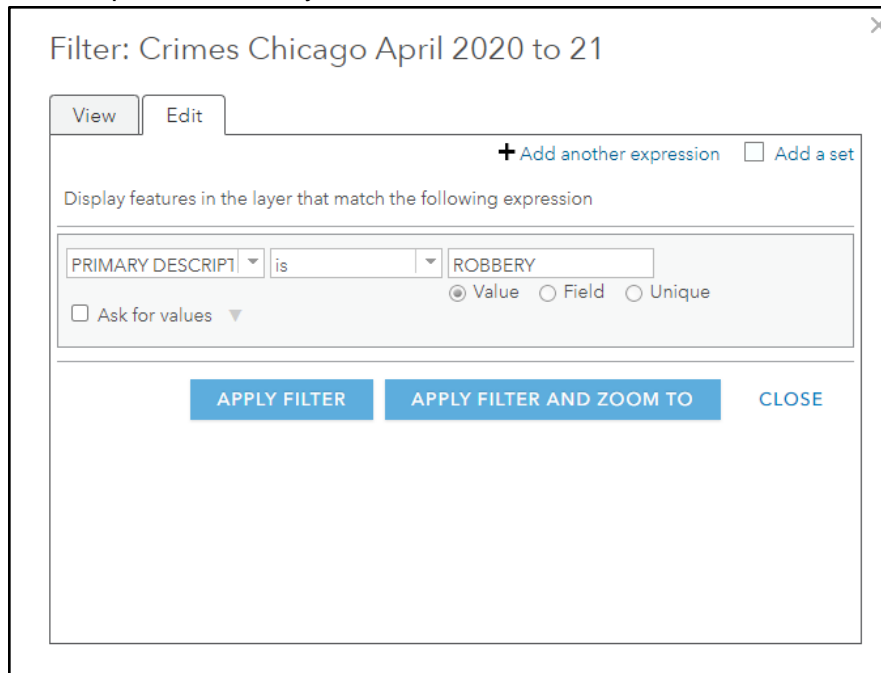
- Configure popups to say how many crashes occurred at each cluster:



How to filter crimes layer to show relevant reported crimes:

Search ArcGIS Online and add “Crimes Chicago April 2020 to 21”

- Filter for Description = Robbery




- Enable clustering and configure popups

Chicago Geospatial Semester Project

Cluster Points

Crimes Chicago April 2020 to 21

Enable Clustering



[Configure Clustering Pop-up](#)

Configure Clustering Pop-up

Crimes Chicago April 2020 to 21

Show Pop-ups i

Pop-up Title

Pop-up Contents


Display:

[CONFIGURE](#)

[Configure Attributes](#)

Custom Attribute Display X

Use the area below to define, format, and lay out the information you want to display.



Font Size

{cluster_count} reported robberies near this location

[OK](#) [CANCEL](#)

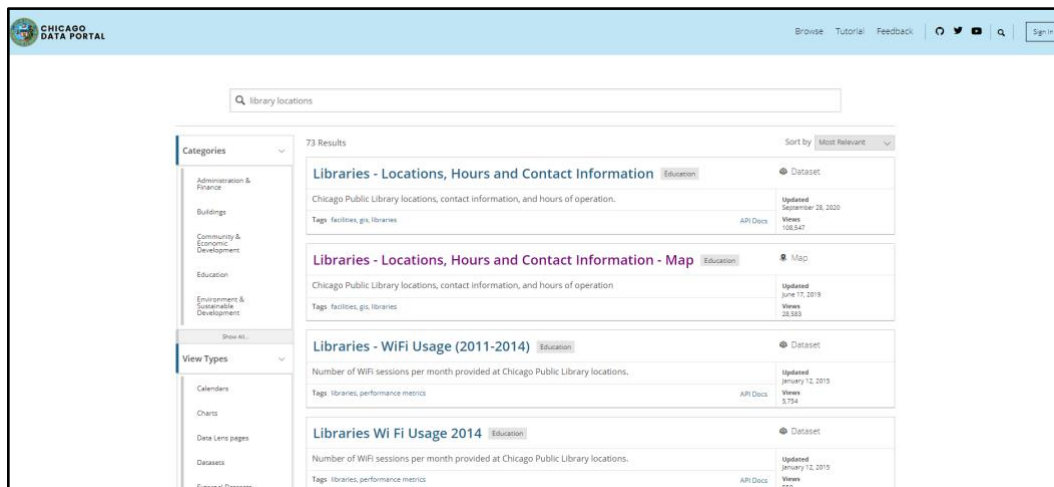
About the Living Atlas crime index layer:

Layer “USA Property Crime”

- This shows property crime index at different scales, down to the block group level
- No data table, but popups are pre-configured

How to find and use external datasets from the Chicago Data Portal:

- Go to <https://data.cityofchicago.org/>
- Search:



- Data does not need to be categorized as “Map” in order to be mapped. If it is a “Dataset”, preview the data table to make sure it has columns with geographic information, such as latitude and longitude or addresses

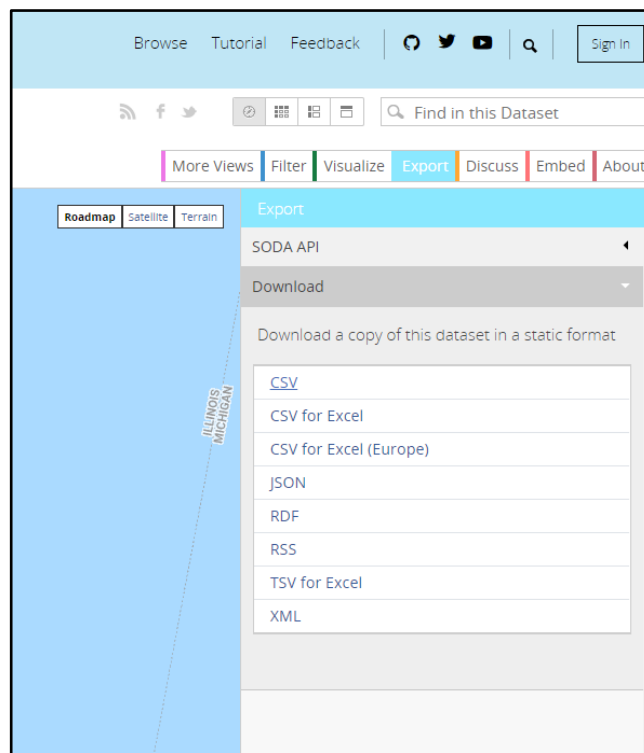
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Table Preview [View Data](#) [Create Visualization](#)

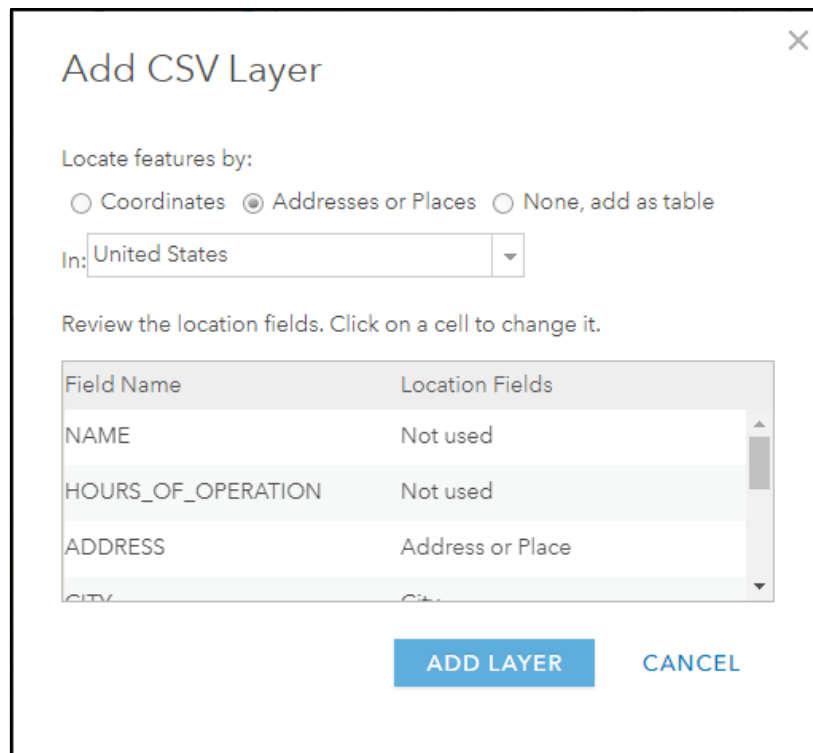
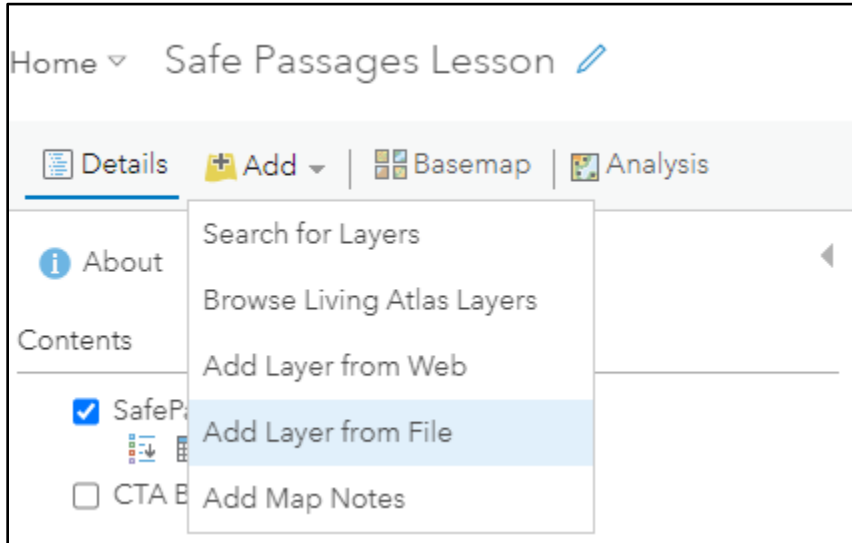
NAME	HOURS OF...	ADDRESS	CITY	STATE	ZIP	PHONE	WEBSITE	LOCATION
Albany Park	Sun., Closed; M...	3401 W. Foster...	Chicago	IL	60625	(773) 539-5450	https://www.ch...	(41.975456°, -8...
Altgeld	Sun., Closed; M...	13281 S. Corlis...	Chicago	IL	60827	(312) 747-3270	https://www.ch...	(41.654730218...
Archer Heights	Sun., Closed; M...	5055 S. Archer ...	Chicago	IL	60632	(312) 747-9241	https://www.ch...	(41.801213659...
Austin	Sun., Closed; M...	5615 W. Race A...	Chicago	IL	60644	(312) 746-5038	https://www.ch...	(41.889272153...
Austin-Irving	Sun., Closed; M...	6100 W. Irving ...	Chicago	IL	60634	(312) 744-6222	https://www.ch...	(41.953173900...
Avalon	Sun., Closed; M...	8148 S. Stony I...	Chicago	IL	60617	(312) 747-5234	https://www.ch...	(41.746717221...
Back of the Yar...	Sun., Closed; M...	2111 W. 47th St.	Chicago	IL	60609	(312) 747-9595	https://www.ch...	(41.808384423...
Beverly	Sun., Closed; M...	1962 W. 95th St.	Chicago	IL	60643	(312) 747-9673	https://www.ch...	(41.721180505...
Bezazian	Sun., Closed; M...	1226 W. Ainslie...	Chicago	IL	60640	(312) 744-0019	https://www.ch...	(41.971681948...
Blackstone	Sun., Closed; M...	4904 S. Lake P...	Chicago	IL	60615	(312) 747-0511	https://www.ch...	(41.805840309...
Brainerd	Sun., Closed; M...	1350 W. 89th St.	Chicago	IL	60620	(312) 747-6291	https://www.ch...	(41.732316757...
Brighton Park	Sun., Closed; M...	4314 S. Archer ...	Chicago	IL	60632	(312) 747-0666	https://www.ch...	(41.815138789...
Bucktown-Wick...	Sun., Closed; M...	1701 N. Milwa...	Chicago	IL	60647	(312) 744-6022	https://www.ch...	(41.912722395...

< Previous Next > Showing Rows 1 to 13 out of 81

- Look for “Export” button. Export dataset in .csv or .shp format



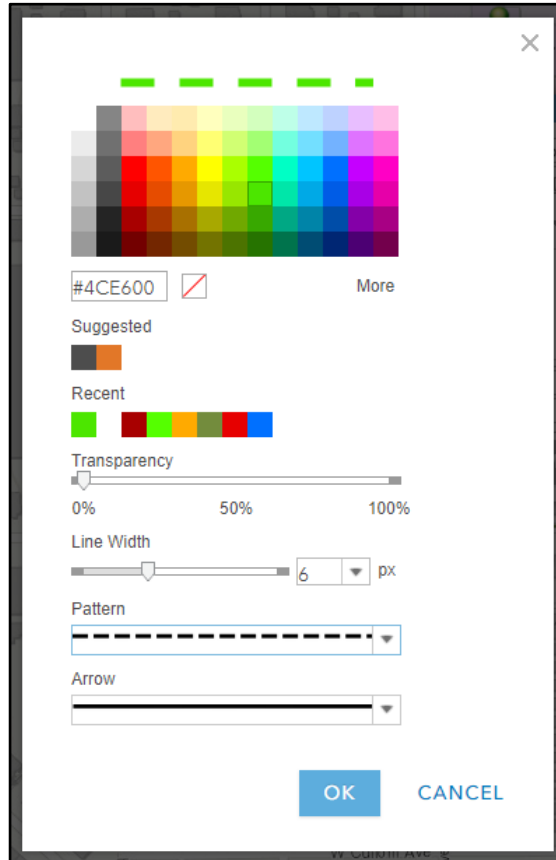
- There are two ways to add a layer to your map.
 - The easiest is to drag and drop the file right into your map.
 - If your file is larger, or there are multiple address fields (address, city, state, etc), select “Add layer from file”



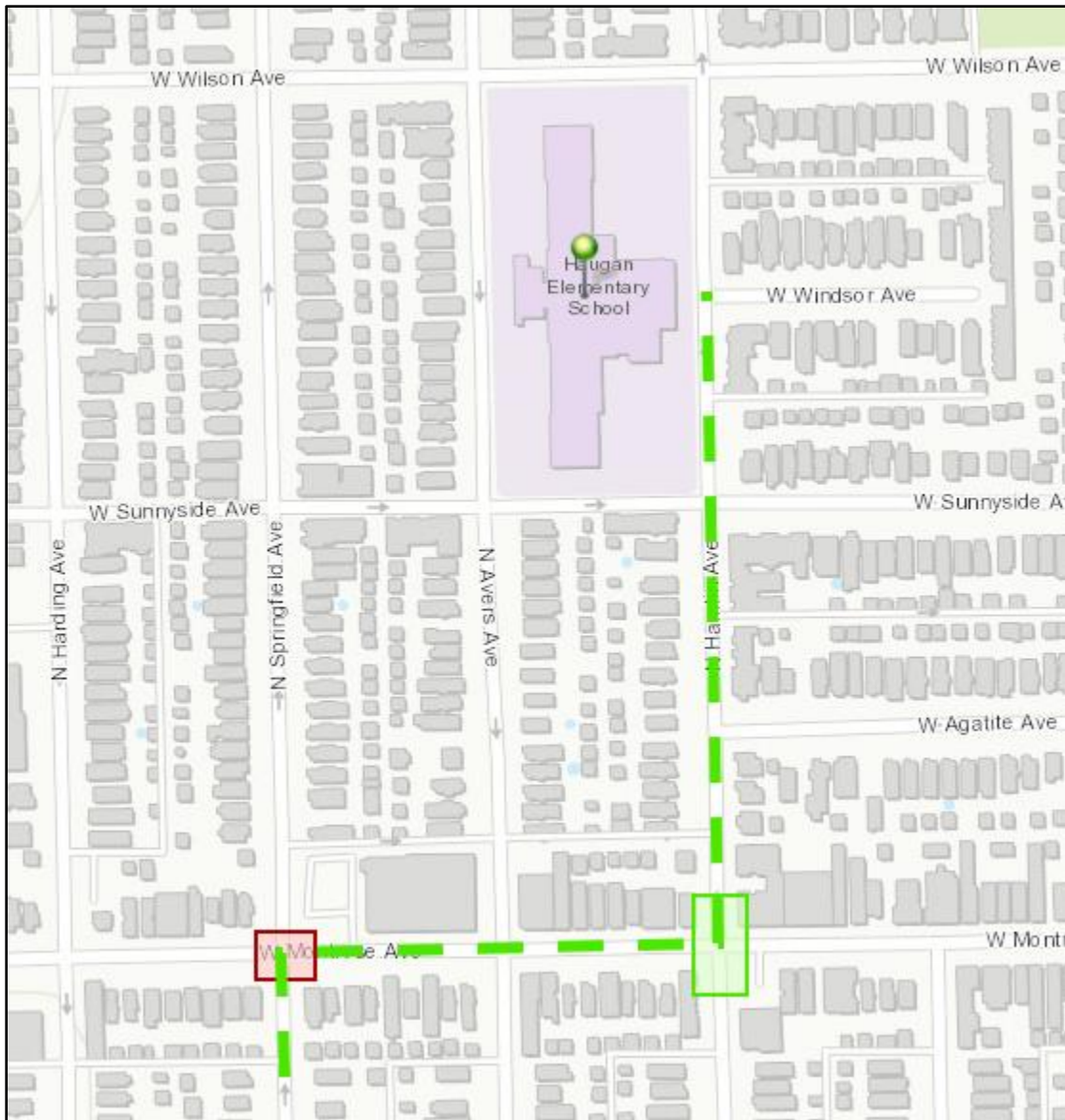
Create your safe route to school

After students have completed their analysis, each group should consider all the information they have gathered and mapped, and determine what route they could take that makes the best use of “safe spots” and avoids or improves problem spots. Add that route to the map using map notes, as a line feature.

Example symbology:



Example map:



Market Analysis: Starting Your Own Business

Intro:

Have you ever seen a new business open up, only to close a few months later? Why do some businesses survive and others don't? There are many factors that go into opening a successful business, and one of them is understanding the market. In other words, you want to find out whether there is enough of a consumer base to support your business.

In this assignment, you will propose a new business idea and location for your community. You will use Business Analyst Online to define a market area and run a market analysis report, which will help you understand whether there are enough customers in the area to support your new business.

Getting started (in groups):

- Thinking about the community you live in, what is a type of business that your neighborhood needs?
- Do you have an idea for where would be a good location for this type of business? Are there any vacant buildings or lots that could be a good location for this type of business? What amenities should be nearby?
- Within your group, decide on one type of business, and a specific location. For example, a bike shop at the corner of Adams and Western Ave.

Once you have decided on a business and location, discuss the following questions in your group:

- Why is there a need for this type of business?
- What kind of consumer market would be needed to support this type of business? (Who will use it and how? What demographic characteristics describe this population? What other economic activities is it connected to?)
- How far do you think people are willing to travel to get to this business? How will they get there?
- Do some research on the real estate requirements for this type of business. What is the average square footage? Will it need parking, and how much?

Analysis:

1. Open the Business Analyst application in ArcGIS Online.
2. Add your proposed business location, and define travel time rings based on the distance you think people are willing to travel to get there.
3. Once you have your market area map, run two or more market analysis reports that will help you understand the population dynamics of your market area.

- a. First, select the Demographic and Income Profile. This report will tell you how many households of different income levels there are in your market area, how many people there are of different age groups, how many people there are of different races and ethnicities, and other characteristics of the population.
- b. Now select at least one other report to help your analysis. Review the possible reports and information they provide. Which reports seem most relevant to your consumer base? Are you able to find any of the population characteristics that you identified as being relevant for your business type?

Reading the report:

Take some time to look over your report. Using the report, answer the following questions:

For the Demographic and Income Profile:

1. How many total households are there in your market area?
2. Is your market area increasing or decreasing in population?
3. What is the median household income?
 - a) What is the difference between median household income, average household income, and per capita income

For you other report(s):

1. How many people or households are there with the population characteristics that you think are most relevant for your business?

Conclusion:

- Based on your market analysis, is there a sufficient market to support this new business idea? Why or why not?
- Are there any type of policy interventions that could impact the market? For example, what types of policies might encourage or discourage people from using this type of business?
- Do you think there is another location that might be better suited for your business? If so, feel free to run a market analysis at another site.

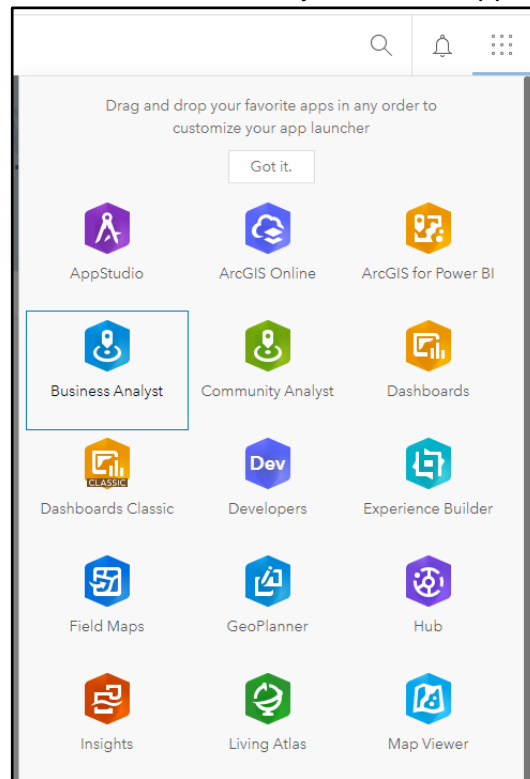
Infographic and Presentation:

You are going to give a market analysis presentation to the class, explaining why a new business owner should or should not open this new business in your neighborhood. You should include the location(s) you considered, and why they may or may not be the best locations for this business. Create an infographic to present the findings of your market analysis. Your market analysis reports have a lot of information in them. Select just the most important information that you used to make your conclusion.

Implementation Guide for Market Analysis: Starting your own business

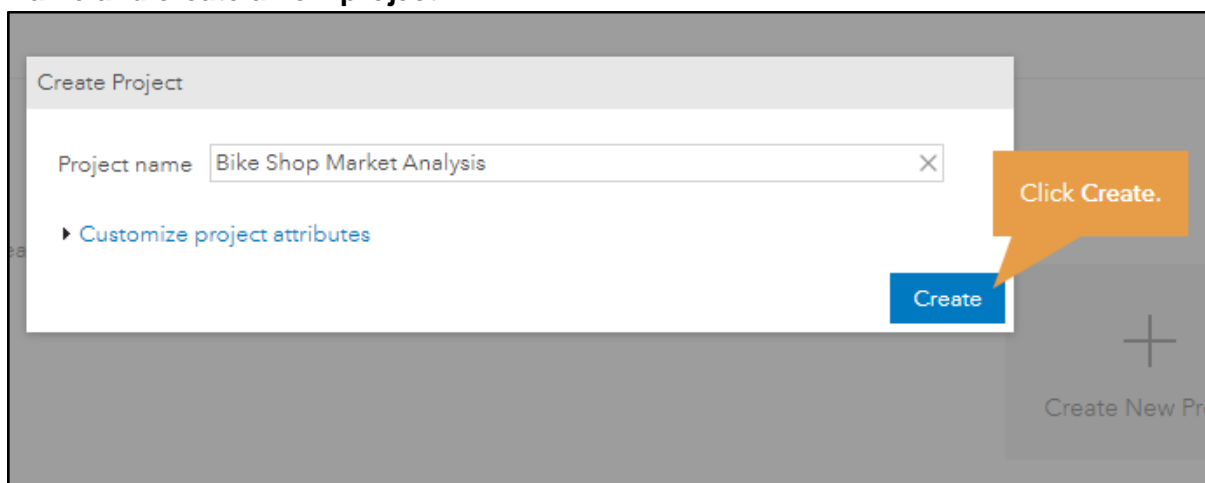
This lesson asks students to think of a new business that would benefit their community, and to propose a location for it. For this implementation guide, we are using the example of a bike shop.

1. Sign into arcgis.com, select Business Analyst from the applications menu

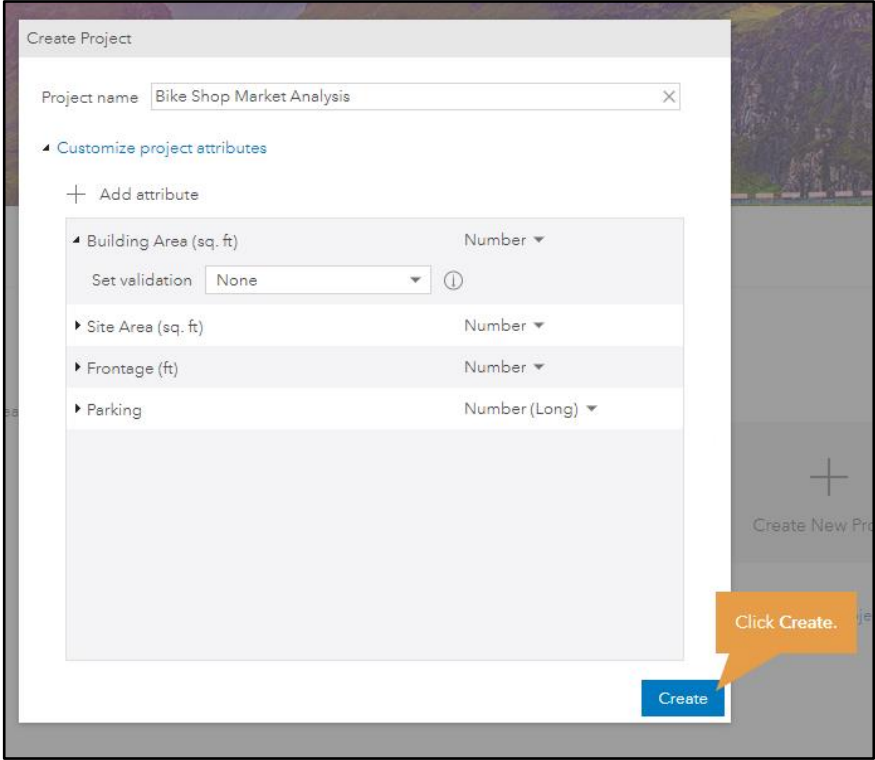


You may have to sign in a second time to launch Business Analyst.

Name and create a new project.



Customizing your project by adding attributes is optional. You have the option to ask students to research average square footage and parking requirements of their business type during the group preparation phase.



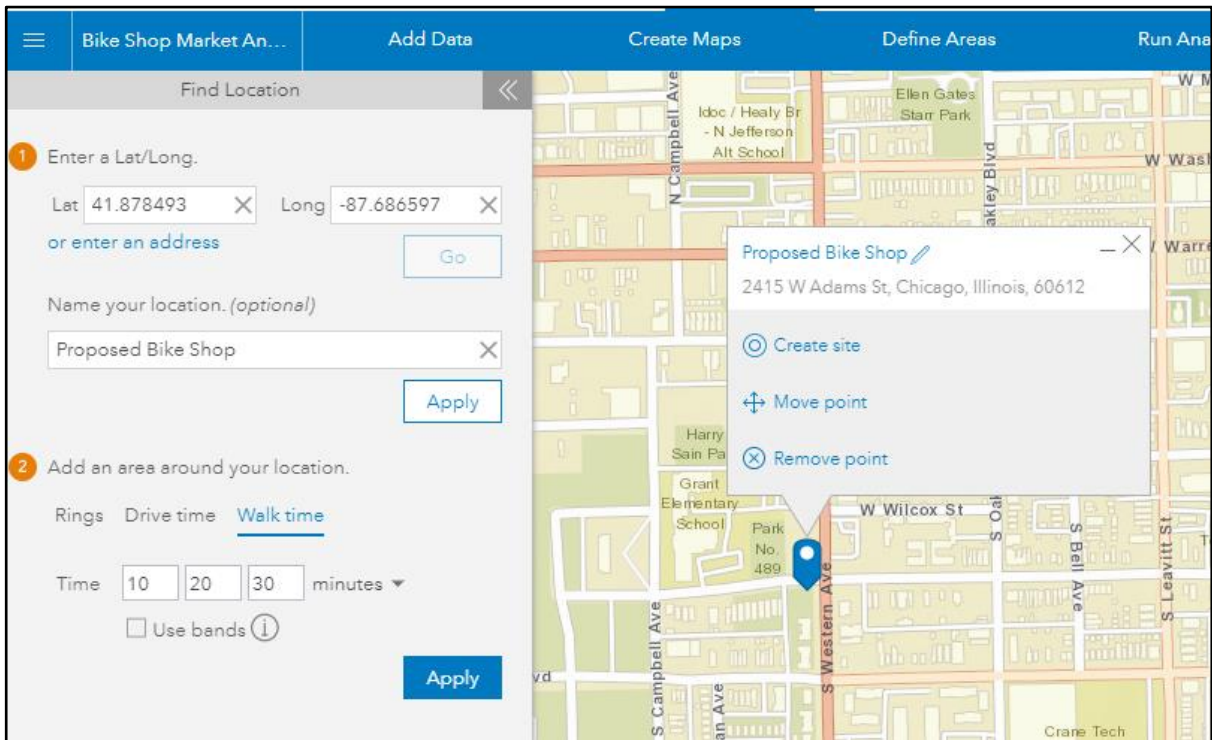
Open your project after it is created.

- 2. Under the Define Areas tab, select Find Location. Enter the address or latitude and longitude coordinates of the location you selected for your proposed new business.

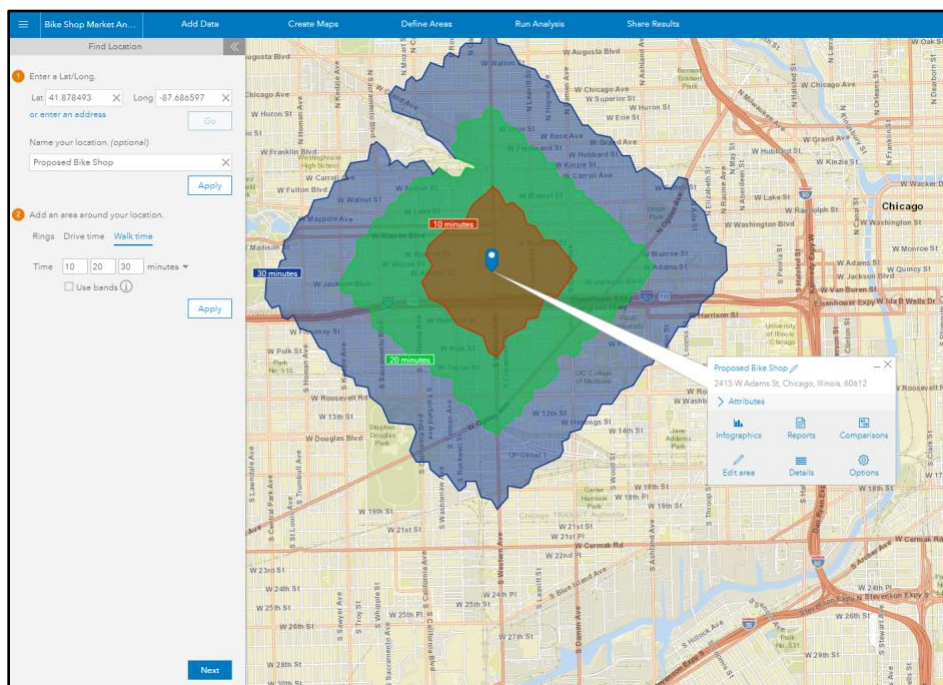
Tip: You can use Google Maps to find the approximate address and lat/long coordinates by clicking on the location you want to use.



3. Add an area representing distance rings, drive or walk time. This should be based on how far you think people will be willing to travel to get to this business.
For a bike shop, let's assume that most people would be willing to walk 10 minutes to get to a bike shop, 20 minutes if necessary, and 30 minutes if there was no other alternative.

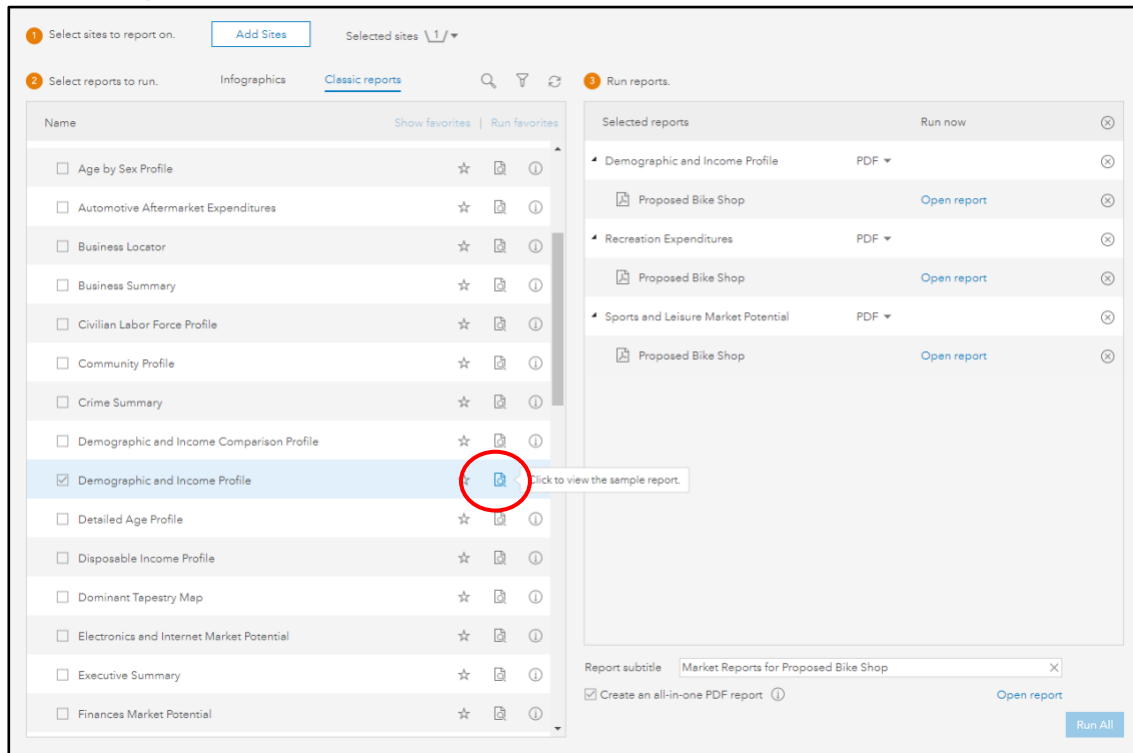


Click Apply and view the market area for your proposed bike shop, based on the three different travel times you used.



4. Click Next, then click **Run Reports**. Here you will **select reports** that contain information on consumer characteristics of people you expect to patronize your business.

As you are browsing, you can view sample reports to see what variables are included in each report.



You should select the Demographic and Income Profile, as well as one or more other reports relevant to your business.

For this example, we selected three reports in addition to the Demographic & Income Profile:

- ACS Population Survey
- Recreation Expenditures
- Sports and Leisure Market Potential

Click **Run All** to generate the reports. They will download to your computer and be added to your Business Analyst project.

5. **Open and view the reports.** Each report is generated for each of the three travel time areas.

You can find them by clicking back to the tab with your project name

The screenshot displays the ArcGIS Business Analyst interface. The top navigation bar includes 'Home', 'Maps', and 'Reports'. Below this, a secondary navigation bar shows the current project 'Bike Shop Market Analysis' and several workflow steps: 'Add Data', 'Create Maps', 'Define Areas', 'Run Analysis', and 'Share Results'. On the left, a sidebar lists project items under 'All Projects > Bike Shop Market Analysis'. The main map area shows a street grid in Chicago with three concentric, irregularly shaped buffers around a central point, labeled '10 minutes' (innermost, brown), '20 minutes' (middle, green), and '30 minutes' (outermost, blue). A blue dot marks the central location. The sidebar table is as follows:

Name	Date	...
Point Locations (Sites)		...
My Point Locations	08/17/2021	...
Polygons (Sites)		...
My Polygons	08/17/2021	...
Geographies (Sites)		...
My Geographies	08/17/2021	...
Previously Run Reports		...
ACS Population Summary	10/18/2021	...
Sports and Leisure Market Pot...	08/17/2021	...
Demographic and Income Pr...	08/17/2021	...
Recreation Expenditures	08/17/2021	...

At the bottom of the sidebar, there are links for 'View full table' and a 'Close' button.

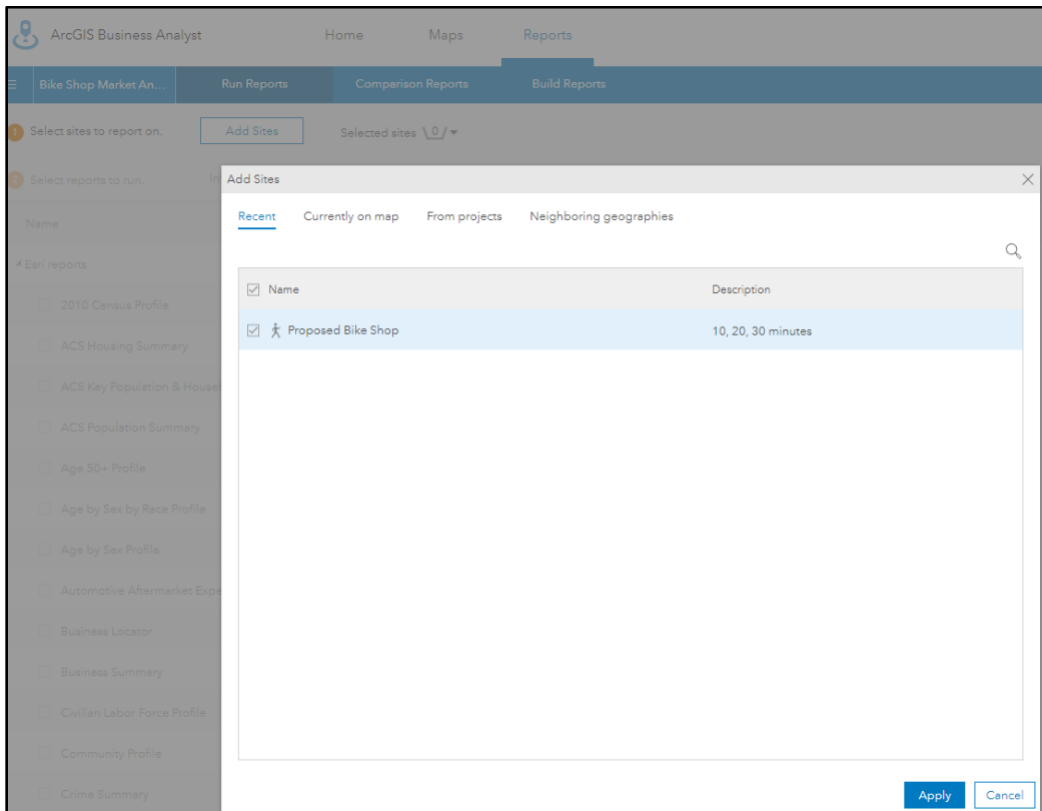
Some examples of variables of interest for planning a new bike shop location:

- Recreation Expenditures report:
 - Average amount of money spent on bicycles

- Sports and Leisure Market Potential report:
 - Expected number and percent of adults or households who participated in bicycling in the last 12 months

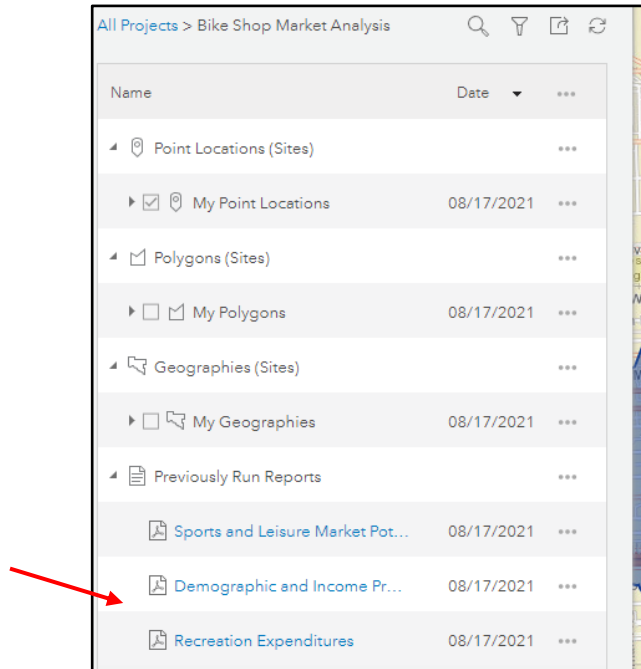
- ACS Population Summary
 - Means of transportation to work; Bicycle

If you want to go back and search for a different report, you can return to the Run Reports selection page. Click the Reports tab at the top of the page. Then click Add Sites, select your project, and click Apply.



6. Answer the **report-reading** questions.

For the Demographic and Income Profile, open that report by clicking the hyperlink in the table of contents, under Previously Run Reports



Let's answer these questions for the **10-minute walking time** market area, using the forecasts for 2021.

You may want to add or revise these questions as they relate to your curriculum and learning goals.

Within each report, the list of variables will first be reported for the 10 minute walk time area, with subsequent pages reporting for the 20 and 30-minute walk time areas.

1. How many total households are there in your market area? **3,296**
2. Is your market area increasing or decreasing in population? **Slightly decreasing**
3. What is the median household income? **\$51,032**
 - a) What is the difference between median household income, average household income, and per capita income
Average is the mean income of all households, could be skewed by very high or low outliers. Median is the middle income where half the population of households is higher and half the population is lower. Per capita is the average income for each individual.



Demographic and Income Profile

Proposed Bike Shop
 2415 W Adams St, Chicago, Illinois, 60612
 Walk Time: 10 minute radius

Prepared by Esri
 Latitude: 41.87849
 Longitude: -87.68660

Summary	Census 2010	2021	2026			
Population	8,016	8,387	8,378			
Households	3,112	3,296	3,295			
Families	1,674	1,768	1,772			
Average Household Size	2.47	2.45	2.45			
Owner Occupied Housing Units	905	968	998			
Renter Occupied Housing Units	2,207	2,327	2,297			
Median Age	30.7	32.5	33.1			
Trends: 2021-2026 Annual Rate	Area	State	National			
Population	-0.02%	-0.15%	0.71%			
Households	-0.01%	-0.09%	0.71%			
Families	0.05%	-0.18%	0.64%			
Owner HHs	0.61%	0.17%	0.91%			
Median Household Income	1.80%	2.28%	2.41%			
Households by Income	Number	Percent	Number	Percent		
<\$15,000	906	27.5%	826	25.1%		
\$15,000 - \$24,999	322	9.8%	310	9.4%		
\$25,000 - \$34,999	214	6.5%	205	6.2%		
\$35,000 - \$49,999	181	5.5%	180	5.5%		
\$50,000 - \$74,999	432	13.1%	425	12.9%		
\$75,000 - \$99,999	356	10.8%	359	10.9%		
\$100,000 - \$149,999	579	17.6%	634	19.2%		
\$150,000 - \$199,999	160	4.9%	193	5.9%		
\$200,000+	146	4.4%	163	4.9%		
Median Household Income	\$51,032		\$55,787			
Average Household Income	\$69,302		\$77,148			
Per Capita Income	\$27,572		\$30,699			
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	631	7.9%	612	7.3%	606	7.2%
5 - 9	542	6.8%	572	6.8%	553	6.6%
10 - 14	566	7.1%	567	6.8%	568	6.8%
15 - 19	694	8.7%	615	7.3%	607	7.2%
20 - 24	639	8.0%	646	7.7%	634	7.6%
25 - 34	1,664	20.8%	1,555	18.5%	1,515	18.1%
35 - 44	1,079	13.5%	1,299	15.5%	1,197	14.3%
45 - 54	891	11.1%	875	10.4%	1,000	11.9%
55 - 64	623	7.8%	748	8.9%	724	8.6%
65 - 74	377	4.7%	537	6.4%	572	6.8%
75 - 84	233	2.9%	260	3.1%	297	3.5%
85+	76	0.9%	102	1.2%	104	1.2%
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White Alone	1,360	17.0%	1,400	16.7%	1,418	16.9%
Black Alone	5,744	71.6%	5,811	69.3%	5,657	67.5%
American Indian Alone	23	0.3%	20	0.2%	18	0.2%
Asian Alone	365	4.6%	502	6.0%	572	6.8%
Pacific Islander Alone	5	0.1%	5	0.1%	5	0.1%
Some Other Race Alone	341	4.3%	414	4.9%	451	5.4%
Two or More Races	179	2.2%	236	2.8%	258	3.1%
Hispanic Origin (Any Race)	780	9.7%	951	11.3%	1,043	12.4%

Data Note: Income is expressed in current dollars.

Source: U.S. Census Bureau, Census 2010 Summary File 1. Esri forecasts for 2021 and 2026.

August 17, 2021

Questions for your other report(s):

1. Within your market area, how many people or households are there with the population characteristics that you think are most relevant for your business?

According to the ACS Population Summary report, there were 73 people who commuted to work via bicycle, which is 2.2% of the population

According to the Sports and Leisure Market Potential report, there were 200 people who did mountain biking (3.2%) and 458 people who did road biking (7.3%) in the last year.



Recreation Expenditures

Proposed Bike Shop
2415 W Adams St, Chicago, Illinois, 60612
Walk Time: 10 minute radius

Prepared by Esri
Latitude: 41.87849
Longitude: -87.68660

Demographic Summary		2021	2026
Population		8,387	8,378
Households		3,296	3,295
Families		1,768	1,772
Median Age		32.5	33.1
Median Household Income		\$51,032	\$55,787
		Spending Potential Index	Average Amount Spent
			Total
TV/Video/Audio			
		79	\$930.18
Cable & Satellite Television Services		79	\$636.94
Televisions & Video		82	\$212.24
Audio		73	\$77.93
Rental of TV/VCR/Radio/Sound Equipment		141	\$1.56
Repair of TV/Radio/Sound Equipment		81	\$1.50
Entertainment/Recreation Fees and Admissions			
		70	\$518.17
Tickets to Theatre/Operas/Concerts		75	\$60.48
Tickets to Movies		77	\$42.68
Tickets to Parks or Museums		70	\$23.71
Admission to Sporting Events, excl.Trips		62	\$40.04
Fees for Participant Sports, excl.Trips		65	\$74.98
Fees for Recreational Lessons		69	\$97.54
Membership Fees for Social/Recreation/Health Clubs		71	\$177.04
Dating Services		141	\$1.69
Toys/Games/Crafts/Hobbies			
		80	\$91.99
Toys/Games/Arts/Crafts/Tricycles		81	\$79.58
Playground Equipment		50	\$1.66
Play Arcade Pinball/Video Games		67	\$1.54
Online Gaming Services		85	\$5.20
Stamp & Coin Collecting		77	\$4.01
Recreational Vehicles and Fees			
		57	\$64.85
Docking and Landing Fees for Boats and Planes		55	\$5.16
Camp Fees		69	\$21.41
Payments on Boats/Trailers/Campers/RVs		48	\$24.48
Rental of Boats/Trailers/Campers/RVs		63	\$13.80
Sports, Recreation and Exercise Equipment			
		71	\$127.77
Exercise Equipment and Gear, Game Tables		64	\$25.52
Bicycles		70	\$20.94
Camping Equipment		64	\$13.23
Hunting and Fishing Equipment		87	\$42.32
Winter Sports Equipment		64	\$4.75
Water Sports Equipment		50	\$4.19
Other Sports Equipment		69	\$4.89
Rental/Repair of Sports/Recreation/Exercise Equipment		55	\$1.59



ACS Population Summary

Proposed Bike Shop
2415 W Adams St, Chicago, Illinois, 60612
Walk Time: 10 minute radius

Prepared by Esri
Latitude: 41.87849
Longitude: -87.68660

	2015 - 2019 ACS Estimate	Percent	MOE(±)	Reliability
WORKERS AGE 16+ YEARS BY MEANS OF TRANSPORTATION TO WORK				
Total	3,361	100.0%	184	■ ■ ■
Drove alone	1,482	44.1%	146	■ ■ ■
Carpooled	136	4.0%	30	■ ■ ■
Public transportation (excluding taxicab)	1,124	33.4%	115	■ ■ ■
Bus or trolley bus	787	23.4%	108	■ ■ ■
Light rail, streetcar or trolley	47	1.4%	39	■ ■ ■
Subway or elevated	251	7.5%	30	■ ■ ■
Long-distance/Commuter Train	38	1.1%	17	■ ■ ■
Ferryboat	0	0.0%	0	■ ■ ■
Taxicab	40	1.2%	34	■ ■ ■
Motorcycle	1	0.0%	5	■ ■ ■
Bicycle	73	2.2%	24	■ ■ ■
Walked	148	4.4%	40	■ ■ ■
Other means	40	1.2%	27	■ ■ ■
Worked at home	316	9.4%	77	■ ■ ■



Sports and Leisure Market Potential

Proposed Bike Shop
2415 W Adams St, Chicago, Illinois, 60612
Walk Time: 10 minute radius

Prepared by Esri
Latitude: 41.87849
Longitude: -87.68660

Demographic Summary	2021	2026
Population	8,387	8,378
Population 18+	6,251	6,272
Households	3,296	3,295
Median Household Income	\$51,032	\$55,787

Product/Consumer Behavior	Expected Number of Adults/HHs	Percent	MPI
Participated in aerobics in last 12 months	428	6.8%	94
Participated in archery in last 12 months	144	2.3%	88
Participated in backpacking in last 12 months	183	2.9%	83
Participated in baseball in last 12 months	201	3.2%	84
Participated in basketball in last 12 months	546	8.7%	113
Participated in bicycling (mountain) in last 12 months	200	3.2%	85
Participated in bicycling (road) in last 12 months	458	7.3%	77
Participated in boating (power) in last 12 months	233	3.7%	80
Participated in bowling in last 12 months	462	7.4%	78
Participated in canoeing/kayaking in last 12 months	336	5.4%	80
Participated in fishing (fresh water) in last 12 months	430	6.9%	66
Participated in fishing (salt water) in last 12 months	244	3.9%	100
Participated in football in last 12 months	267	4.3%	105
Participated in Frisbee in last 12 months	239	3.8%	102
Participated in golf in last 12 months	424	6.8%	81
Participated in hiking in last 12 months	625	10.0%	78
Participated in horseback riding in last 12 months	207	3.3%	144

7. Forming conclusions:

- Based on your market analysis, is there a sufficient market to support this new business idea? Why or why not?

According to the Recreation Expenditures report, the average spending on bicycles was only \$20.94 in this market area, with an area total of \$69,009. This is a very low level of consumer spending, which makes us feel not very optimistic that our bike shop would do well here.

The number of bike commuters is pretty low as well. However, the number of road cyclists in this area is higher (7.3% of the population)


- Are there any type of policy interventions that could impact the market? For example, what types of policies might encourage or discourage people from using this type of business?

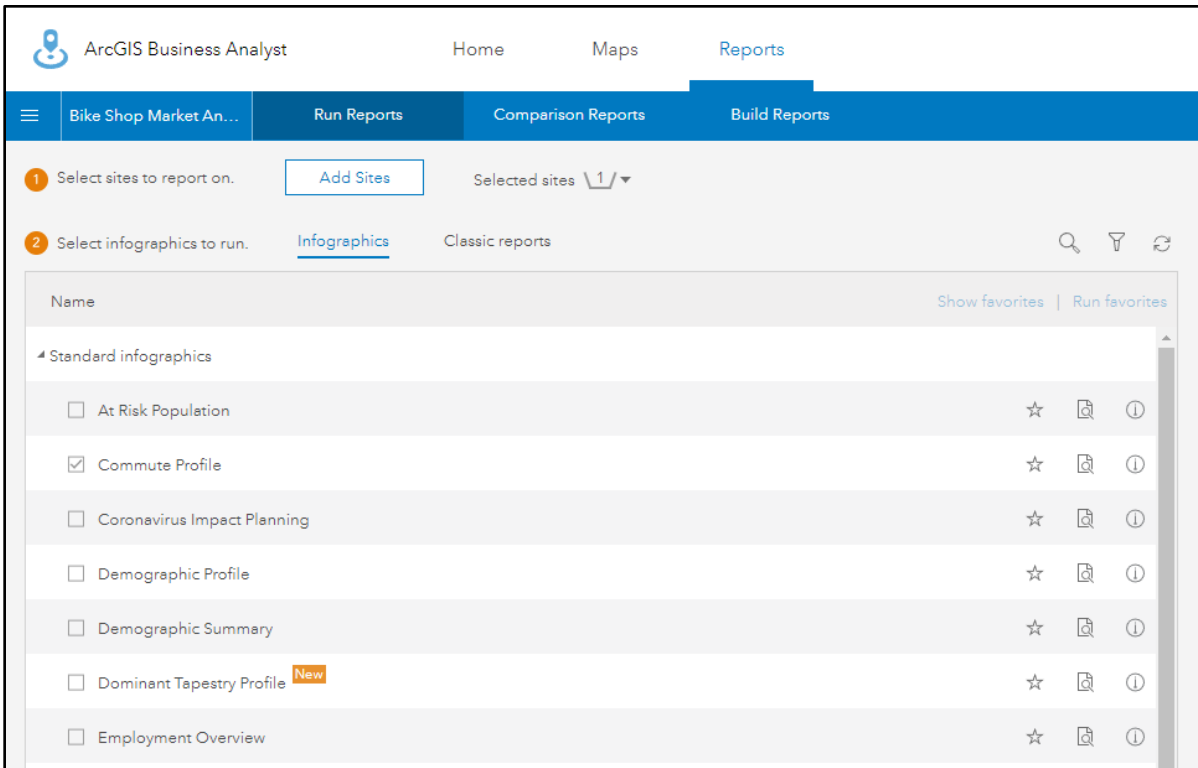
We think that the bike shop market could increase if there was more public investment in building bike lanes and improving safety for bicyclists.

The bike shop could also develop some educational programs, such as holding a workshop on how to ride your bike to work. 7.3% of the population already does some road biking. Those cyclists may present an untapped market for becoming bike commuters, which would create more sales opportunities for the bike shop.

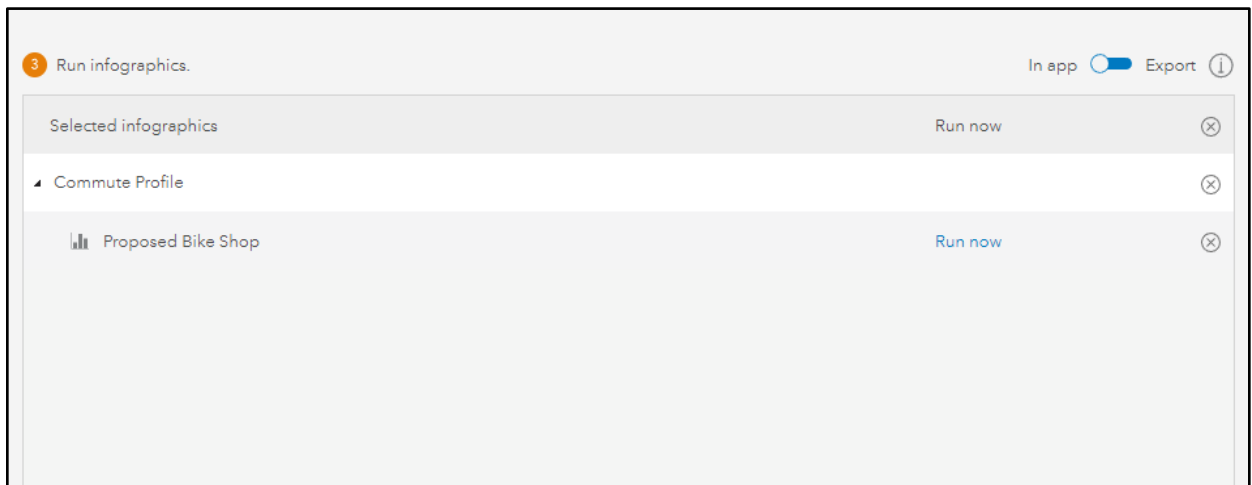
8. Run an infographic:

An infographic includes much of the same information as the report but in a more easy to digest format. Click the Reports tab and choose Infographics under Run Reports.

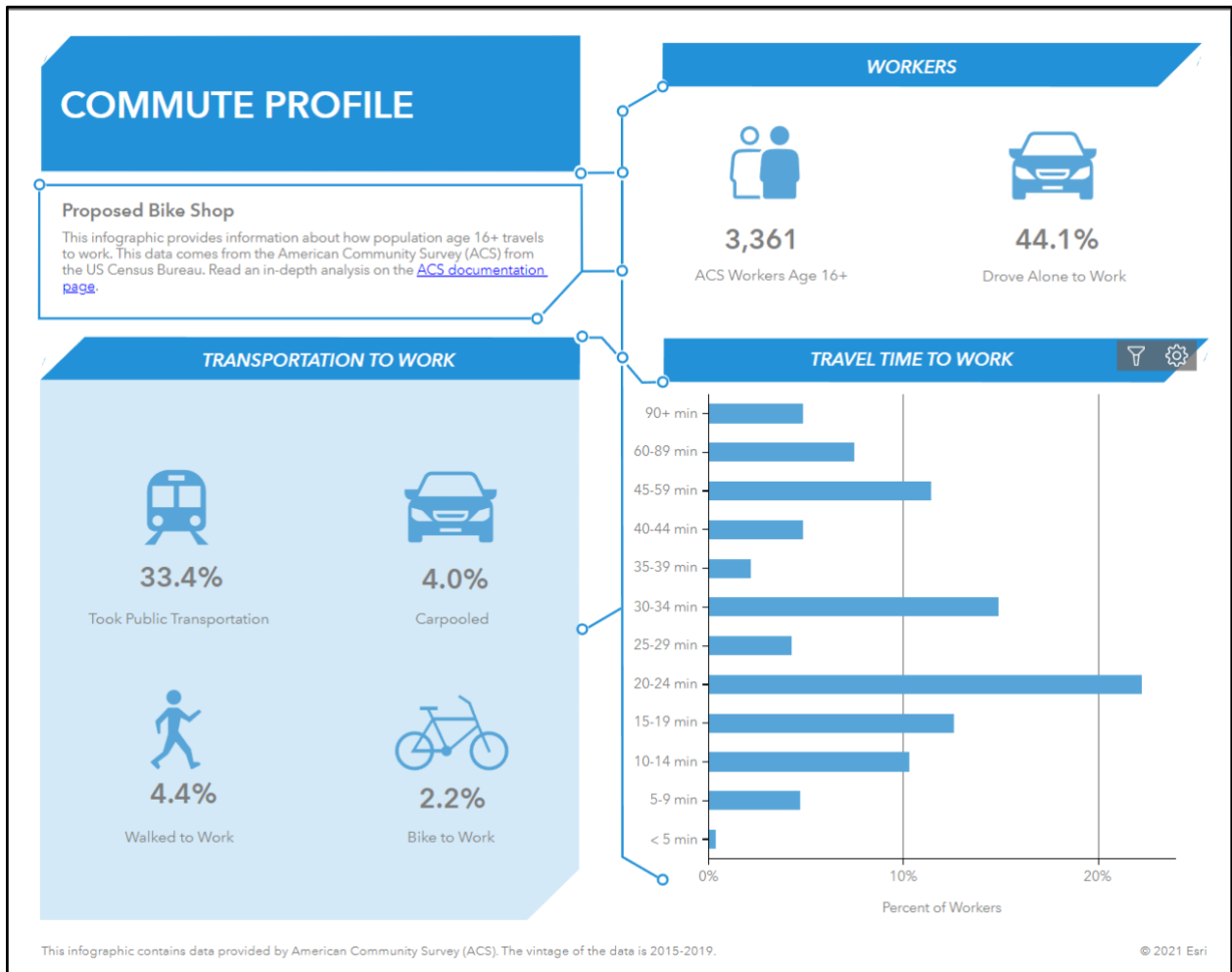
The infographics menu is almost identical to the report menu. The site is still selected from the report, so we are on step 2: Select infographics to run. Just like with the reports, you can view an example of the infographic by clicking the  button.



The “Commute Profile” infographic that looks relevant for our bike shop. After selecting it, click Run now in the right-hand pane:

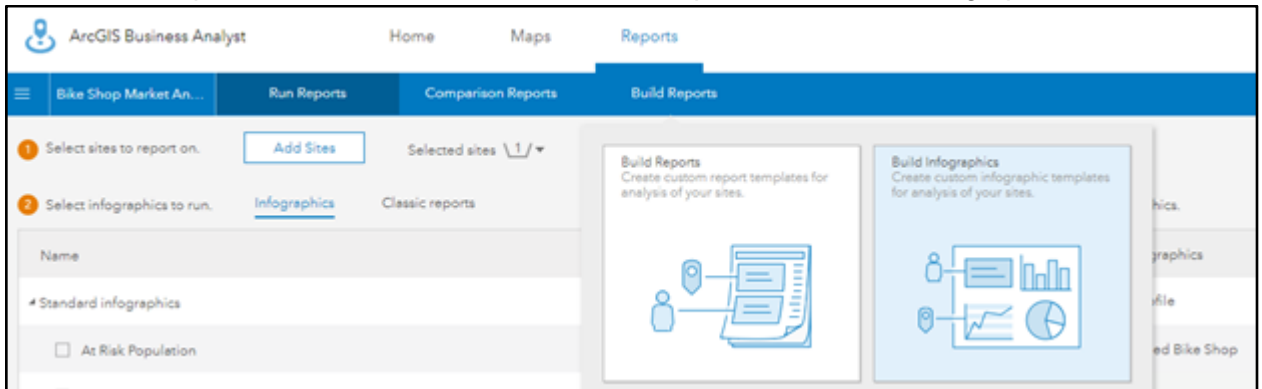


The result:

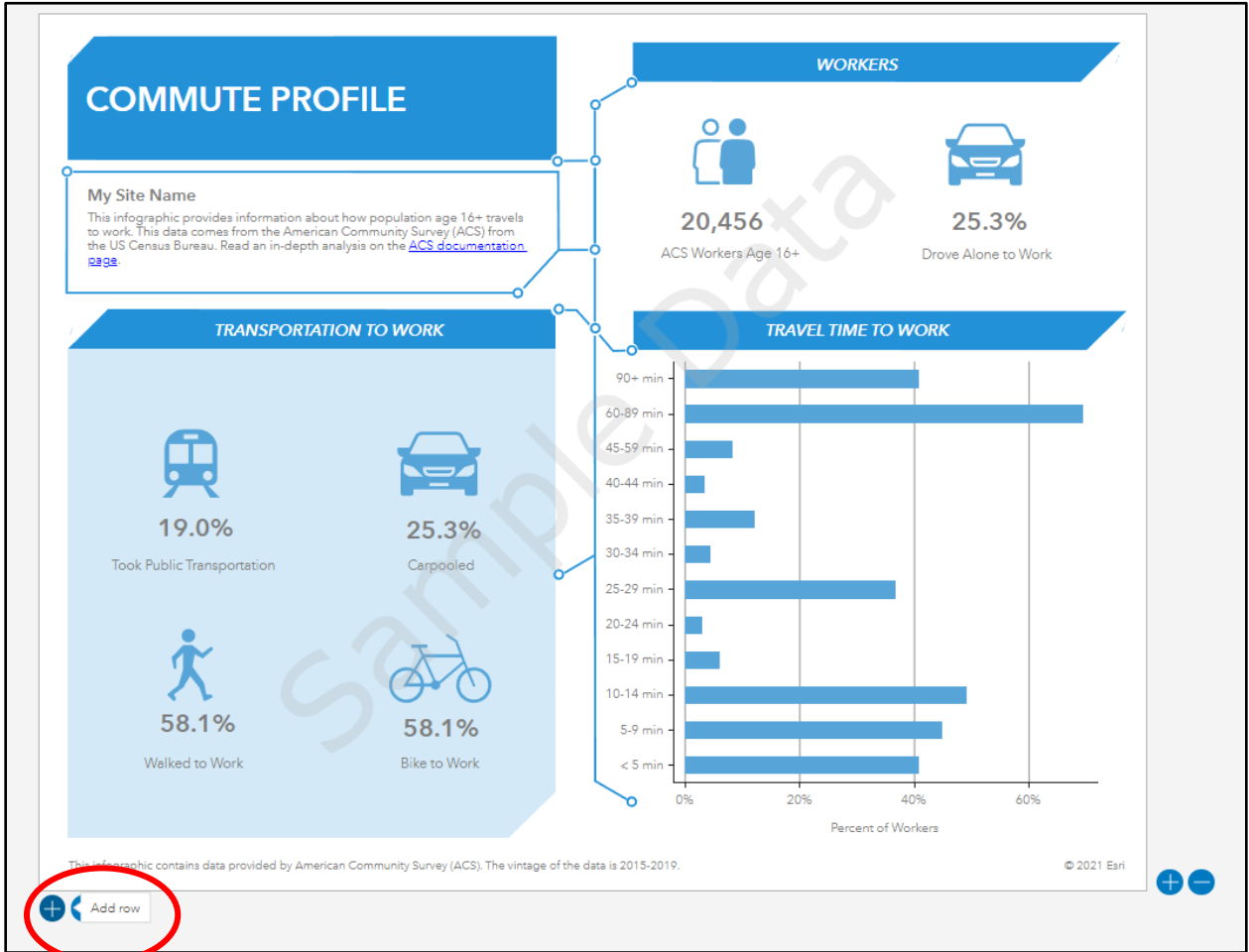


9. This looks good, but now we want to **customize this infographic** to include the other variables we used in our analysis about recreational biking and expenditures.

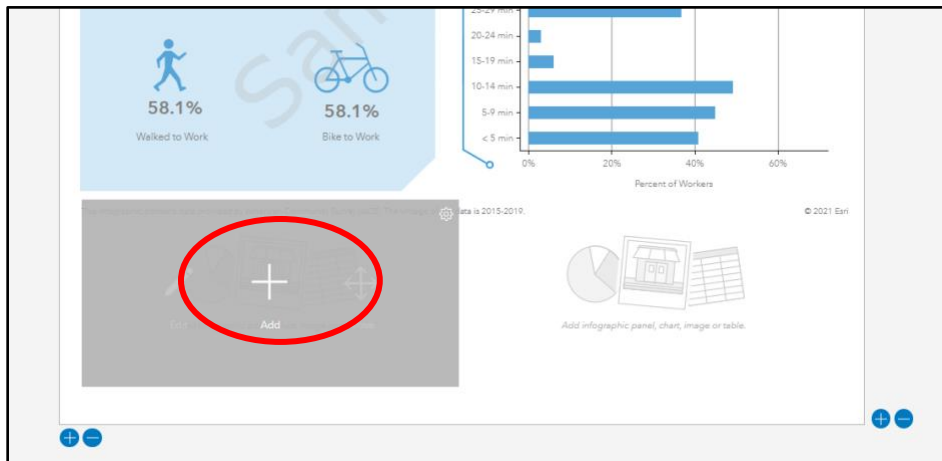
Go back to Reports, and this time select the Build Reports tab > Build Infographics

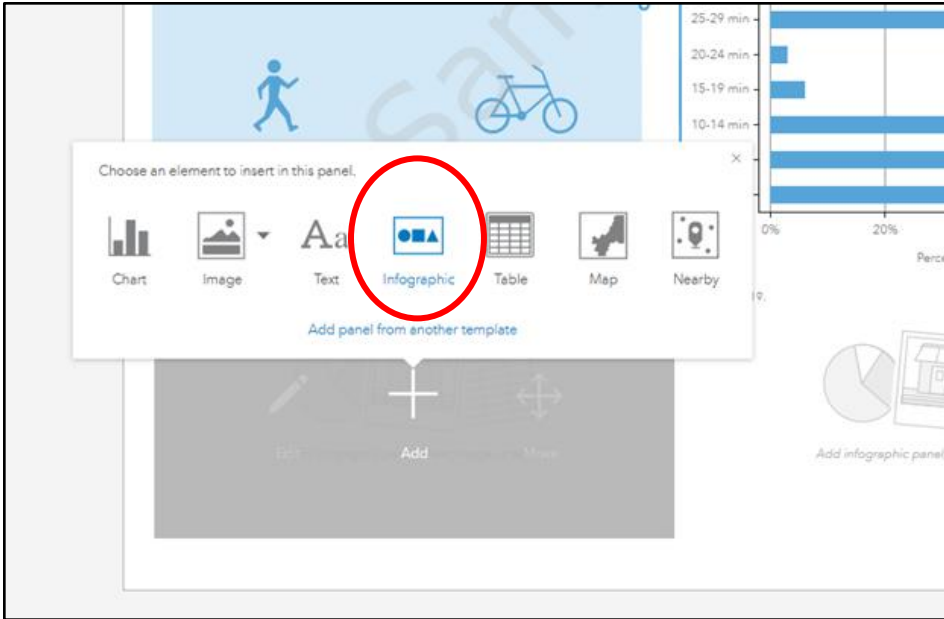


Open the Commute Profile template. You now have options to edit the different sections of the infographic. Add a new row at the bottom of the template.

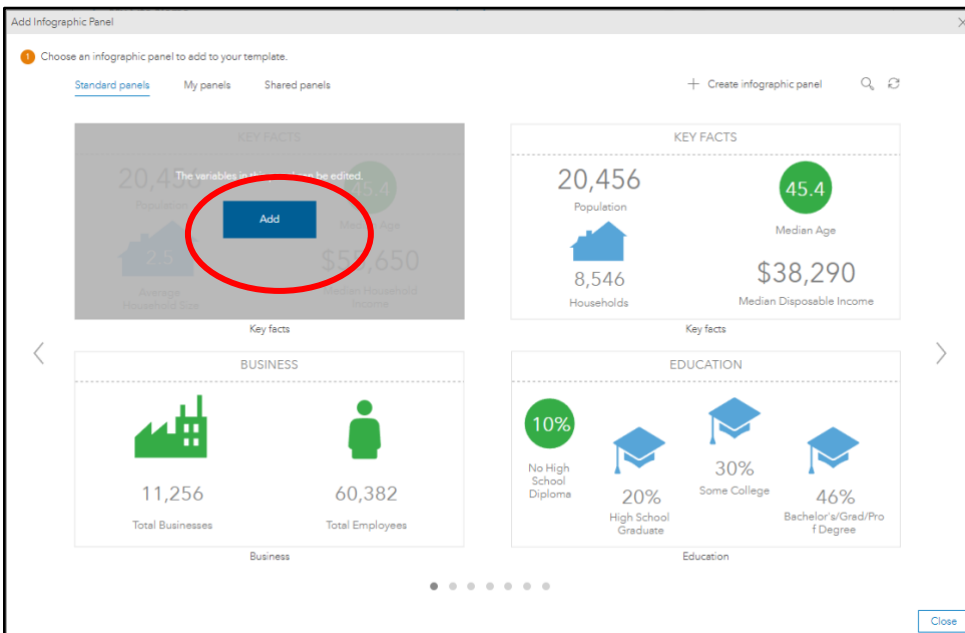


Then click the plus sign to add a new element, and select Infographic

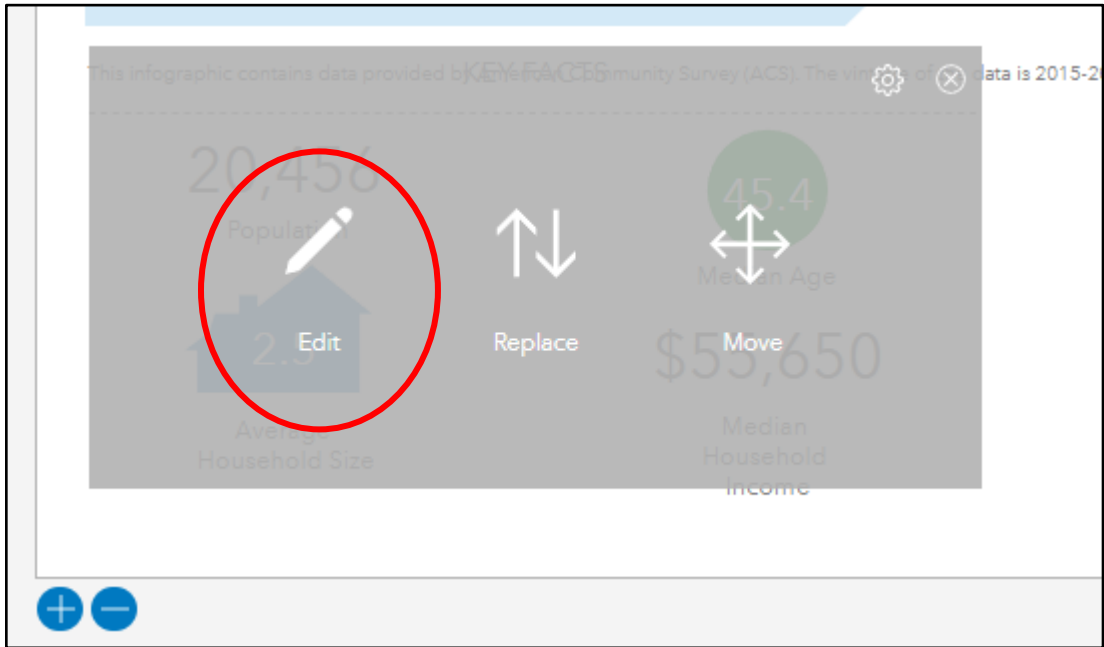




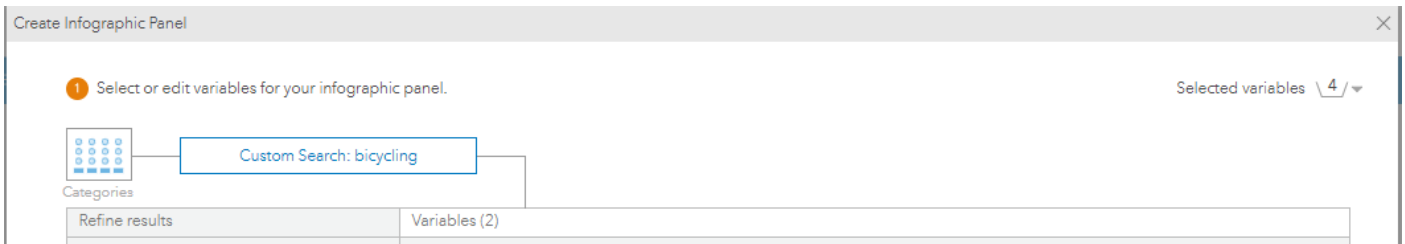
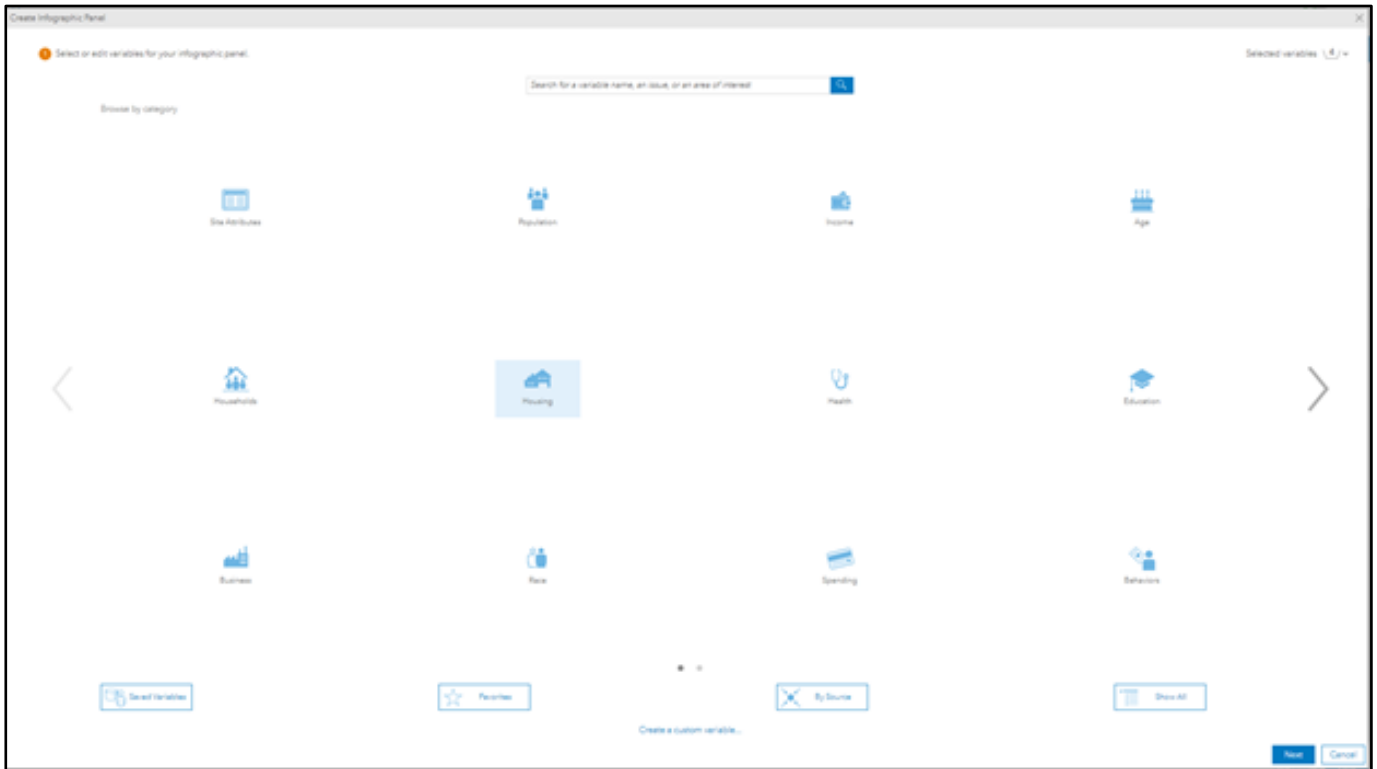
The first step asks you to select which layout you want to use. Don't pay attention to the variables shown, just decide how many "buttons" you want to show. We chose the first panel shown here and added it to the template.



Once the panel is added, you can edit it.



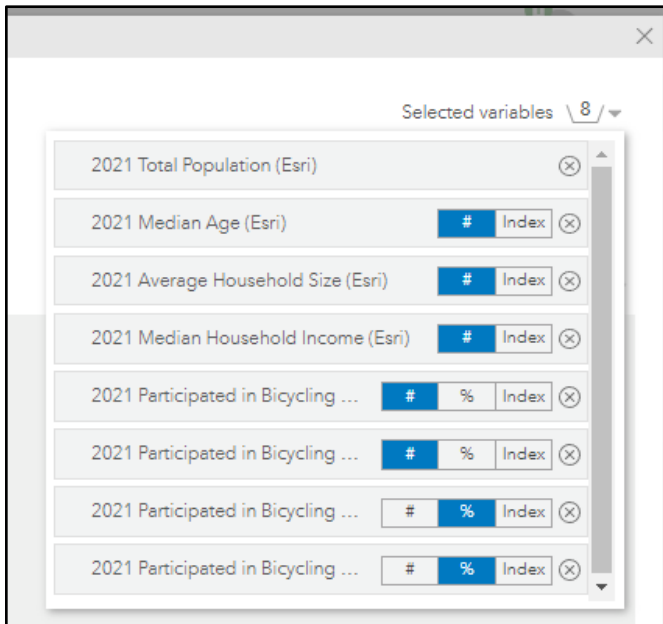
At the bottom of the editing interface, click “Edit variables”. You can browse the categories to find variables, or search for a keyword. In order to find the variables from our reports about recreational cycling, we searched “bicycling”.



Clicking the name of the variable will add it to the template. For each of the the two variables, select “#” and “%” to add both the number of people and the percentage of the population who participated in mountain and road bicycling. This adds a total of four additional variables to the template.

The “Selected variables” item in the top right corner is keeping track of all the variables included in the infographic. You have the option to remove whatever variables came with

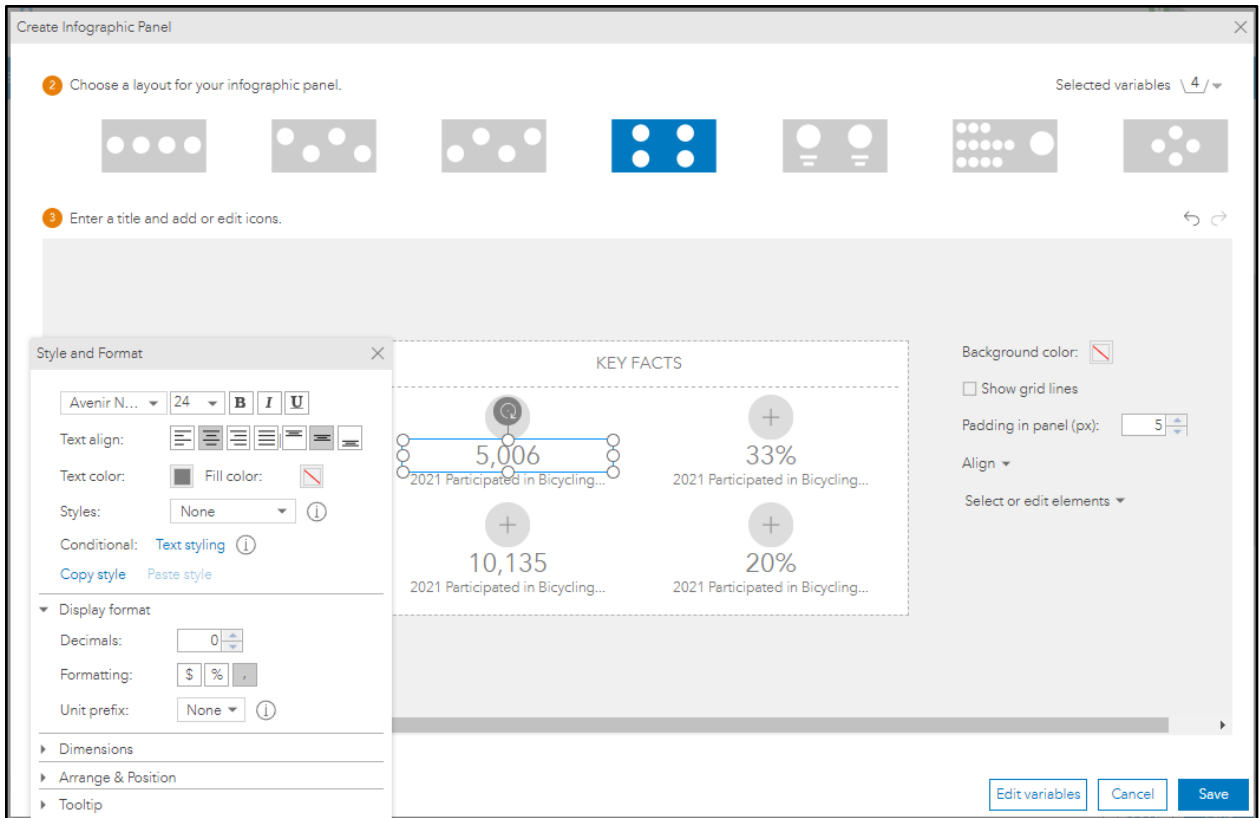
the template that you don't want to use, by clicking the x. We removed Total Population, Median Age, Average Household Size, and Median Income.



Click Next.

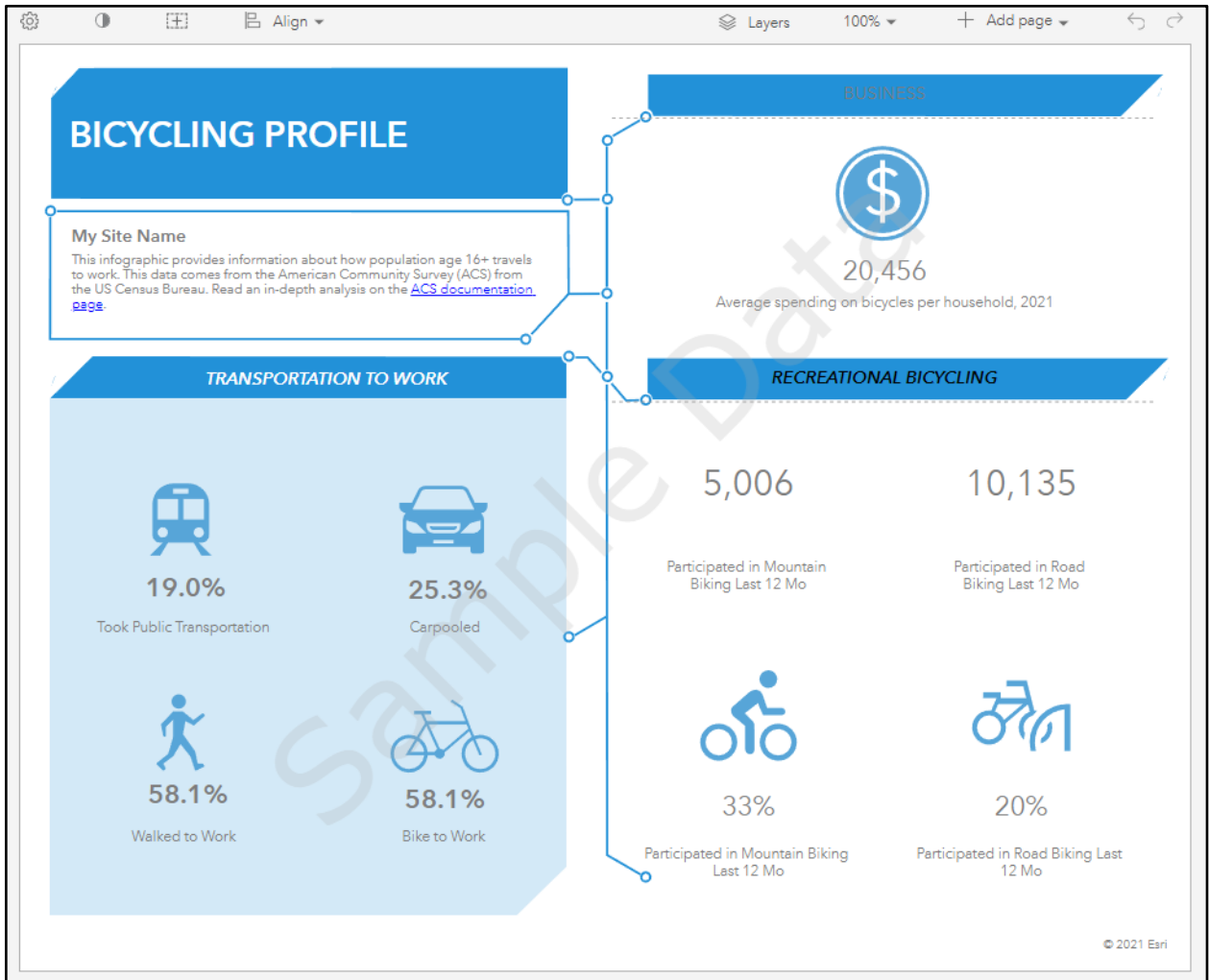
Choose the layout style you want (step 2).

Step 3 is where you style this panel. Click the numbers or text to change the font/colors/labels. Click the plus sign to add shapes, icons, or images. Click "KEY FACTS" to change the title of this panel.



Click Save to save this panel of the Infographic.

You can also delete unneeded panels from your infographic template, reorder panels, and make other design changes.



When you are done editing your Infographic, click Save. This will save your custom template.

Save Infographic Template

Title:

[Show infographic metadata](#)

Once your template is saved, you can continue to edit it by looking under “My Templates”, under Build Reports > Build Infographics.

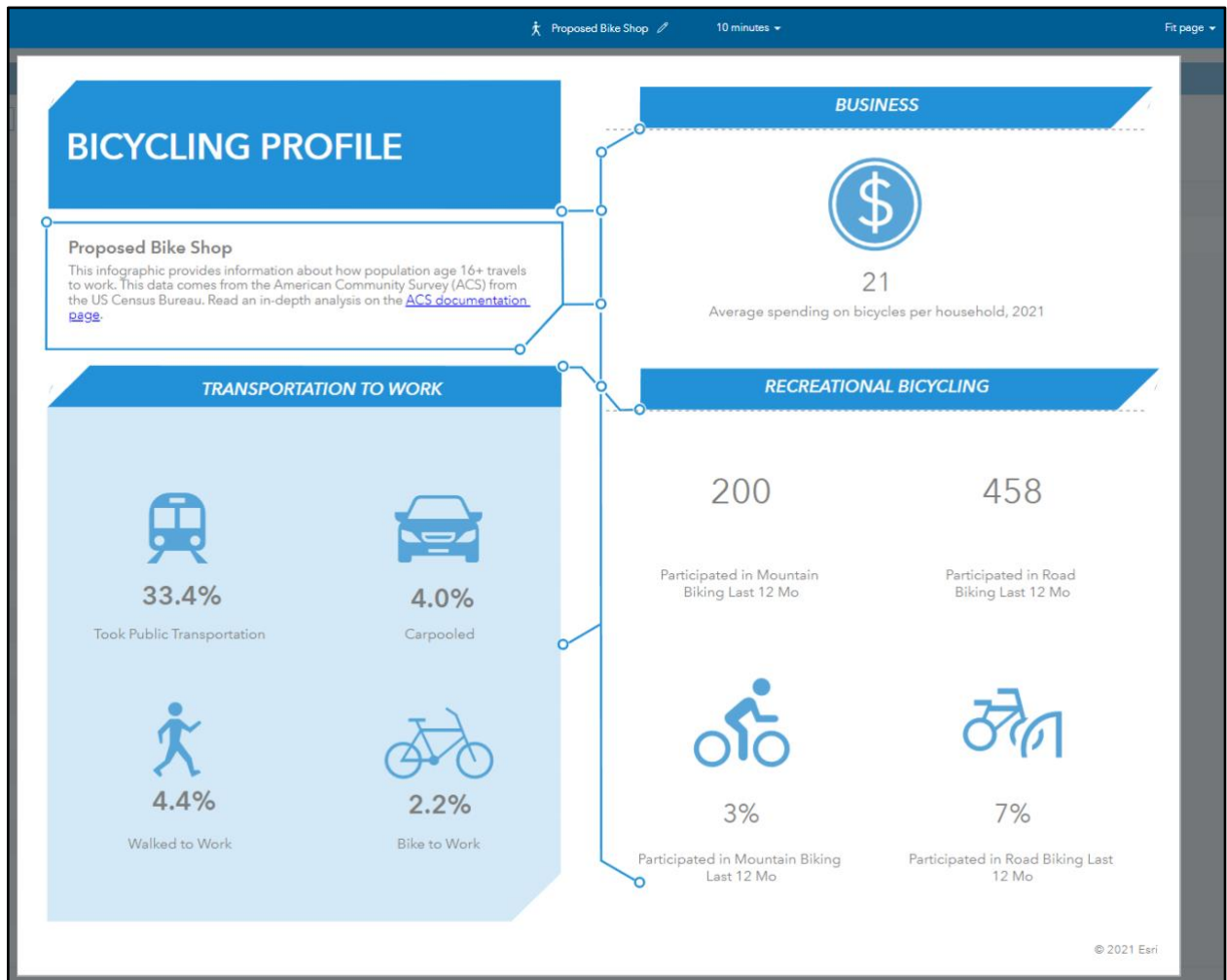
When you are done editing and are ready to run your infographic, go to Run Reports >Run Infographics, and select your template under My Infographics. Make sure you have your site selected. Click Run now.

The screenshot displays the ArcGIS Business Analyst interface. At the top, the navigation bar includes 'Home', 'Maps', and 'Reports'. The 'Reports' section is active, with sub-tabs for 'Run Reports', 'Comparison Reports', and 'Build Reports'. The 'Run Reports' sub-tab is selected, and the 'Run Infographics' step is highlighted with a red circle and the number 3. The interface shows a list of infographics under 'My infographics' and 'Standard infographics'. The 'Bike Shop Market Analysis Infographic' is selected, and the 'Proposed Bike Shop' site is visible in the 'Selected infographics' panel. The 'Run now' button is visible next to the selected infographic.

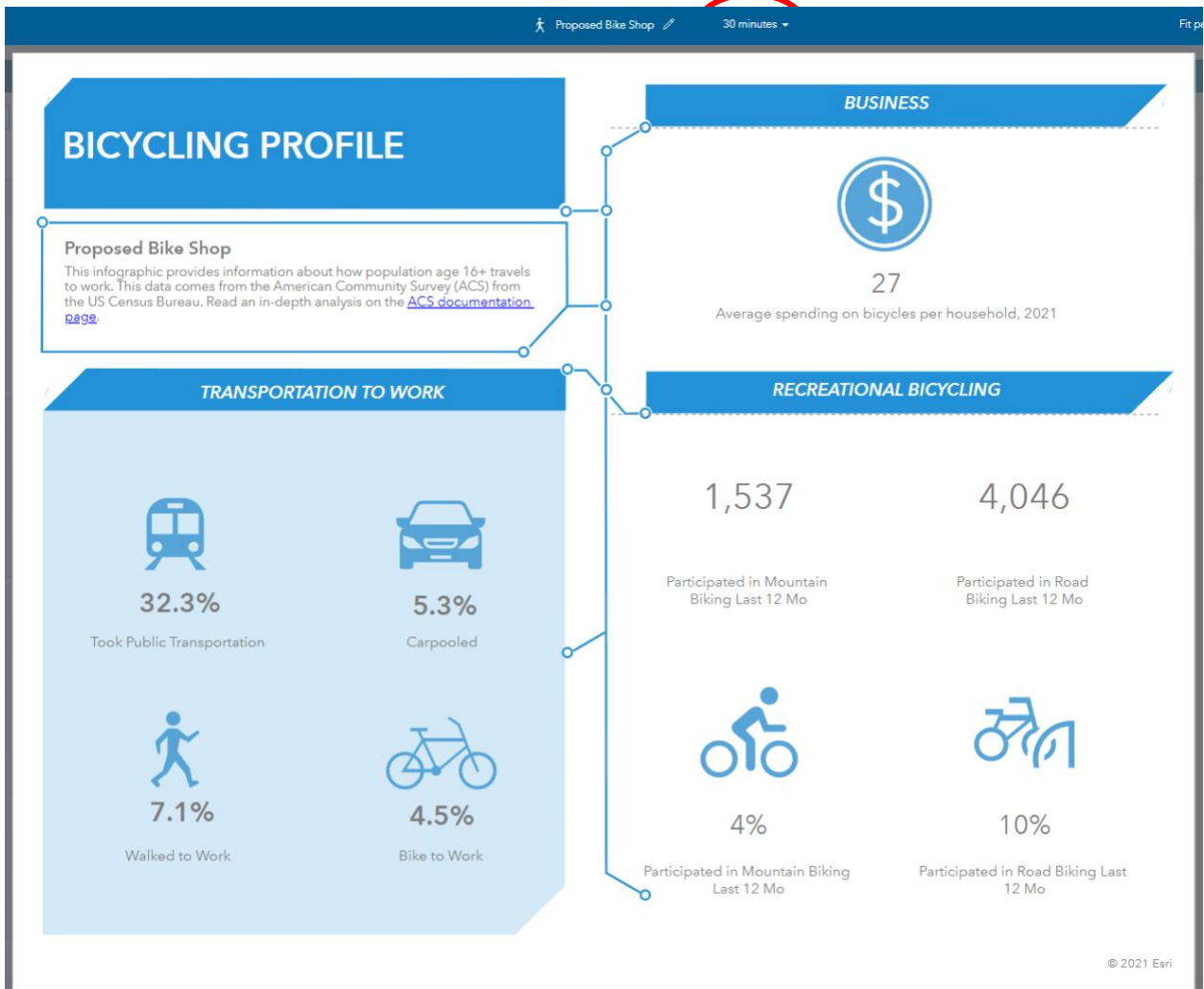
Name	Show favorites	Run favorites
My infographics		
<input checked="" type="checkbox"/> Bike Shop Market Analysis Infographic	☆	🔍
Standard infographics		
<input type="checkbox"/> At Risk Population	☆	🔍
<input type="checkbox"/> Commute Profile	☆	🔍
<input type="checkbox"/> Coronavirus Impact Planning	☆	🔍
<input type="checkbox"/> Demographic Profile	☆	🔍
<input type="checkbox"/> Demographic Summary	☆	🔍
<input type="checkbox"/> Dominant Tapestry Profile New	☆	🔍
<input type="checkbox"/> Employment Overview	☆	🔍
<input type="checkbox"/> Executive Summary - Call Outs	☆	🔍
<input type="checkbox"/> Health Care and Insurance Statistics	☆	🔍

Selected infographics	Run now
Bike Shop Market Analysis Infographic	
Proposed Bike Shop	Run now

Final Result:



More possible analysis: **Based on this infographic, we can see that there are very few bike commuters within 10 minutes walking distance from our proposed bike shop location. However, if we run the infographic for our 30-minute walking distance, the percentage increases to 4.5%. This may lead our group to advocate for creating a bike shop in a different, nearby location that may have a larger market.**



10. Create a presentation for the class. Use your infographic and other information you gained from your market analysis reports to explain why a new business owner should or should not open this kind of business in your neighborhood.

Shark Tank Lesson

Overview

This lesson starts with reviewing current methods for determining market potential. You will first brainstorm what variables would affect the market for an example product and explore the variables brainstormed using the data available in BAO and use a tool in BAO called Suitability Analysis to find the best market for the product in Chicago. You will then choose a shark tank product of your own and complete a suitability analysis for Chicago. During this lesson, you will practice GIS skills such as: creating sites using a layer from ArcGIS Online, using a data browser to select variables, and running the suitability analysis tool.

Before we begin consider the following questions:

- What information is needed to determine market potential?
- How have we visualized market potential so far in this class?
- What are some drawbacks to this method?

Suitability Analysis

As a class we will go through a demo of suitability analysis for a product called “Unbuckle Me” which is a seat belt release tool for child car seats. This tool has a very specific customer in mind, yet also has a large population of consumers.

Using the information gathered from <https://unbuckleme.com/>, work with a small group to generate a list of attributes of the unbuckle me customer and market.

UnBuckle Me Customer Attributes	UnBuckle Me Market Characteristics

Next, use the suitability analysis function in BAO to map the variables off your list. You need to try a minimum of three different changes to your data. A change can include adding or removing a variable and/or changing a weight. Each change to the data must accompany a change to the map in the screenshot. Each change to the data may or may not change the ranking list.

Variable Analysis

Discuss the following questions in your group and be prepared to share out with the whole class

- How many variables did your group choose?
- How many are too many variables?
- How many are too few variables?
- Were there any variables that BAO did not have data for?
- How did weight affect the final map?
- How confident are you in your chosen market?
- What would you do differently next time?

Find a site for your own product

Now you will use GIS to analyze a market for your chosen product. The goal of this activity is to identify the best possible market for your product based on customer attributes and market characteristics.

Use this website <https://allsharktankproducts.com/> to choose a product that interests you. Think about the needs of your community. The only requirement is that the product is school appropriate.

Once you pick your product, do some research and come up with a list of attributes that you can use in the suitability analysis. When choosing your final market, make sure you consider the attribute representations and weights.

Make a Storymap

Next, you will create a story map that uses your maps and analysis to explain why your selected location is the best for your chosen product. The introduction should be about your product. The body will include the map, table, and a justification for why the market you are featuring is the best for the product. The conclusion should include suggestions about how to market this product in the neighborhood chosen. Finally, you will present your storymap to your classmates.

Shark Tank Suitability Analysis Implementation Guide

Learning Objectives

The lesson starts with reviewing current methods for determining market potential. Students will brainstorm in pairs or groups what variables would affect the market for a product like Unbuckle Me, a tool for helping to remove toddlers from car seats more effectively. Students will explore the variables brainstormed using the data available in BAO. Students will then use a tool in BAO called Suitability Analysis to find the best market for Unbuckle Me in Chicago. Throughout the process students will analyze data representation and weights in the calculation of market potential. They will also grapple with the plethora of data available and consider how much data is too much data. After analyzing the Unbuckle Me product students will choose a shark tank product of their own and complete a suitability analysis for Chicago. During this lesson, students will learn GIS skills such as: creating sites using a layer from ArcGIS Online, using a data browser to select variables, and running the suitability analysis tool.

Standards

- CCSS.ELA-LITERACY.SL.9-10.2 / CCSS.ELA-LITERACY.RST.11-12.7: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- CCSS.ELA-LITERACY.WHST.9-10.8 / CCSS.ELA-LITERACY.WHST.11-12.8: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

Lesson Structure

Overview

The lesson starts with a teacher model of the GIS techniques needed for the lesson. The technical skills are detailed in this implementation guide for you to use as a resource. The lesson starts with an introduction to an example Shark Tank product, UnBuckle Me, and a suitability analysis done in small groups and as a whole class. First, students work in small groups to research the product and identify

customer attributes and market characteristics. Next, they use the suitability function in Business Analyst Online to map the variables they identified. Then they discuss their analysis of the variables in small groups and share out and discuss their findings with the whole class. Next, they will conduct their own site suitability analysis with a shark tank product that they select. Finally, they will make a storymap that uses their maps and analysis to explain why their selected location is the best for their chosen product. They will present their Storymaps to the class to share their findings.

Lesson Introduction and Model: Unbuckle Me

Use the following website to introduce the product “Unbuckle Me”. <https://unbuckleme.com/> This is a product that was featured on the TV show Shark Tank in season 11. The product was picked up by the sharks but can always use a new marketing strategy. After reviewing the website for the product, the class will generate a list of factors that affect the market of the product. Factors can be demographics or features of the product. Have students break into pairs or small groups to generate a list. Come back together as a class and share ideas. Generate a list by having students share out. If two or more groups have the same variable add a marker to indicate a count.

Suitability Analysis

As detailed below, model the GIS skills involved in conducting a site suitability analysis. Students will then try it out, first as a class with UnBuckle Me. They will work in small groups to list customer attributes and market characteristics. They will then map the variables they identified.

Next, they will have a think pair share discussion focused on the variables they used in their analysis. In the variable analysis discussion, keep in mind:

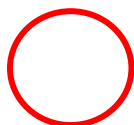
- Three to five variables is the sweet spot. With three variables, changing the weights can have a significant impact on the final results. With more than five variables, the effect of each new variable is minimal.
- Changing the weight for one variable can have a significant impact on the final results. If you need to have two variables that have more significance than the others the most you can do is about 30%. This number decreases with the number of additional variables.
- Confidence in the chosen market is contingent on the variables chosen. If the variables truly include the best customer attributes and market characteristics without any additional dead weight, then the confidence in the market should be high.

Next, they will select their own shark tank product and try out the suitability analysis on their own.

Storymap Activity

Before the storymap activity, model the process of creating a storymap. Students will work collaboratively in their small groups to create a storymap that includes their maps, analysis, and action plans.

When they are done, have students share their storymaps with the class. This can involve either a whole class presentation or small group discussion.



GIS Skills and Analysis

Using the guide below have students log into BAO and add the Chicago communities layer. Once the layer is added, students will need to create sites for each of the 77 communities and then run the suitability analysis tool.

Modeling GIS Skills

At the beginning of the lesson, model the GIS techniques that students will use in the inquiry activities. Step-by-step instructions for the GIS skills that are needed for this lesson are outlined below.

GIS Analysis

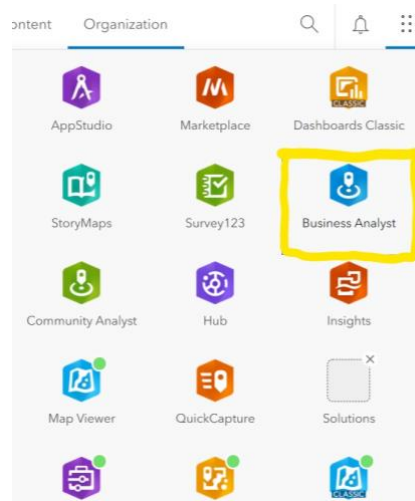
This document provides information about the Suitability Analysis Tool in Business Analyst Online (BAO). If you already know how to log in and have created a project, click [here](#) to skip ahead.

Go to <https://www.arcgis.com/index.html> and log in.

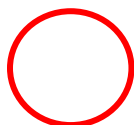
At the top of the page click the application button.

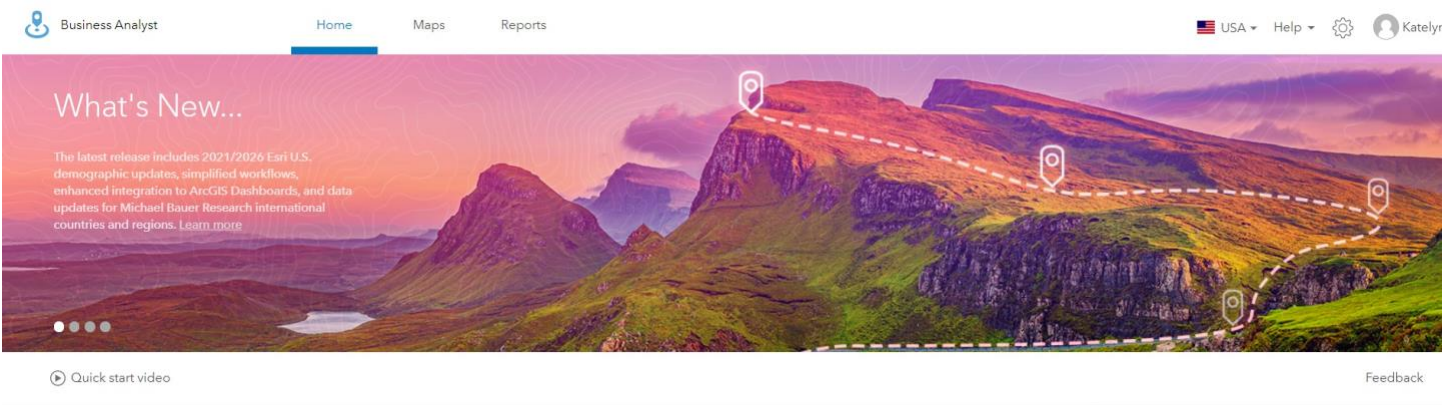
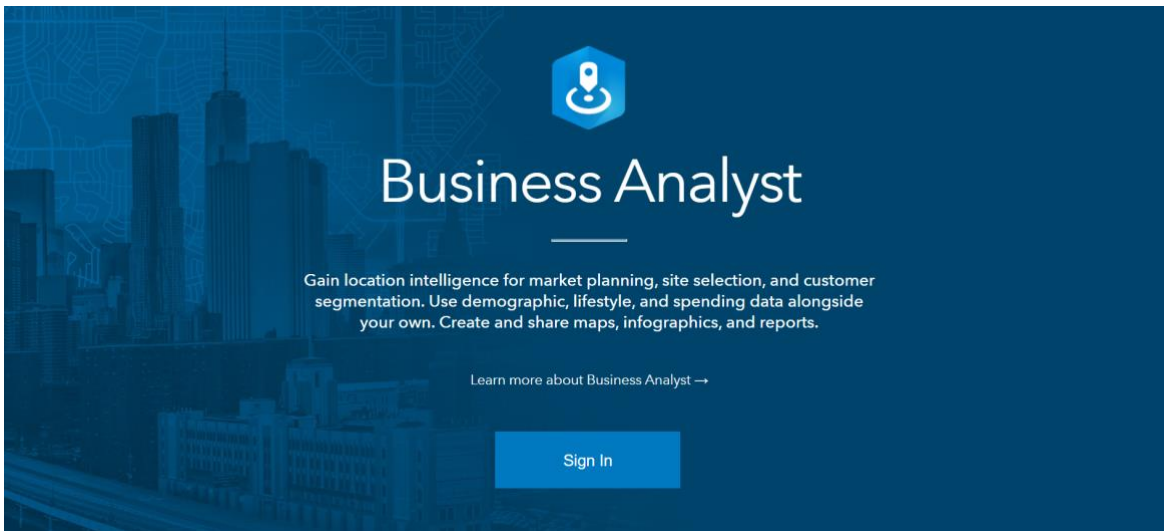


Click the business analyst application.



You will be prompted to sign in again. Use the same login as for ArcGIS Online (AGO). Because this is your first time, you will need to create a project. You may need to scroll down a bit to find the option. After today, you will find your project under home.



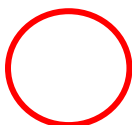


There are always interesting facts in the chart on the right that show you the wide range of data available in BAO.

Once you click the create new project button, all you need to do is name your project. You do not need to worry about the advanced settings.



Your project will show up at the bottom of the homepage. Click to open.



Quick start video

RECENTLY CREATED

PROJECTS

SITES

REPORTS

SEARCHES



Project 1 
Last Modified: 07/08/2021



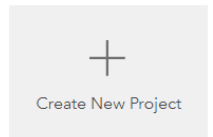
Chicago
Last Modified: 06/21/2021



Elementary
Last Modified: 01/29/2021



Freedom BAO demo
Last Modified: 01/12/2021

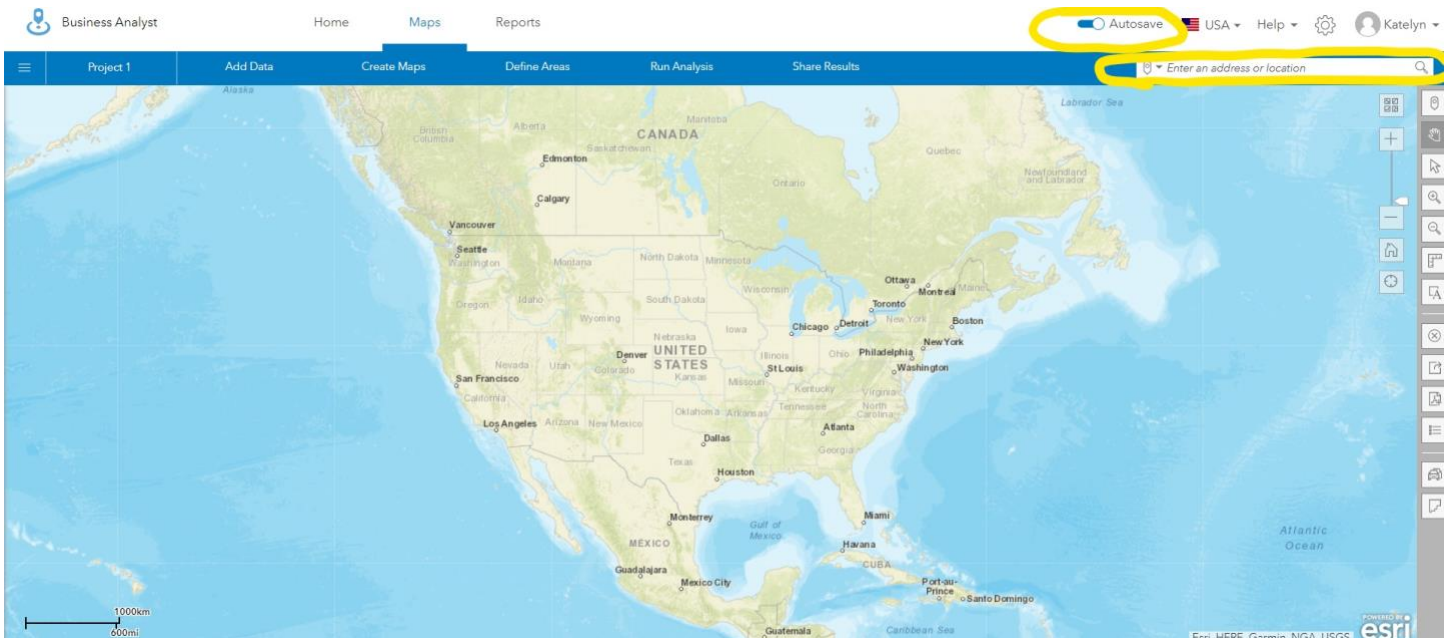


Create New Project

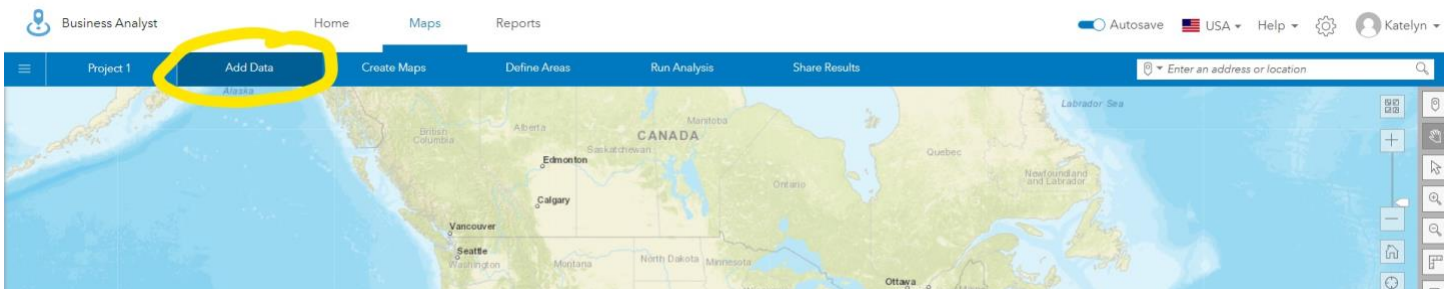
[Show all projects](#)

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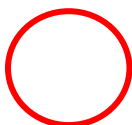
You now have a blank map to work on. The first button to note is the autosave. BAO is one of the applications that does not require you to hit a save button. This is a double edged sword. On the positive side, you do not need to worry about losing your progress. On the negative side, there is no undo button. You need to make a decision whether to leave autosave on or not.

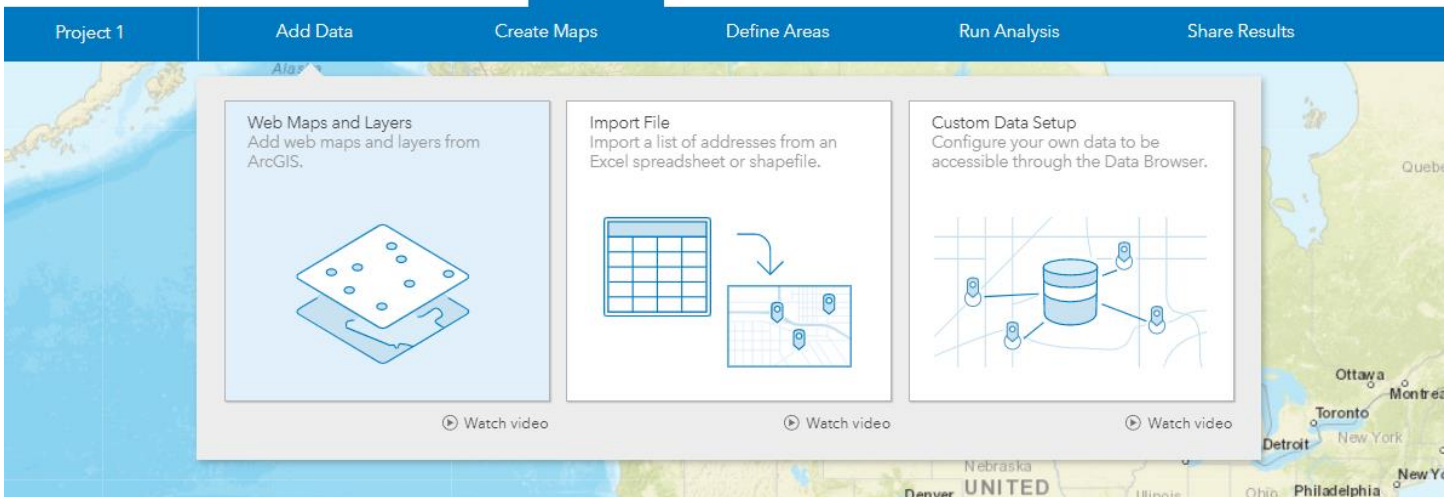


There are many ways to add data in BAO. The first is to add data from AGO either using your organization or the living atlas. Click the add data button.

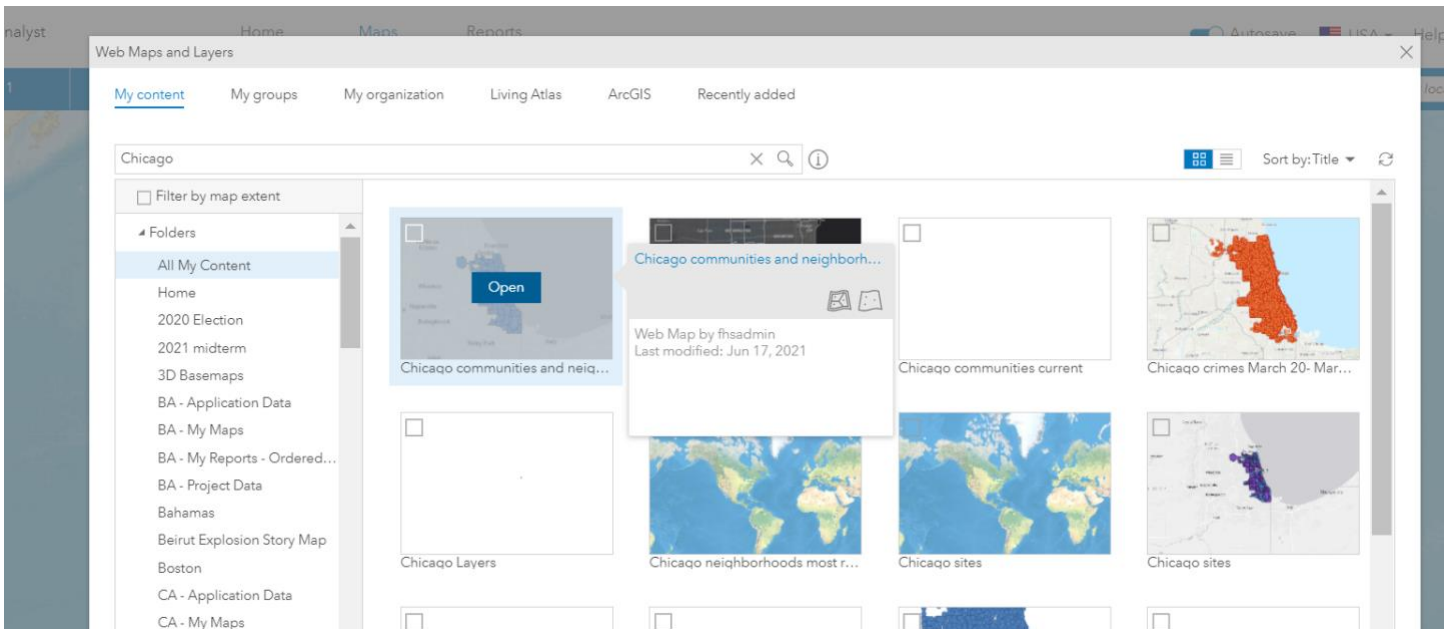


Choose web maps and layers

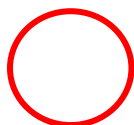


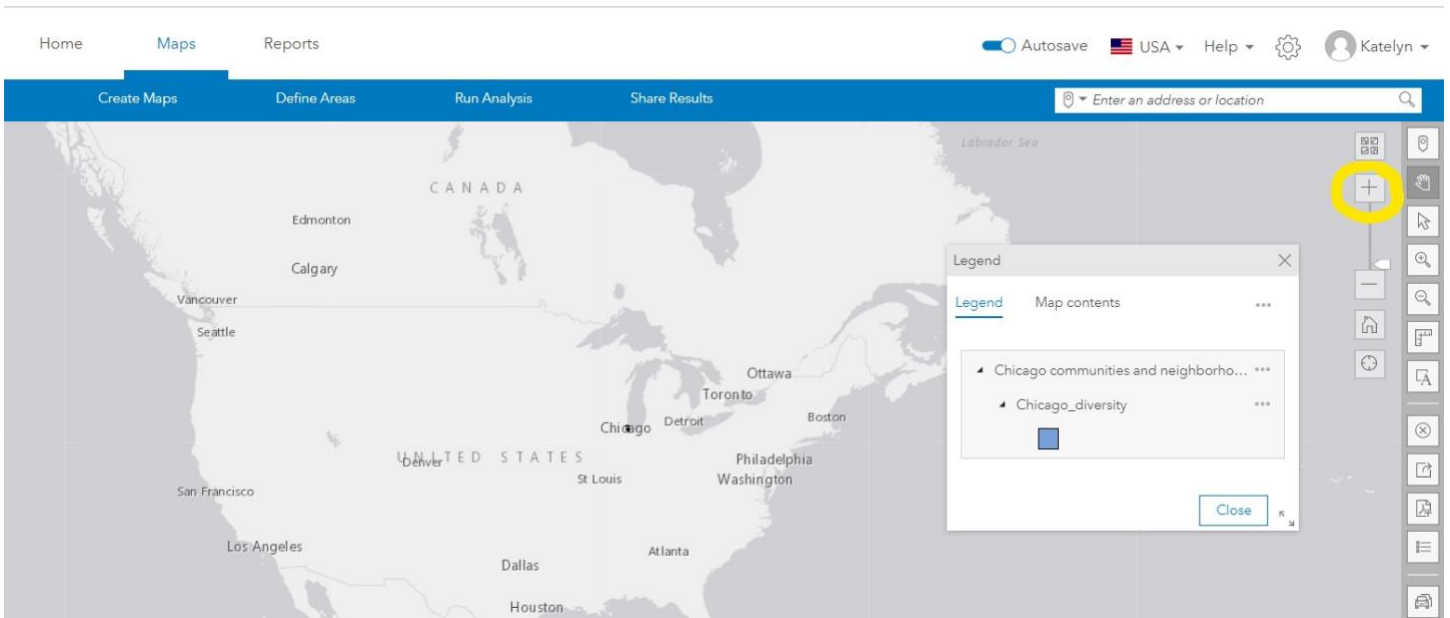


Next search for your content. Search “Chicago” and choose “Chicago communities and neighborhoods”.

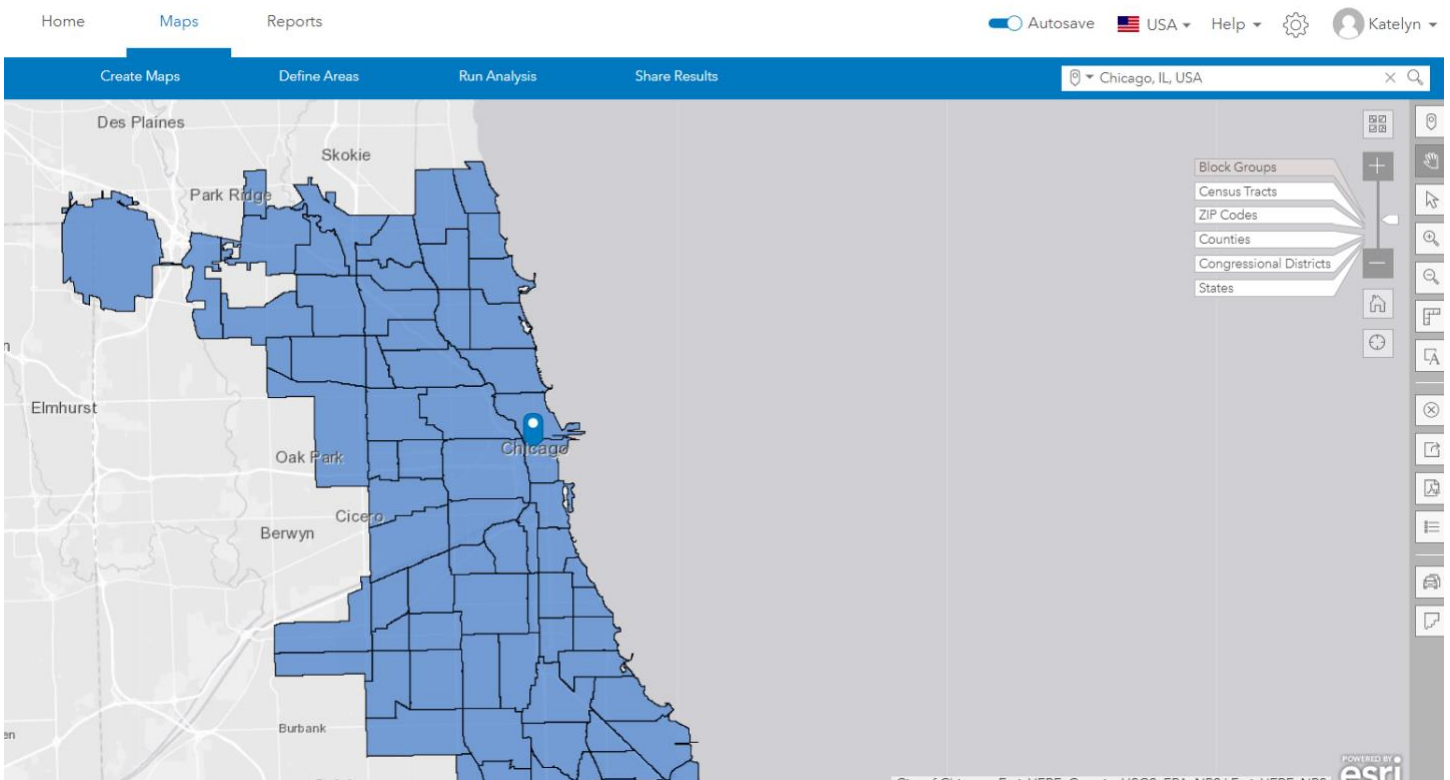


Initially it will not look like much because the map is zoomed to the US.

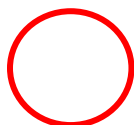


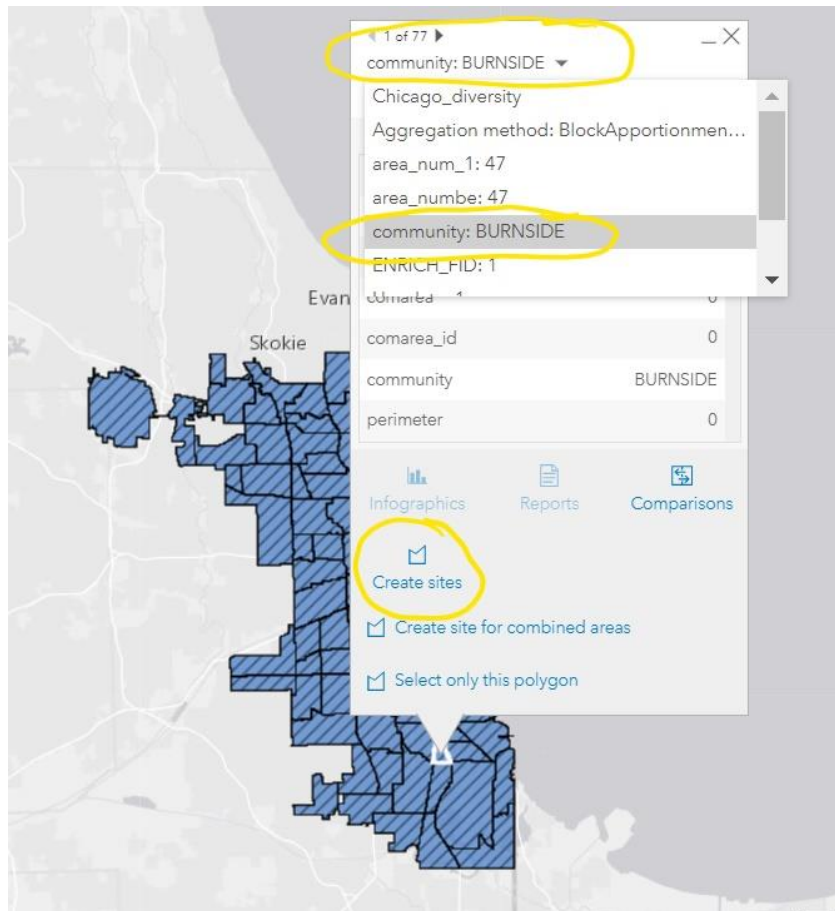


Use the zoom buttons on the side to zoom in to Chicago.



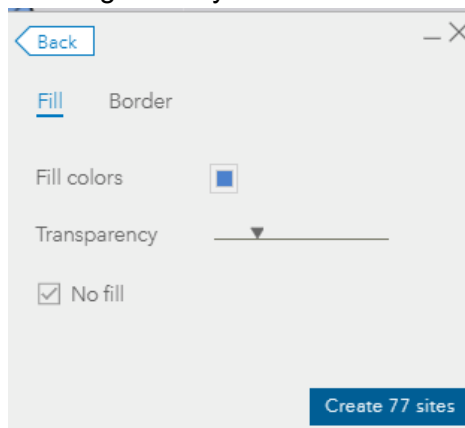
On the right side in the toolbar, choose the arrow which is for “selection”. Then click, hold, and draw a box around the Chicago neighborhoods selecting all 77. You may need to zoom out to see the entire area.



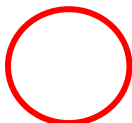
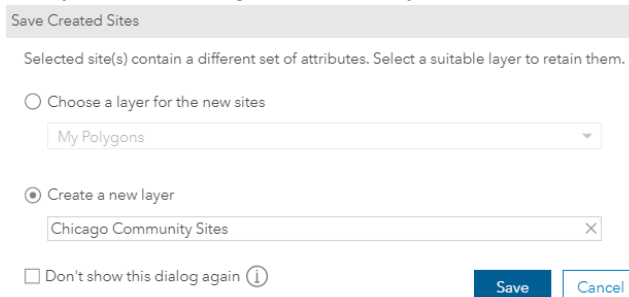


At the top of the dialog box you can change the attribute that gives each site its name. Make sure the “community” attribute is selected. Click “create sites”

In the next box you can style the layer. Change the style to “no fill”. Then click “create 77 sites”.

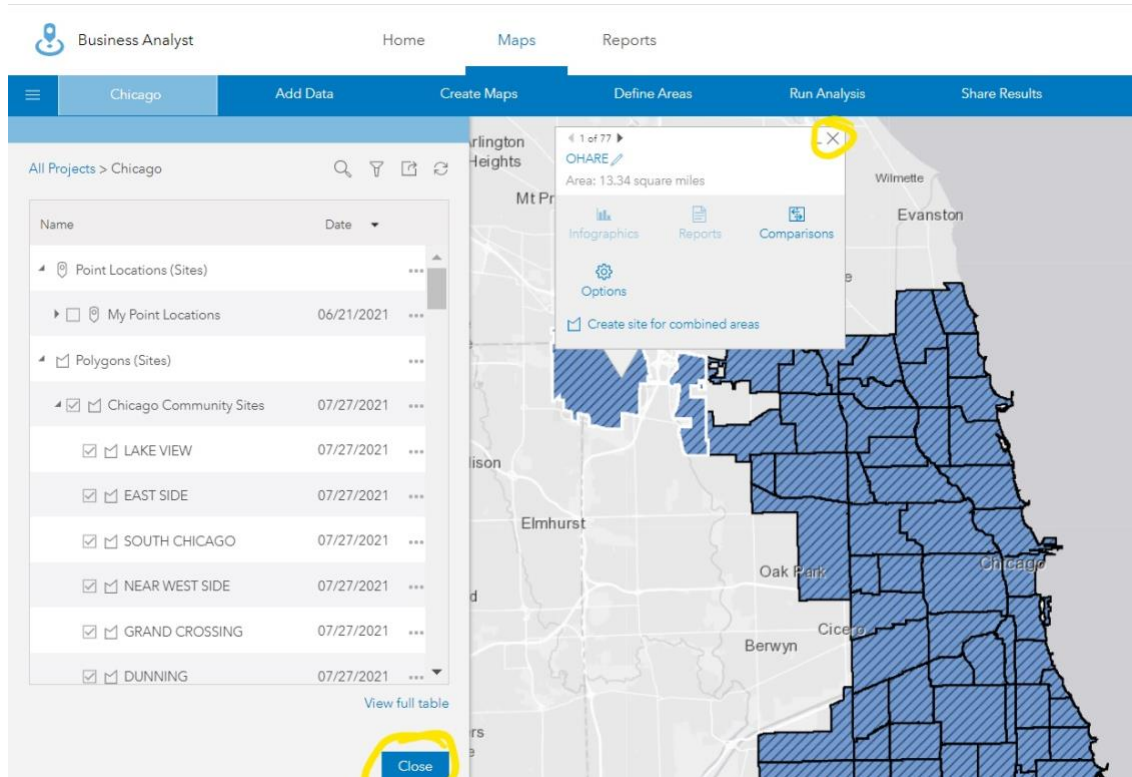


You now need to name the layer. Type in “Chicago Community Sites”. Click save.

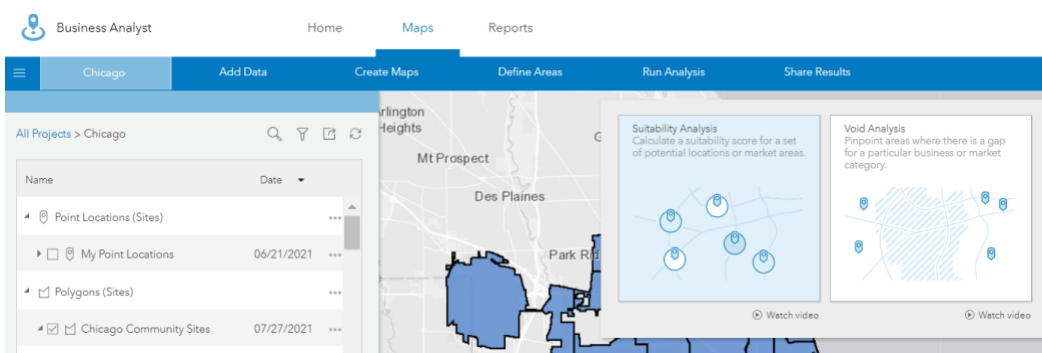


You will go through two dialog boxes explaining that the sites are being saved and the layer is being created.

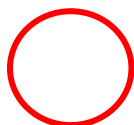
Go ahead and close the dialog box to the left and the dialog box for the sites. The diagonal lines in the map indicate that the layer contains sites.

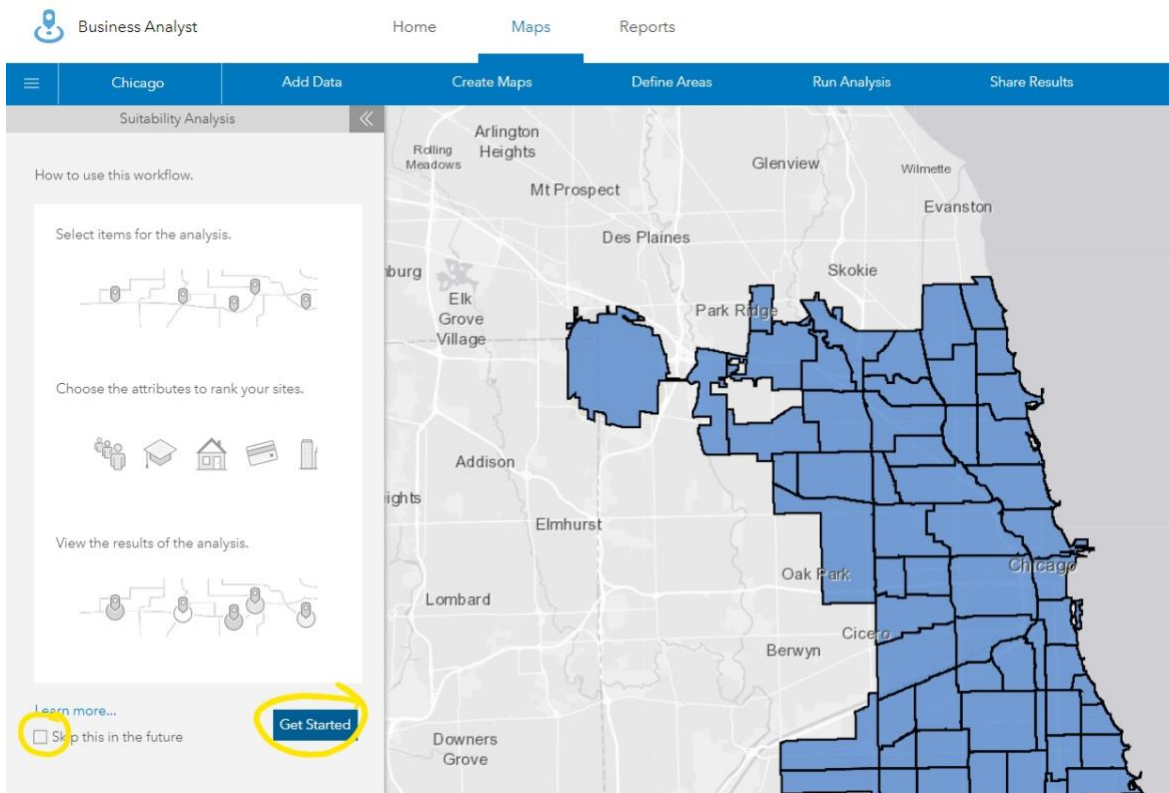


Click the “maps” tab at the top of the screen and choose “suitability analysis”.

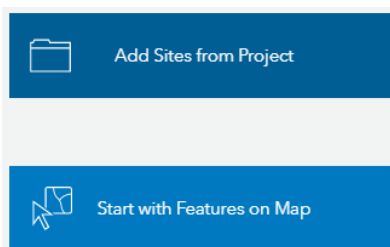


Go ahead and click the “skip this in the future” button and click “get started”. You will start the analysis by choosing sites.



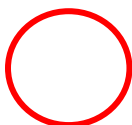


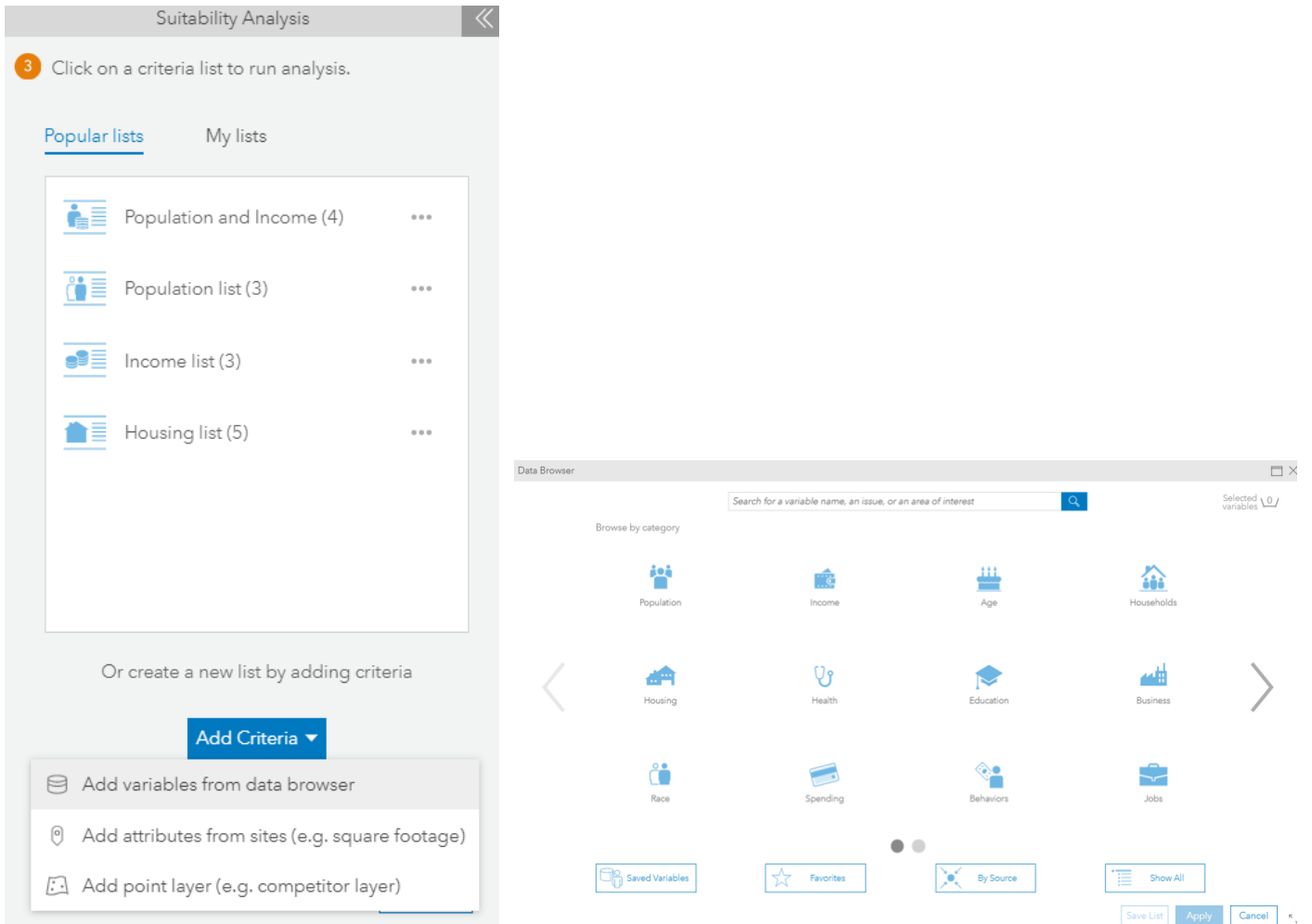
Click the “add sites from project” button and then close the dialog box which looks blank. I am not sure what its purpose is.



All 77 sites should be checked on the left side of the screen. Click “next”.

On the next screen you will see some preloaded options for variables. You can ignore those for now since our product requires very specific variables. Click “add criteria”. Then click “add variables from browser”.



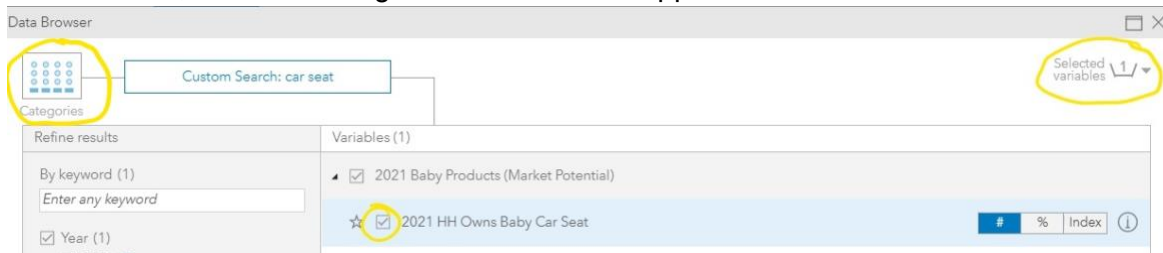


You may be familiar with the data browser from AGO as it is the same browser used for enriching layers.

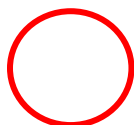
You can search for the layers in any order. We are going to use the search bar to search for “car seat”. I usually start with the categories rather than use the search, but in this case we need a very specific variable.



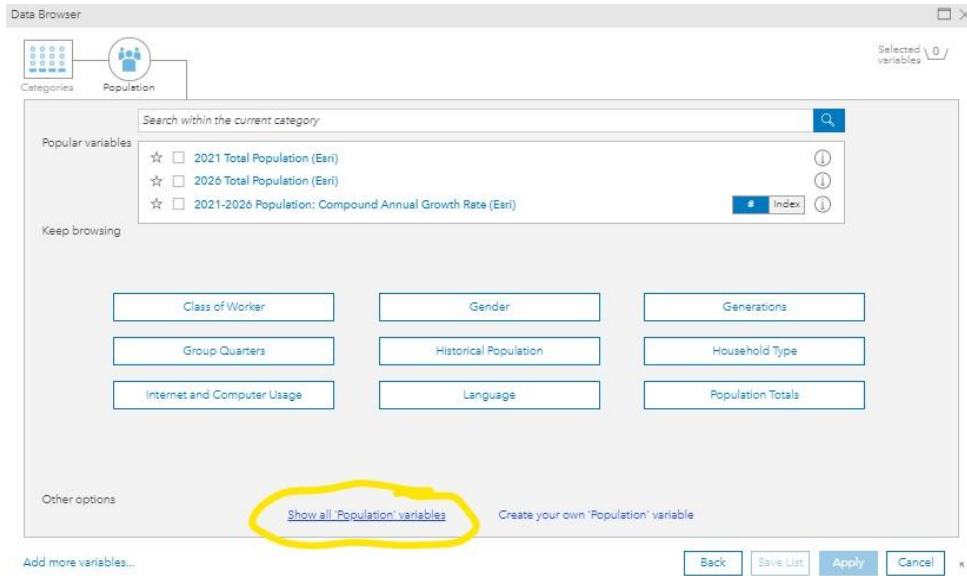
This search leads us to the “2021 Baby Products (market potential). Click the check box next to “2021 HH Owns Baby Car Seat” to select it. You will see the selected variables set to “1” in the upper right corner. To return to the main menu, click the “categories” button in the upper left corner.



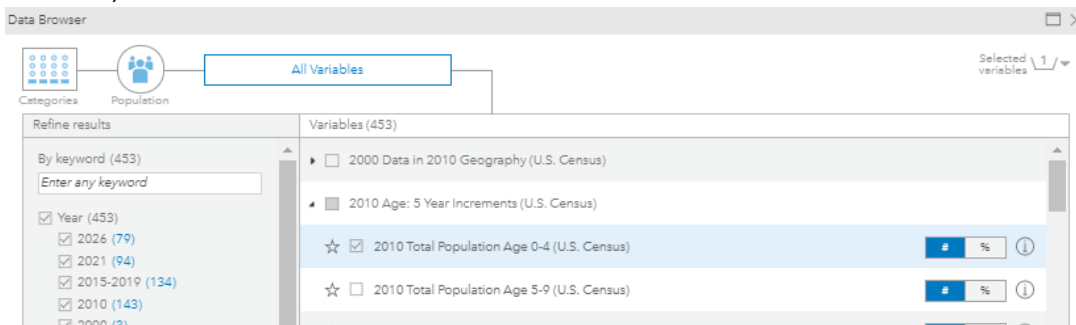
The second variable we are going to search for is “baby/toddler” age. Click the population button. The next menu has three popular variables and nine button categories. If you are unsure where to start when



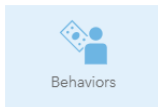
searching for a specific variable, this is a good place to start. Click the “show all ‘population’ variables” link at the bottom of the box.



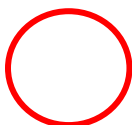
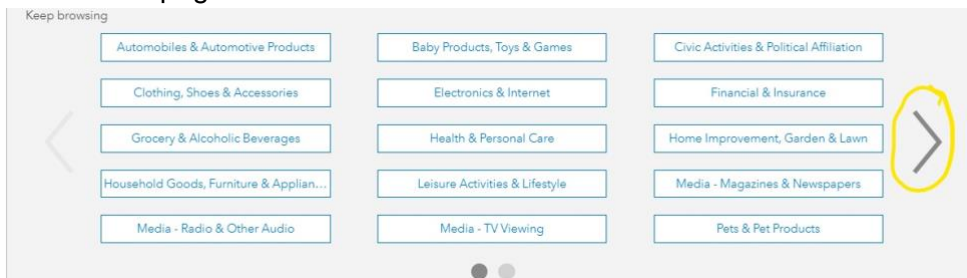
At the top expand the “2010 Age: 5 Year Increments (U.S. Census)”, then check the “2010 Total Population Age 0-4 (U.S. Census)”.



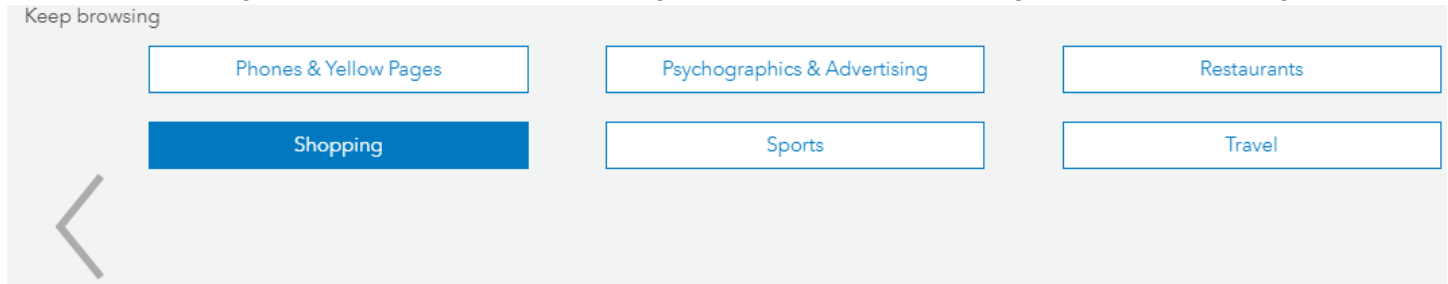
Click the “categories” button in the top left corner to return to the main menu. Next we are going to explore the



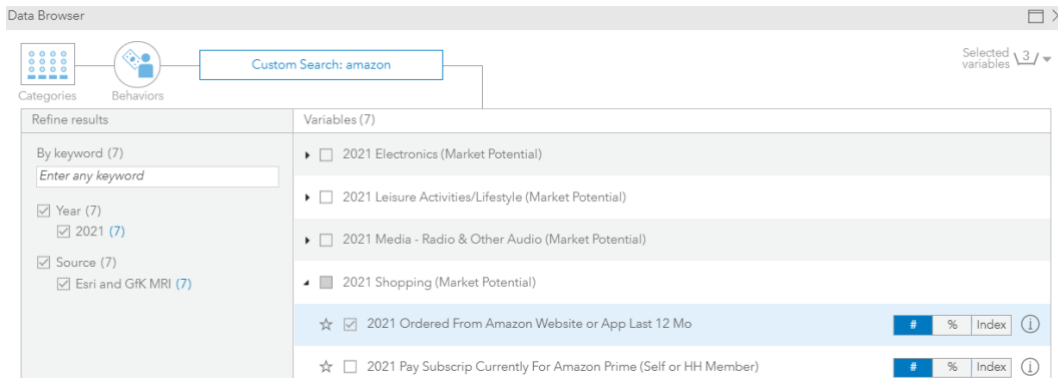
behaviors category. This category has two pages of buttons. The first page has 15 buttons. Click the arrow to go to the second page.



On the second page there are six buttons including the one we want “shopping”. Click the shopping button.



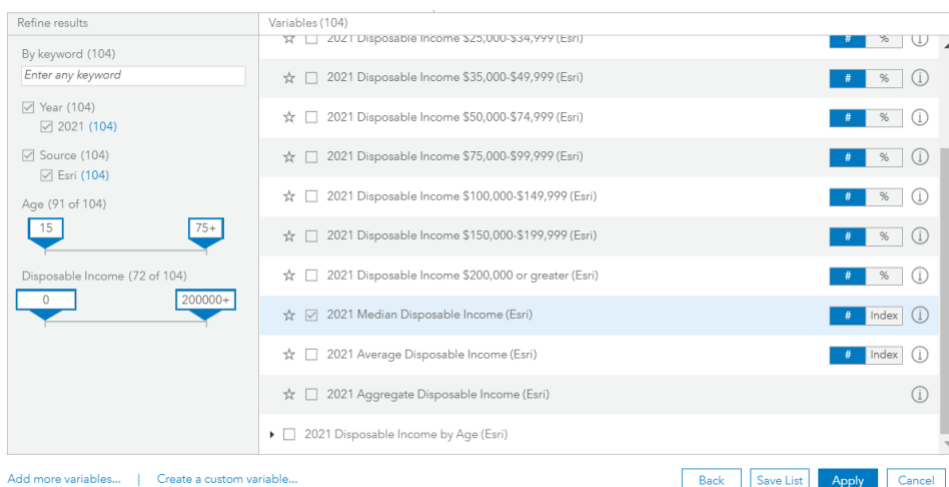
At the top of the box there is a search function. Type in “amazon”. The Unbuckle Me product is currently being sold on Amazon. Under the “2021 Shopping (market potential)” there is a “2021 ordered from Amazon website or App in last 12 mo”. Click the check box to add this third variable.



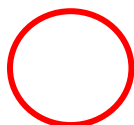
Return to the main menu. Click the “income” button. In the next menu, click the “disposable income” button.

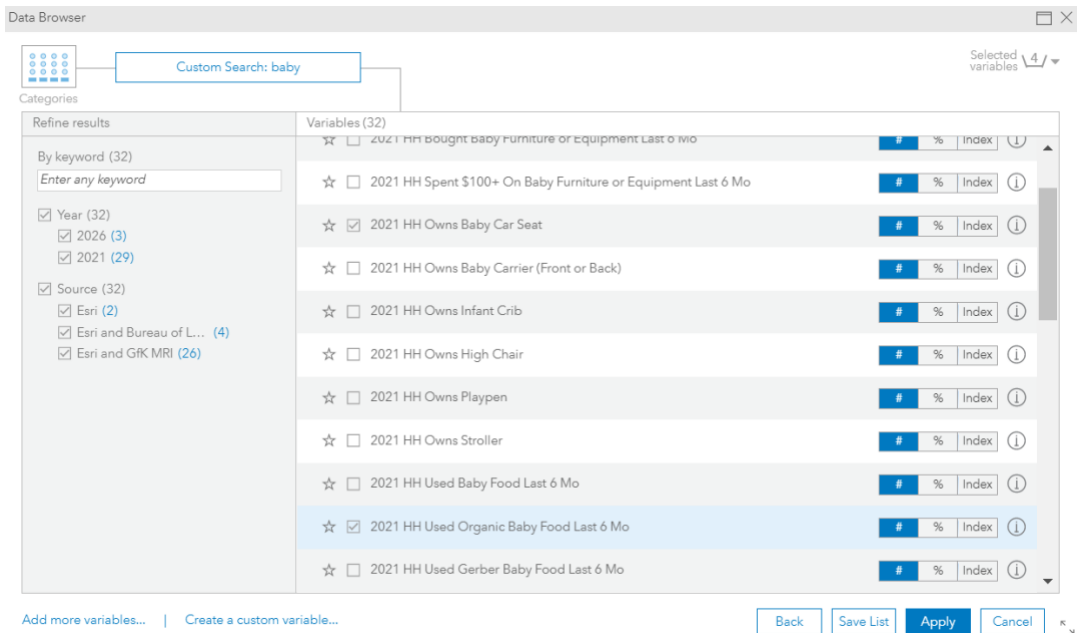


You will need to scroll down to the bottom of the list to find the next variable “2021 Median Disposable Income (Esri)”. Click the check box and return to the main menu one last time.

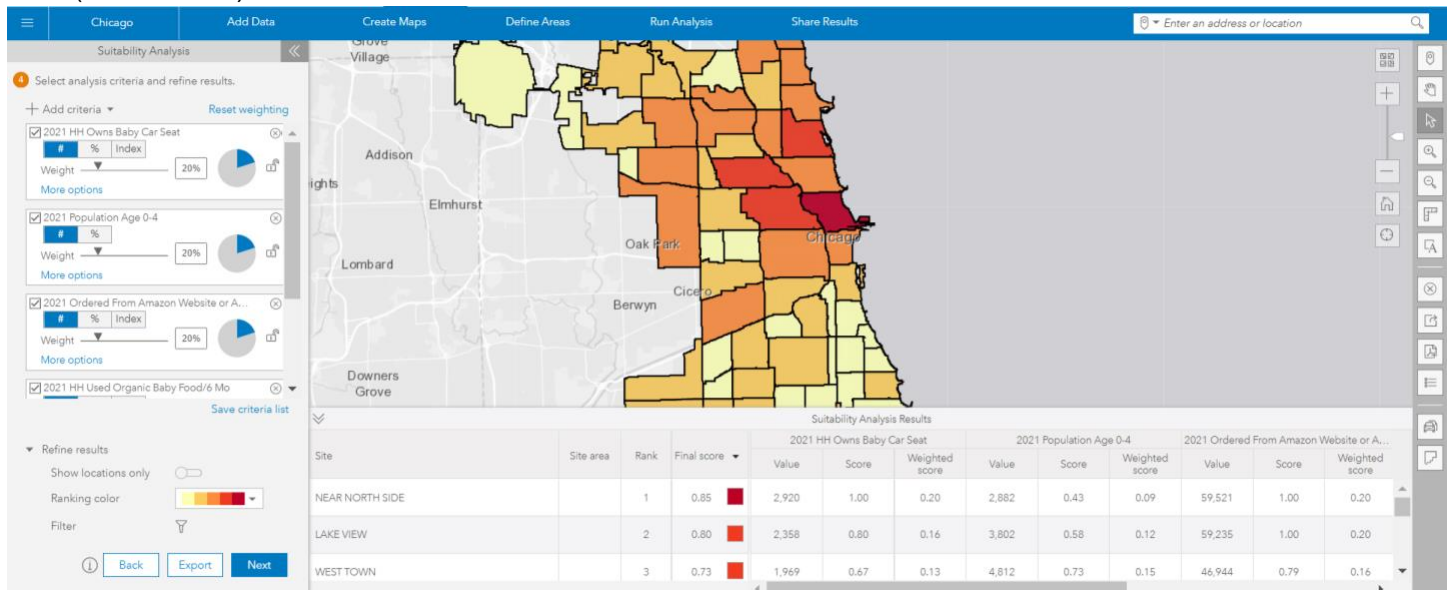


For the last variable we will be using the search function again to search for “baby”. There are 32 options under “baby”. Unbuckle Me is a bit of a luxury product so I chose “2021 HH Used Organic Baby Food in the Last 6 Mo” as a luxury item. We now have all five variables and are ready to run the suitability analysis. Click the “apply” button to move on to the next step.

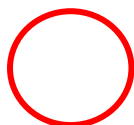


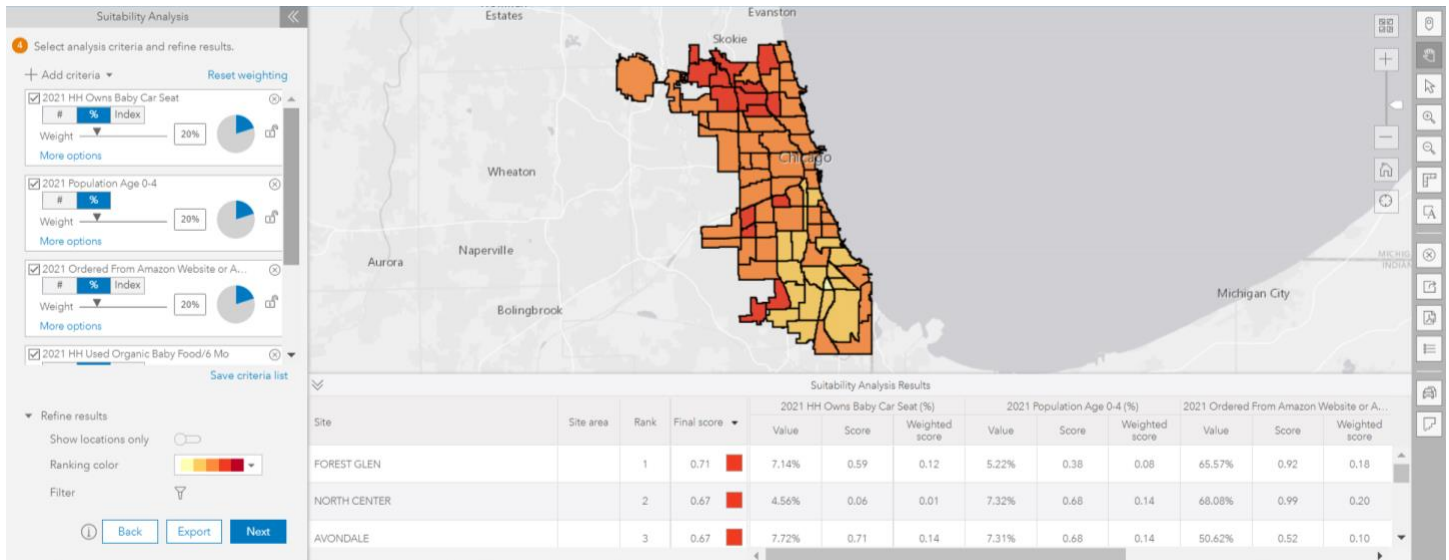


This is what the initial screen looks like. On the left you have the five variables and their weights. You can only see three to start, but you can scroll to see the other two. On the bottom you see the Ranking table. With each of the five variables set to 20% the best community for the Unbuckle Me product is "Near North Side". All 77 communities are ranked starting with a final score of 0.85 (an 85% match) all the way down to final score of 0.02 (a 2% match).



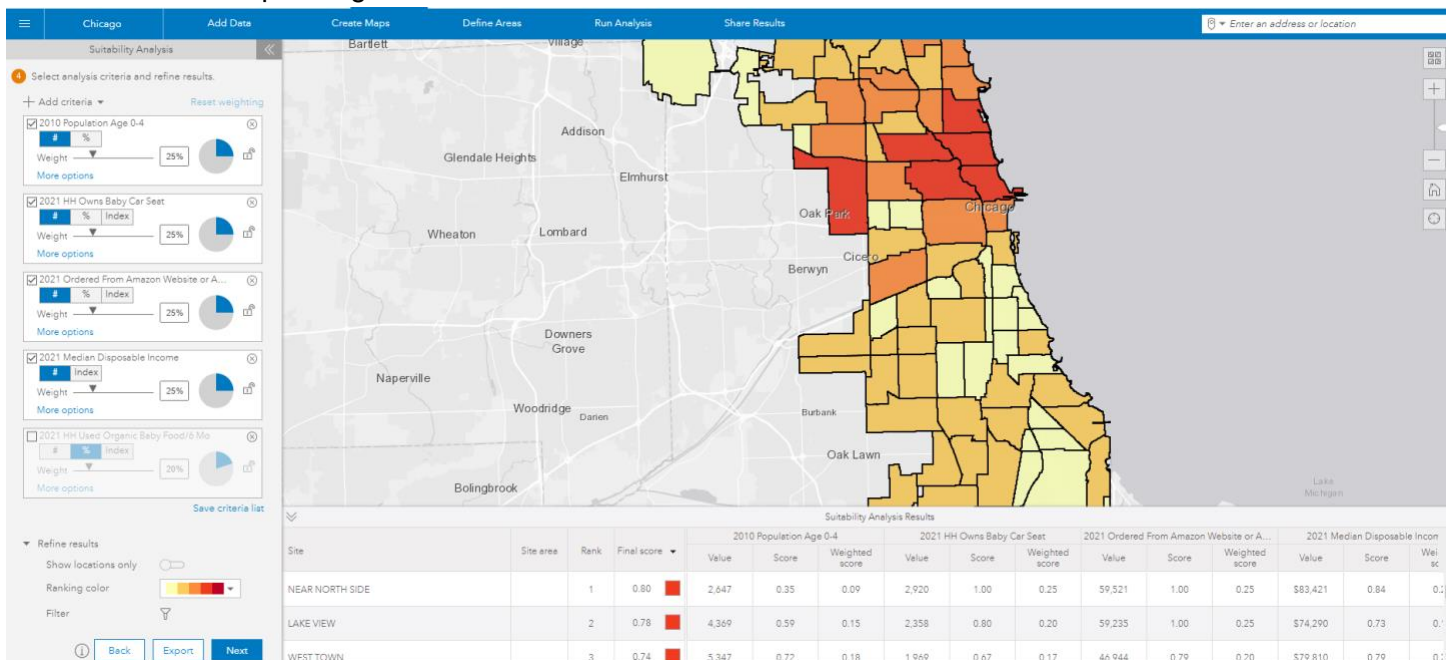
Initially the variables are all set to a number (#) but we can change the display to percent. Change all the variables to percentages. The one exception is median disposable income.



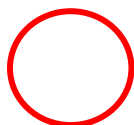


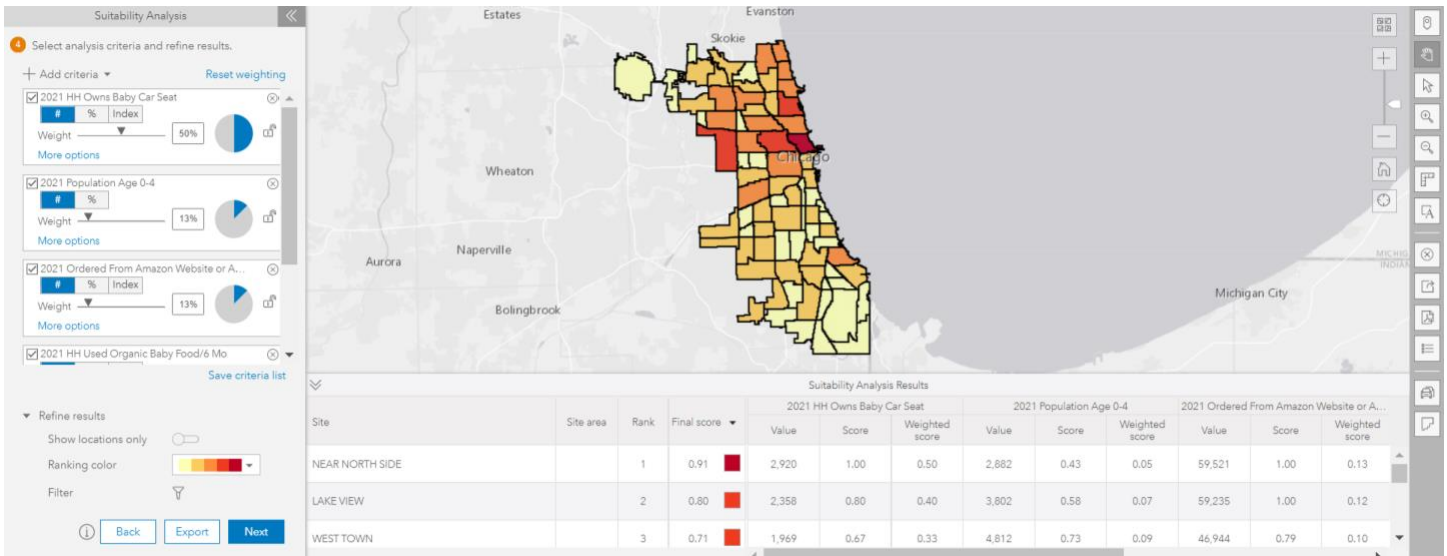
The new number one market is Forest Glen with a final score of 0.71. Let's think about what number vs percentage means. The amount does not take into consideration differences in population. For example a community with a high population will statistically have the highest number of people who ordered from Amazon. Percentage, as the name suggests, divides the value by the total. One method is not necessarily better than the other. You need to decide which representation to use.

Set the variables back to number. Now we are going to turn off a variable to see how the map changes. The variable of organic baby food (2021 HH Used Organic Baby Food/6 Mo) might not be the best. Uncheck the box to see if the map changes.



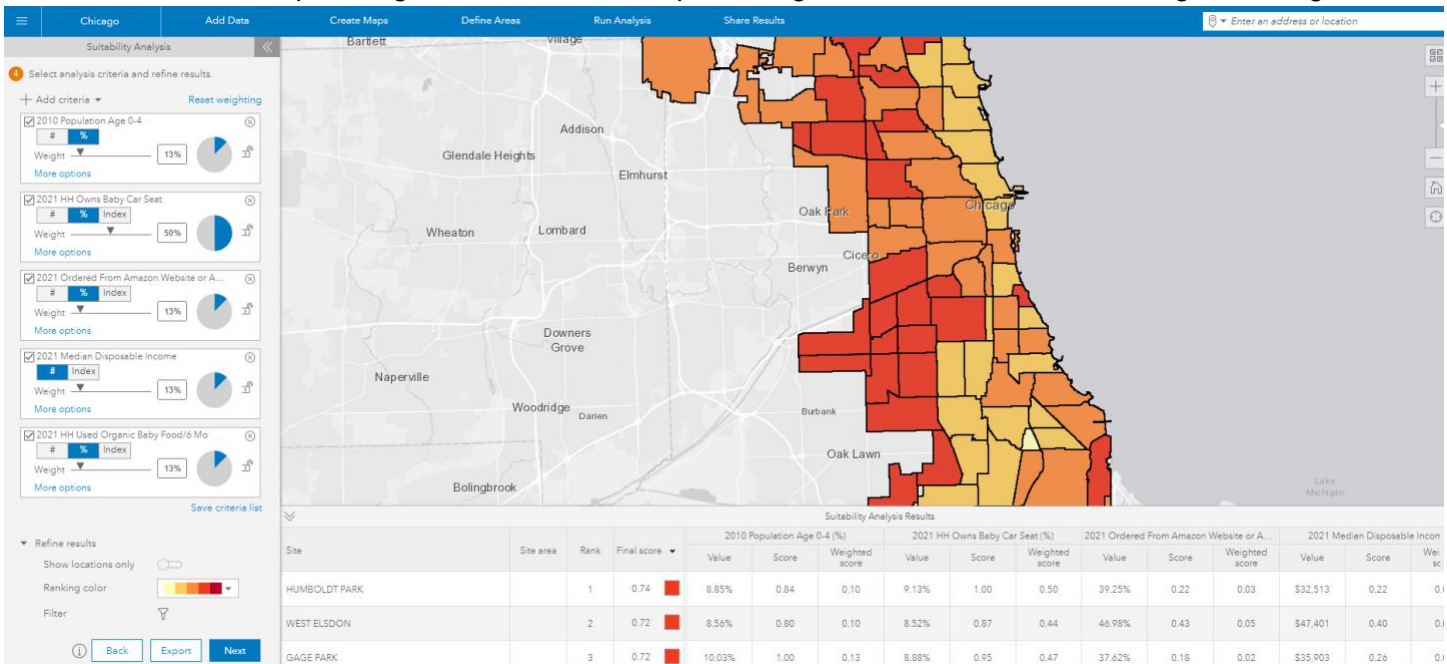
The top ranked communities remain the same but the final score decreased to 0.80. Recheck the box. Now we are going to change the weights to see how the data changes. Of the five variables, the most important to the product is the number of car seats (2021 HH Owns Baby Car Seat). The product is useless to those without a car seat. Let's set the weight for this variable to 50%.





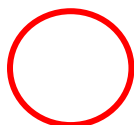
The map automatically updates with the new data. The top ranked sites did not change but the final score has increased to 0.91. The other change that happens to the data is that the weights for the four remaining variables split to 13% each.

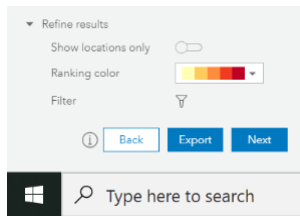
Let's see how the map changes when the data is represented by percentages and the car seat variable is 50%. To make this map, change the values back to percentages. You do not need to change the weights.



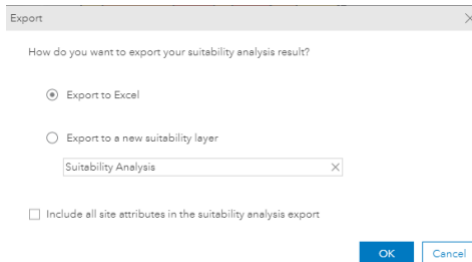
This time the number one market is Humboldt Park. At this point you need to make some decisions. You have the opportunity to change variables, weights, and representations (number vs percent). What style is best for this market?

In order to complete the final project you will need to export the table. To export the table you will click the export button at the bottom of the page.



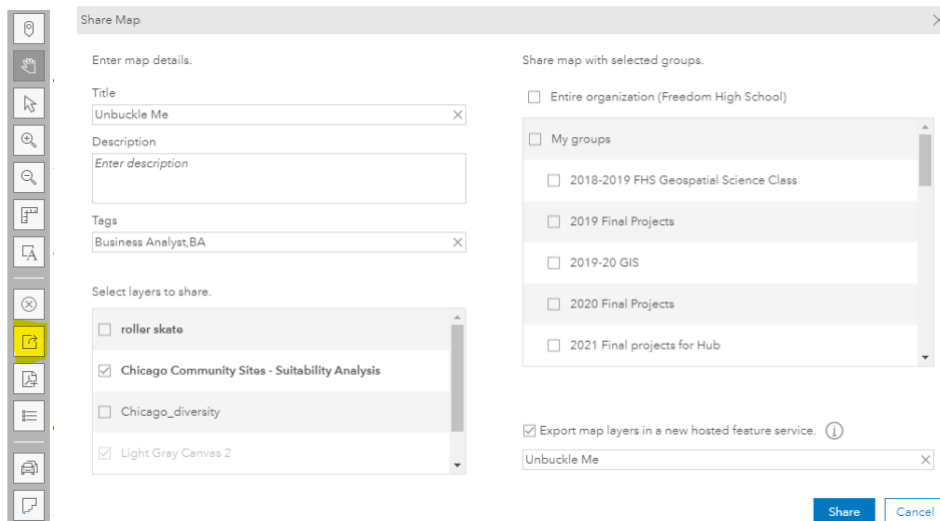


In the next window, you have the option to “export to excel”. This is how you will access your table of results.



The Excel file will download to your computer. You will need to add it to google drive to access it in your report.

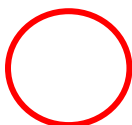
You will also export the map to add to your final story map. On the right side of the screen you will find a toolbar, we have not used it much. The button highlighted is the export map button. Make sure to title the map, select the layers, and check the “export map layers in a new hosted feature service”. Click share.



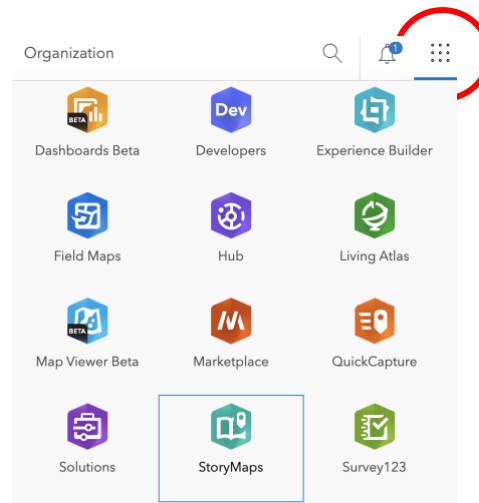
You now have a new layer in your AGO content that you can add to your story map.



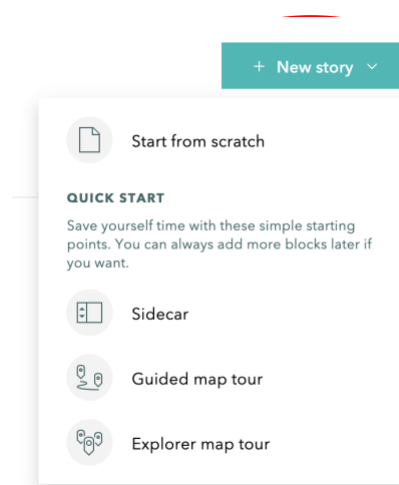
Create a Storymap



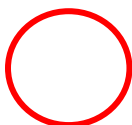
In the home menu, click on the app builder icon and select the “StoryMaps” app.



Click “New Story” and select the type of StoryMap you want to create. If you want the most flexibility, try “start from scratch.” If you want a pre-set structure, try the other options.



Follow the prompts to add information to your storymap. Click the green plus sign to add other media, such as maps and videos, or more text to your story. When you are ready to share your story, don't forget to click publish!

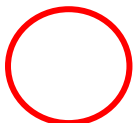


Title your story

Start with a short introduction or subtitle

Katie James | Draft

 Tell your story...



Community Change Agents

Overview

In this lesson you will use mobile data collection technologies and geographic information systems (GIS) to collect and analyze data about your community. You will develop a research question related to something about your community that interests you. You will then work with your classmates to collect local data related to your research question, use GIS to analyze spatial patterns and relationships in your data, and share your analysis and answers to your research question with the class.

Data in Your Community

Imagine walking to school. *As you walk, what are things you could count, observe, measure, estimate, or rate during the journey? More importantly, which of these examples is the most interesting to you?*

Complete the chart with 3 examples of data you can collect in your community. Identify which of the community data examples you are the most interested in.

Community Data	What could you do to collect data? (count, observe, measure, estimate, rate)

Defining “Your” Geography

Individuals and societies use many methods to organize people and the land they inhabit. Borders and community areas of various sizes have been established across most of the planet. Examples include countries, states, counties, census tracts, zip codes, community areas, neighborhoods, etc.

As a first step in your project, you need to define a specific “geography” or the area from which you will collect data. Questions to consider as you define your area include:

Chicago Geospatial Semester Project

- *What is an appropriately sized geography that will provide a meaningful amount of collected data?*
- *What features define the borders of your geography?*
- *Will you be able to equally access most parts of your geography?*
- *What existing geographies could you use for this project? (Why do extra work!?)*

Developing a Research Question

Your goal in collecting local data is to investigate a question you have about your community. This question should be considered your research question (RQ). Collecting local data will allow you to use GIS analysis to help you answer your RQ with evidence.

The ultimate goal of this project is to foster change, improvement, or growth in your community. Think about the community data examples you listed above and consider the following questions alone and then with a partner:

- *Is there a community issue you would like to investigate and solve?*
- *Are there ways you would like to improve your community?*
- *Does your community have assets or highlights that you would like to learn more about?*
- *What local data could you collect related to this community issue, asset, or improvement? Is it related to the community data you listed above?*

Based on your discussion, develop a specific research question that you would like to address. The research question should draw on the community data and issue, asset, or improvement that you would like to investigate. Make sure the community data you choose to collect will help you answer your research question. Write your research question in the space below.

Collecting Local Data with Survey123

Next, use Survey123 to design a tool to collect the data you need for your project. Your teacher will show you how Survey 123 works. Then you will create the survey and collect your data!

GIS Data Analysis

Once you've collected your data, it's time to use GIS to look for spatial patterns and relationships in the data. First, you will move your data from Survey123 into ArcGIS online (Your teacher will walk through this process). Once you have your map, think about the ways you want your data to be classified and symbolized in GIS.

Chicago Geospatial Semester Project

Take a look at your map and consider the following questions:

- *Do you notice any patterns in the data across your defined geography?*
- *How does the data change as you look at various locations?*
- *What trends/patterns/differences do you see in the data?*
- *What's causing these differences or patterns and how are they related to issues within your community?*

Next, use Arcgis Online, ESRI's Living Atlas, or [The Chicago Data Portal](#) to find additional data that could be helpful in explaining your findings, the patterns you see in the data, and answering your RQ. Examples of relevant data include: age, gender, race/ethnicity, socioeconomic status, crime, landscape/geography, and census data. Add any layers that you think are useful to your map and revisit the questions above.

Save and share all map(s) and layers.

Creating a Storymap

Next you will create a storymap to showcase your maps, analysis, and findings. All maps and layers created need to be shared and then uploaded into a chosen storymap template. Your storymap should focusing on addressing these:

- *What issue(s) does your research question examine?*
- *What answers has your GIS analysis provided?*
- *How can your analysis and findings be used by people in your community?*

Sharing Your Findings

Finally, you will present your storymap to your classmates. If possible, you can also share your storymap with members of your community.

Community Change Agents

Implementation Guide

Learning Objectives

Students will use mobile data collection technologies and geographic information systems (GIS) to gather and analyze data relative to their surroundings/communities. *Examples of data include: student observations of cell phone use by operators of vehicles, the location of trees within parks, broken sidewalk sections, gas station locations, etc.* Patterns and trends in the data will be examined spatially across student-selected geographies and factors related to identified relationships will be investigated. The overall goal of the project is to promote student collaboration and integrate collected data into ArcGIS online for mapping, display, and analysis purposes. Findings and results will be communicated through the creation of storymap presentations.

Standards

- CCSS.ELA-LITERACY.SL.9-10.2 / CCSS.ELA-LITERACY.RST.11-12.7: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- CCSS.ELA-LITERACY.RST.9-10.4 / CCSS.ELA-LITERACY.RST.11-12.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- CCSS.ELA-LITERACY.SL.9-10.5 / CCSS.ELA-LITERACY.SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- CCSS.ELA-LITERACY.WHST.9-10.6 / CCSS.ELA-LITERACY.WHST.11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- CCSS.ELA-LITERACY.WHST.9-10.8 / CCSS.ELA-LITERACY.WHST.11-12.8: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

- CCSS.MATH.CONTENT.HSS.MD.A.1 Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.

Lesson Structure

Overview

Students will be introduced to data collection by generating examples ideas of data that exists in their community. Next, students will select a topic related to a community issue and develop a specific research question. They will then use GIS to collect relevant local data and analyze patterns and relationships within the collected data. Analysis, findings, and answer(s) to research questions will be presented via student-made storymap presentations.

NOTE: This lesson can be done individually or in groups. Structure the lesson in the way that will work best for the individual needs and circumstances of your classroom.

Lesson Introduction

Students will develop examples of community data that could be collected, mapped, and analyzed. They will then develop a research question related to an issue or asset in the community or a community improvement project that interests the students.

Provide a brief introduction to Survey123, ArcGIS Online and the relationship between the software/technology and the lesson's goals. Answer questions.

Modeling Survey123 and Arcgis Online Techniques

Demonstrate how to create and modify a survey in Survey123. Provide time for students to familiarize themselves with survey design and creation as well as practice collecting (and retrieving) data for GIS analysis. Various GIS analysis tools will be explored post Survey123 practice time.

Work Time

Students will create individual surveys uniquely fit to collect the community data they have identified and selected. Parameters for data collection will be established by the teacher and can be scaled up or down depending upon the amount of allocated time and the size of the assumed locations students plan to visit.

Students will take their collected data and import it into Arcgis Online. Relationships and patterns in the collected data will be analyzed using GIS and compared/coupled with other data from differing sources (Arcgis Online and or esri's Living Atlas). Answers to proposed research questions will be provided.

Storymap Activity

Before the storymap activity, model the process of creating a storymap. Students will work collaboratively in their small groups (or individually) to create a storymap that includes their maps, analysis, and research question answers.

When they are done, have students share/present their storymaps with the class. This can involve either a whole class presentation or small group discussion.

Modeling GIS Skills

At the beginning of the lesson, model the data collection techniques (using Survey123) that students will use in the aforementioned inquiry lesson. Step-by-step instructions for the data collection/survey use, and GIS skills that are needed for this lesson, are outlined below.

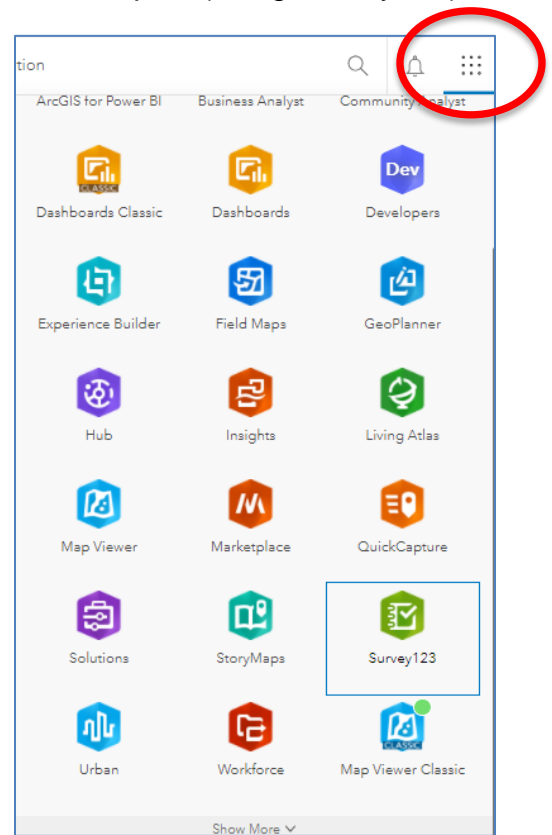
Survey 123 Skills: Survey Creation

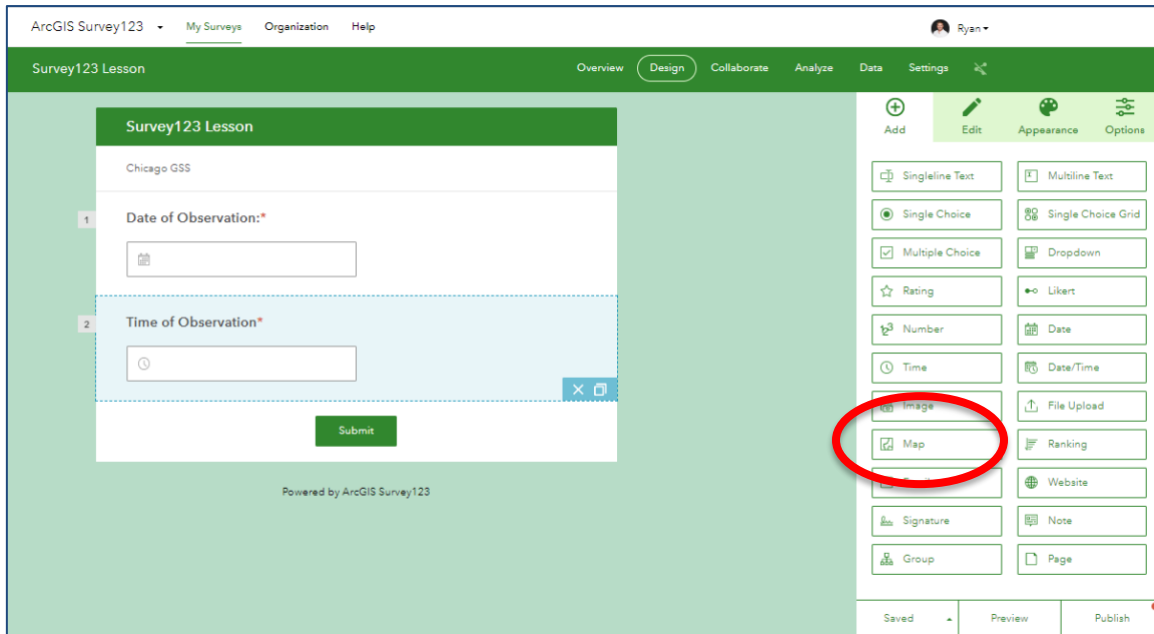
Creating a survey begins with accessing Survey123 within the Arcgis Online ecosystem. The “waffle” icon on the top right of the screen provides access.

Follow the prompts related to create a new survey, the option related to blank surveys provides the most flexibility in choosing how data will be collected.

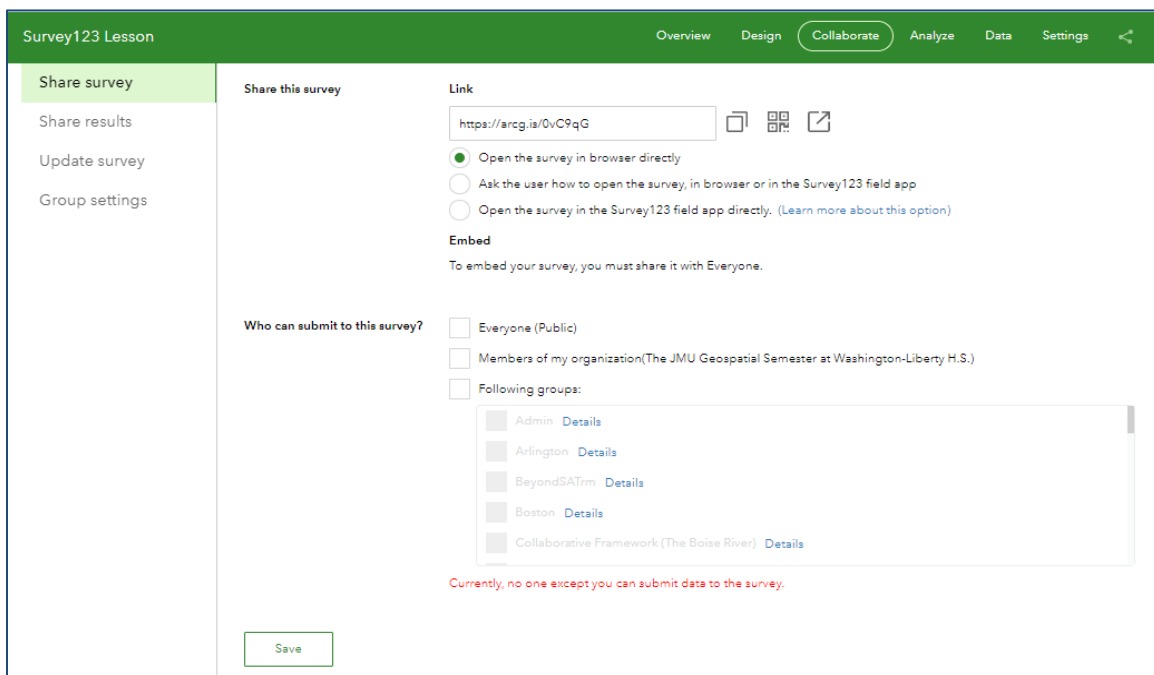
Modifying Surveys

Demonstrate how to insert questions and adjust visible parameters based upon the preference of the survey designer. Modifications can be made following provided prompts. Important: stress to students the need to ask appropriate and related questions that help to potentially answer their proposed research questions. Examples of the page where modifications to the survey are provided, follow below:





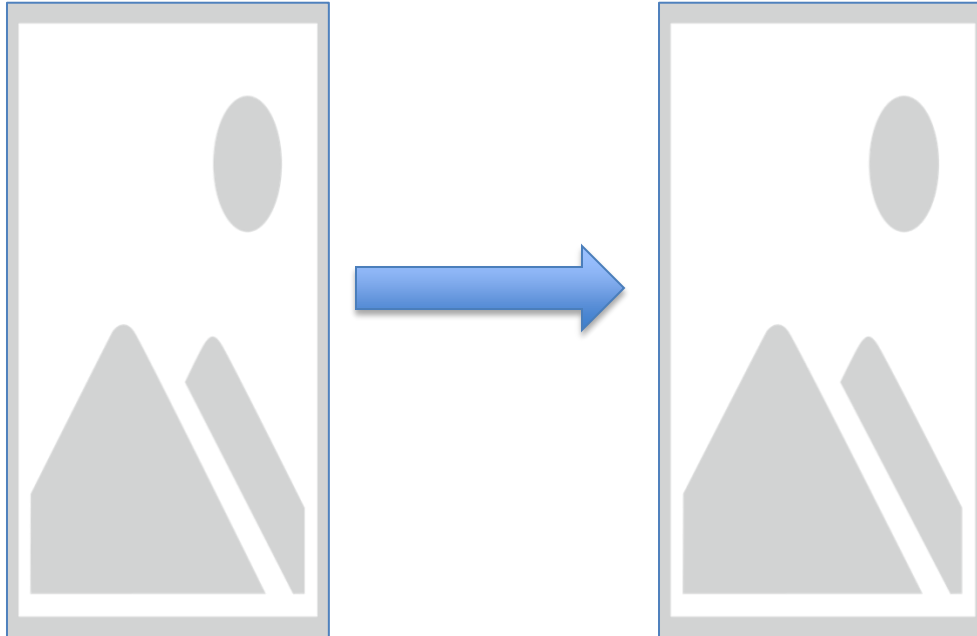
IMPORTANT: survey results for this lesson will be dependent upon the location where data is taken. The MAP feature will need to be added to the survey to collect location data. It is in the list of parameters in the image above.



Saving and publication are the last steps in the protocol, if other people will be collecting data for the survey, it is important to grant access, **Collaborate properties** must be adjusted. The survey can then be sent/shared with other collaborators.

Collecting Survey Data

Two options exist for Survey123 users when collecting data. Action can be taken using a URL to access the survey OR a user may download the Survey123 APP onto a mobile device. Both will require Arcgis Online log-in credentials for use. Searching in the APP for your survey needs to be done first, then the survey can be added to the app for use.



Using GIS to analyze collected data

Students can be directed to log into their Arcgis Online accounts once data collection is complete and return to the Survey123 section. Access the survey, click on Data in the green menu bar and “Open in Map Viewer” to begin using GIS for analysis work.

Data And Time Of Observation	DECIDUOUS or EVERGREEN Tree?	Tree Health Observation:
May 26, 2021, 12:45 AM	2	DEAD
	1	

Opening and displaying the data in the map viewer will allow users to add data relevant to the process of answering the research. Upon the completion of the GIS analysis, Web Maps must be SAVED and then SHARED (user sets the properties) to proceed to

the final lesson objective: creating a Storymap Application that presents the results of each survey's data analysis and answer(s) to the proposed research question.

Creating a Storymap

Open the map that was created and used in the analysis section above. Hit "SHARE," select "CREATE A WEB APP," and then "BUILD A STORYMAP" to commence work on the final lesson deliverable, the storymap application that displays the collected data, the GIS analysis via created maps, and subsequent discussion of results and research question answers. OR, once logged into Arcgis Online:

Click "New Story" and select the type of StoryMap you want to create. If you want the most flexibility, try "start from scratch." If you want a pre-set structure, try the other options.

Follow the prompts to add information to your storymap. Click the green plus sign to add other media, such as maps and videos, or more text to your story. When you are ready to share your story, don't forget to click publish!

