

Educator Guide

For the Get to Know GIS (for Secondary Students) Learning Plan

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Contents

Taking the courses	1
Accessing the web courses	1
Accessing ArcGIS Online.....	2
Course Teacher Tips.....	4
Tips for all courses	4
Exploring GIS Maps	6
Getting Information from a GIS Map	8
Using GIS to Solve Problems.....	10
Telling Stories with GIS Maps.....	12
Putting Your GIS Skills to Work	14

Taking the courses

To complete the web courses in the Get to Know GIS (for Secondary Students) learning plan, students must be able to access two resources:

- Esri Academy website (to access the web courses)
- Your school's ArcGIS Online organization (to access the GIS application)

Adults may use standard procedures to access and obtain ArcGIS user accounts. For students of minor age, however, you may need to choose options that protect students' personal information.

Accessing the web courses

When you launch one of the courses in the Get to Know GIS (for Secondary Students) learning plan, you have the option to sign in or to access the course anonymously (without signing in).

Anonymous access is the simplest option and the one that we recommend for minor students. With anonymous access:

- Students will not be prompted to sign in to Esri.com. Esri will not have personal information about students.
- Students who pass the course quizzes or exam will NOT receive the usual certificate of completion. In this case, you may want to find a different way for students to show you that they have passed the quizzes or to assess their learning.

You, the educator, and other adults might prefer to sign in to Esri.com when you take a course. When you sign in, we can track your progress through the course, and you can receive a certificate of completion that will be saved in your training history.

If you choose to have students sign in to Esri.com to access a course, keep these points in mind:

- You can take steps to enable students to use their ArcGIS Online organization credentials to sign in to Esri Training. (The ArcGIS Online organization

administrator can “Enable Esri Access” for each student account.) In this case, we recommend that you set up “generic” ArcGIS Online user accounts that do not include students’ personal information. You can read more about what is meant by a “generic” account and how to create them in the document, [ArcGIS Online Organizations for Schools and Clubs](#), page 12, and starting on page 26.

- Course certificates will show a student’s generic user name, not their actual name.
- Course certificates are associated with an Esri-enabled account until the ArcGIS Online account is no longer Esri-enabled, and the account is deleted. This means that if you reassign generic user accounts to other students, they will have access to any course certificates that a previous student earned. And, unless the password is changed, the previous student could continue using the ArcGIS Online and Esri accounts.

Accessing ArcGIS Online

This document assumes that you have already set up an ArcGIS Online organization for instructional use.

About ArcGIS Online for Schools

ArcGIS Online is a cloud-based GIS for using, creating, and sharing maps and apps. An ArcGIS Online organizational subscription is included in the [ArcGIS for Schools Bundle](#). The bundle of mapping software is available at no cost for instructional use to individual U.S. K12 schools, school districts, and states directly from Esri. Beyond the U.S., the bundle is available to schools worldwide through Esri’s network of international distributors.

Information about setting up and administering an ArcGIS Online organization is available in these resources:

- [Setting up ArcGIS for your school, a teacher's guide](#)
- [ArcGIS Online Organizations for Schools and Clubs](#) (in the [Esri K12 GIS Organization](#) resource portal)
- ArcGIS Online Help, in the [Administer](#) section

Students will need to sign in to their ArcGIS Online organization to save their maps and access certain GIS tools and resources. The following table indicates which courses in the learning plan use ArcGIS Online and for what purposes.

Course title	Why an ArcGIS Online organization user account is needed
Exploring GIS Maps	Save work
Getting Information from a GIS Map	Save work
Using GIS to Solve Problems	Perform analysis Save work
Telling Stories with GIS Maps	Access ArcGIS StoryMaps software Save work Share story (optional)
Putting Your GIS Skills to Work	Not used

Notes

- Adults can use an ArcGIS Online public account to complete *Exploring GIS Maps*, *Getting Information from a GIS Map*, and *Putting Your GIS Skills to Work*.
- Course exercises in *Using GIS to Solve Problems* and *Telling Stories with GIS Maps* require GIS tools that are available only to ArcGIS Online organization members. (Refer to the following *Course Teacher Tips* section for more information.)

Course Teacher Tips

The information in this section pertains to the courses included in the Get to Know GIS (for Secondary Students) learning plan:

Exploring GIS Maps
Getting Information from a GIS Map
Using GIS to Solve Problems
Telling Stories with GIS Maps
Putting Your GIS Skills to Work

The learning plan itself is simply a way to group and organize the courses. No Esri certificate is issued for completing the learning plan.

Tips for all courses

The following information pertains to all the web courses in the learning plan.

- The web courses are self-paced. Students may work independently to complete the material.
- We suggest that you complete the courses yourself before assigning them to students. You can test the computing environment, make sure that students have the prerequisite skills, and devise ways to introduce the material, engage students in discussion, and so on.
- Course exercises do not depend on completion of exercises in another course.
- The courses include videos. If students are working in a classroom environment, you may want to encourage students to use a headset or earbuds. Alternatively, you can arrange to watch the videos as a class.
- Keep in mind that the internet is a dynamic environment. While Esri strives to keep courses up to date, occasionally a link may break, or an ArcGIS Online interface may change.
- Each course includes a set of short quizzes. Quizzes are intended to be a self-check to aid in learning, not a rigorous assessment.

- Adult learners who are signed in to Esri Academy receive a digital certificate of completion when they complete a course. They can view or download the certificate from their My Learning Activity page.

Accessing Map Viewer Classic

In ArcGIS Online, students interact with ArcGIS Map Viewer. A new version of Map Viewer was released in spring 2021.

- Course exercises will continue to use the version called Map Viewer Classic until some point in 2022.
- There are several ways that students can access Map Viewer Classic.
 1. To open a map or layer from a search result or from My Content, click the More Options button (three dots at the bottom right of the item card) and choose Open in Map Viewer Classic.
 2. Students can go the App Gallery , located at the top right, next to their user name, and select Map Viewer Classic.

Exploring GIS Maps

Course description

In this course, students learn basic facts about maps and geographic information systems (GIS). Relatable examples convey how GIS maps and tools can help them and others understand the world, perform critical tasks, and make smarter decisions. Exercises have students explore satellite image maps of the United States and make their first map using a web-based GIS called ArcGIS Online.

Vocabulary

basemap: A map depicting locational reference information, such as landforms, roads, landmarks, and political boundaries.

feature: A representation of a real-world object on a map.

GIS: Geographic information system. GIS uses interactive maps to analyze data and help answer questions about the world.

layer: A collection of related features in a GIS map. The features in a layer usually have the same theme, geometry, and set of attributes.

For example, a GIS layer might use lines (geometry) to represent streets (theme) and include the name of each street (attribute).

scale: The ratio or relationship between a distance or area on a map and the corresponding distance or area on the ground. Scale is commonly expressed as a fraction or ratio.

Example: A scale of 1:1,000,000 means that 1 unit on the map equals 1 million units on the earth. In other words, 1 inch on the map shows 1 million inches on the earth (about 189 miles).

spatial analysis: The process of examining the locations, attributes, and relationships of features in spatial data to address a question or gain useful knowledge.

Activities for continued learning

To continue learning about GIS after completing the course, consider sharing these activities with your students.

Watch a video

- View [See What Others Can't](#).
- View the Series Trailer (5 minutes) or Episode 1 (13 minutes) of the [Geospatial Revolution](#) series produced by Pennsylvania State University and PBS. (Educator materials are available from the Resources tab.)
- View [What is Location Intelligence? \(2 minutes\)](#)
- View [Let Science Speak - Dr. Dawn Wright](#), Esri Chief Scientist (5 minutes).

Practice your skills

Keep exploring Imagery and other basemaps on ArcGIS Online. For practice, mark some places with map notes, and then save your map.

Are you wondering what places to look for? To get started, consider the following ideas:

- Interesting places in the region where you were born
- A town or city you would like to visit
- Your favorite entertainment venue
- A country on the other side of the world
- A place that is unlike where you are right now
- The bottom of the ocean
- The home stadium of your favorite sports team
- A place that you are curious about

Getting Information from a GIS Map

Course description

Maps created with GIS are interesting and often beautiful to look at, but they are more than just maps. GIS maps are windows into a database. In this course, students learn to access the data connected to map features to answer questions about the world.

Vocabulary

attribute: Nonspatial information about a geographic feature in a GIS, usually stored in a table and linked to the feature by a unique identifier. For example, attributes of a river might include its name, length, and the amount of solid matter, or sediment load, carried by the river and measured at a gauging station.

attribute table: A database or tabular file containing information about a set of geographic features, usually arranged so that each row represents a feature and each column represents one feature attribute. In a GIS, attribute tables are often joined or related to spatial data layers. You can use the attribute values in those tables to find, query, and symbolize features.

field: A column in a table that stores the values for a single attribute.

legend: The description of the types of features included in a map. Legends often use graphics of symbols or examples of features from the map with a written description of what each symbol or graphic represents.

style: An organized collection of predefined colors, symbols, properties of symbols, and map elements.

symbol: A graphic that represents a geographic feature or class of features. Symbols can look like what they represent (trees, railroads, theaters), or they can be abstract shapes (points, lines, areas) or characters. Symbols are usually explained in a map legend.

thematic map: A map designed to convey information about a single topic or theme, such as population density or geology.

Activities for continued learning

To continue learning about GIS after completing the course, consider sharing these activities with your students.

Practice your skills

Explore attribute tables and layer styling using attributes in ArcGIS Online. Use one of the maps that you made in this course to try the following ideas:

- Use the Hot Spots style for earthquakes. See how the map looks with different basemaps.
- Find the place where you live, and then measure the distance from that location to the nearest tectonic plate boundary or strong earthquake on the map.
- Open the attribute table for Major Cities, and then sort the table to locate the top 10 cities in the world by population.
- Style the Cascades Volcanoes layer using the Type attribute. Does the map show a pattern?

Explore an ArcGIS Online tutorial story map

To learn more about the topic of the course, explore one of the following tutorial story maps. (All of these story maps depict Map Viewer Classic, the same viewer that is used in the web courses.)

- [How to Smart Map - Overview](#)
- [How to Smart Map: Color](#)
- [How to Smart Map: Color and Size](#)
- [How to Smart Map with Clustering](#)
- [How to Smart Map: Heat Maps](#)
- [How to Smart Map: Relationships](#)

Using GIS to Solve Problems

Course description

Asking geographic questions is part of everyday life. However, many geographic questions are complex and require the power of a computer—and GIS technology—to answer them.

This course introduces a five-step process for investigating geographic questions. In the exercises, students use ArcGIS Online tools to solve a realistic community problem.

Student user account privileges

Course exercises use ArcGIS Online analysis tools. To complete the exercises, student user accounts require a Publisher role or a custom role that includes these privileges:

- Publish hosted feature layers
- Spatial analysis

Vocabulary

buffer: An area (polygon) that covers a given distance from a point, line, or area feature.

filter: A GIS operation that hides (but does not delete) features in a map or attribute table. Filters also define a subset of features for analysis.

geoprocessing: A GIS operation used to manipulate GIS data. A typical geoprocessing operation takes an input dataset, performs an operation on that dataset, and returns the result of the operation as an output dataset.

geoprocessing tool: An ArcGIS tool that can create or modify spatial data. Geoprocessing tools perform functions, including analysis (examples: find locations, buffer, find hot spots), data management (examples: dissolve boundaries, merge layers), and data conversion (example: export data).

query: A request to select features or records from a database. A query is often written as a statement or logical expression.

service credits: The currency for ArcGIS Online. ArcGIS Online consumes service credits when you use certain functions, such as spatial analysis, routing, and geocoding. Service credits are also referred to simply as credits.

spatial analysis: The process of examining the locations, attributes, and relationships of features in spatial data to address a question or gain useful knowledge.

workflow: A set of tasks carried out in a certain order to achieve a goal. For example, GIS tools may be used in a certain order to carry out an analysis.

Activities for continued learning

To continue learning about GIS after completing the course, consider sharing these activities with your students.

Watch a video

- Listen to students from Lurgan, Ireland, tell how they used ArcGIS to investigate lingering divisions in their community and find ways to grow peace. [Lurgan Schools: The Differences We Share](#) (26 minutes).
- Learn how two high school students from Hawaii are making a difference with GIS: [Mentoring the Next Generation](#). (14 minutes; the student presentation begins at 3:42).

Practice your skills

Build your skills with ArcGIS Online analysis tools. For example, make a copy of your Greshaw mural study map and try the following tasks:

- Create a half-mile buffer around the Existing Murals layer (using the Create Buffers tool).
- Find the suggested mural sites near elementary schools (you define the criteria).
- Find hot spots of suggested mural sites.

Practice your mapping skills by changing the style of one or more of the results layers that you created.

Telling Stories with GIS Maps

Course description

ArcGIS stories are a popular way to share information. They combine GIS maps with text, photos, videos, and interactivity to present a topic in the form of a web app. In this course, students review storytelling concepts, explore stories, and learn to create an ArcGIS story of their own.

Course exercise data

The course data contains image files (photos) for the story that students build in the course exercises. Because of the variety of educational computing environments and student devices, we have provided two different ways to download the course data.

- A zipped folder can be downloaded using a link in the course Overview tab or at the beginning of any course exercise. Once on the computer, the data must be unzipped (extracted). During the exercise, students must be able to browse to the data location.
- The images can be accessed from in the ArcGIS Online group, Yellowstone Lake Story Photos. Images can be downloaded one at a time using the web browser's save option. Or, students can copy an image to the clipboard and then paste it directly into the story draft.

Vocabulary

publish: Publishing is the process of making a draft story visible to a broader audience. During the publishing process, the following occurs:

- The story builder checks for issues related to the sharing of ArcGIS content used in the story.
- The story is made accessible to your selected audience: Private, My organization, Everyone (Public), or one or more Groups.
- For stories shared with Everyone, summary information about the story is made available to social media platforms.

web app: A software program that delivers information to the user through the World Wide Web, usually in a web browser. ArcGIS stories are web apps.

Activities for continued learning

To continue learning about GIS after completing the course, consider sharing these activities with your students.

Note

Esri's storytelling product is in transition. ArcGIS StoryMaps, which is used in this course, has replaced Esri Story Maps, which is now referred to as "classic story maps." Be aware that the two products have different websites and different galleries.

Practice your skills

Experiment with your Yellowstone Lake story map.

- Add more points of interest to the express map. Refer to the scanned brochure map provided in the exercise.
- Expand the story.
 1. Conduct online research about the Yellowstone Lake area.
 2. Write more narrative text to expand the story.
 3. Add it to your ArcGIS story.
 4. Preview and publish your story again.
- Experiment with different design themes.
 1. In the menu bar at the top of the story, click Design.
 2. In the Design panel, choose a different theme to quickly change the color scheme and fonts used in the story.
 3. To cancel your changes, close the Design panel, and then click the options menu (three dots to the right of Publish) and click Discard Unpublished Changes.
 4. To keep the changes, publish the story again.

Explore more stories

- Ask students to explore more stories in the [ArcGIS StoryMaps gallery](#). You may wish to give students free reign or specify a topic album or assign a particular story.
- If desired, ask students to share what they learned about the content and/or about the storytelling techniques that they encountered.

Putting Your GIS Skills to Work

Course description

GIS is more than a fun tool to explore maps—it is used by workers in thousands of organizations, and it can be the focus of a career. This course is intended to get students thinking about their future. In this course, students will find out where GIS professionals work, what they do, and how their educational choices prepare them for different types of jobs.

Vocabulary

geospatial technology: A set of technological approaches, such as GIS, photogrammetry, and remote sensing, for acquiring and manipulating geographic data.

metadata: Information that describes the content, quality, condition, origin, and other characteristics of data or other pieces of information.

Activities for continued learning

To continue learning about GIS and careers after completing the course, consider sharing these activities with your students.

Watch another geospatial career video

View more geospatial career videos on [Explore Careers in GIS](#), produced by Virtual Job Shadow in partnership with Esri. In addition to the videos in the course, videos are available for these GIS careers:

- Climate scientist
- App developer
- Helicopter pilot - firefighter
- Conservationist
- Health geographer
- Civil engineer
- Volcanologist
- Research geographer
- GIS agricultural analyst
- GIS Developer/Drone pilot

View the video, [Let Science Speak - Dr. Dawn Wright](#), Esri Chief Scientist.

Explore more GIS career and job websites

Use these websites to explore the many disciplines and careers that use geographic information systems. Explore real job postings to see which organizations use GIS in your region.

Career information

- [URISA career page](#) (Urban and Regional Information Systems Association)
- [AAG career page](#) (American Association of Geographers)
- [AGU Career Center](#) (American Geophysical Union)

Job information

- [The GIS Jobs Clearinghouse](#)
- [GISjobs.com](#)
- [Geojobs.org](#)
- O*NET OnLine ([GIS](#) search; [geospatial](#) search)
- [GIS Lounge](#)

Research scholarships in geospatial technology

Look for scholarships for geospatial technology studies on websites such as [CollegeScholarships.org](#).