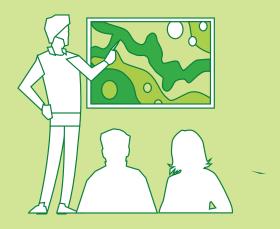


Teach with GIS Implementation Guide

For the classroom



By Kathryn Keranen, Lyn Malone, and Michael Wagner

TeachWithGIS.com



Task checklist

TASK	COMPLETE
1. Getting Started Learn Path for Teachers	
2. Tips and Tricks for a GIS-enabled Classroom	
3. How to use the GIS Curriculum Builder	
4. ArcGIS Organization Management for a Classro	om 🗌
5. Additional Resources	
6. FAQs	

*If you do not have ArcGIS, request your free Schools Mapping Software Bundle Here

*If you are ready to start searching for lessons, visit the GIS Curriculum Builder



1. Getting Started Learn Path for Teachers

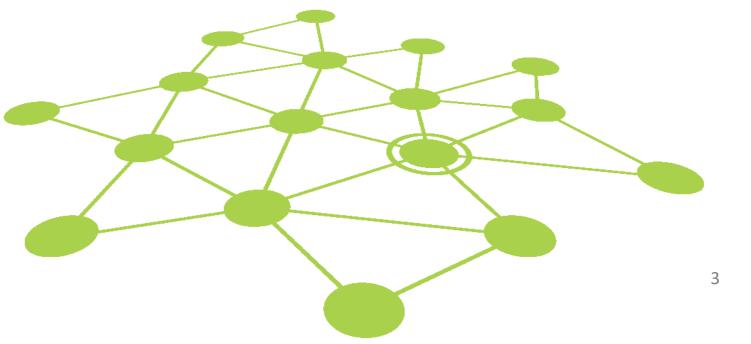
This implementation guide has user-friendly activities and resources to help you develop a geospatial toolkit for your classroom. It is a guide for building your own GIS skills and beginning the process of integrating geospatial technologies across your teaching practice.

If you are new to mapping and GIS, start by simply making a map. The first activities provide guided practice in skills that you'll utilize again and again as you employ GIS to explore global and community issues. The activities are quick, easy, and fun. You can take as much or as little time as you wish. Use these activities as a personal tutorial to build your own skillset or use them as instructional activities for your students — they work both ways. To get started on building your foundation of skills, try this getting started learning path:

• Getting Started Learn Path for Teachers

If you are already a skilled ArcGIS Online user, use the Skill-Builders for a quick review or start searching a gallery of hands-on exercises in the Curriculum Builder.

If you are ready to start managing and configuring your organization, jump to ArcGIS Organization Management for a Classroom.



2. Tips and tricks for a GIS-enabled classroom

A classroom that integrates geospatial problem-solving tools across all its teaching and learning practices is a GIS-enabled classroom. Teachers at every level are making this their goal because a GIS-enabled classroom:

- Develops problem-solving skills
- Cultivates critical thinking skills
- Fosters data literacy skills
- Employs cutting-edge technology to address real-world problems
- Supports collaborative learning
- Encourages the transference of learning across a range of academic disciplines
- Produces active and engaging learning experiences for students
- Is lively and fun

This section of the GIS On-ramp reflects some of the best practices and successful strategies that have helped other teachers achieve their goal of creating a GIS-enabled classroom. Consider this a very small sample of possibilities rather than an all-inclusive directive.

1. Assessment

How you leverage maps and GIS in your classroom will depend on the goals and outcomes you have for your students. Here are a variety of ways that you can assess their comprehension of GIS concepts:

• **Static maps:** ArcGIS Online maps can be exported as PDF files and used in printed or digital reports and PowerPoint presentations.

- **Map of proof:** Design a web map to convey an opinion or to advocate for change. For example, create a map to convince others of the vulnerability of site locations, or use a map to show how a location has changed over time. The two lessons below can be found in the Curriculum Builder and get you started on maps of proof.
 - How far can you see?
 - Layering contemporary imagery with a historical map
- **Backward design:** Backward design is a method used in educational curriculum development. In web mapping, it involves presenting the learner with a finished map and requiring them to duplicate the map as an assessment.
- **Quantitative results:** A map can be used to derive or retrieve quantitative measurements such as acreage, area, and population. An assessment can be based on the ability to correctly derive quantitative results to a query.

Below are just a few of the lessons that can be evaluated with quantitative results. They can be accessed through the Curriculum Builder:

- Obtaining information from imagery: Measuring the Rondonia rain forest
- o Zaatari refugee camp
- Advanced: Web AppBuilder: As students advance, introduce Web AppBuilder to allow them to create custom, map-based apps with ready-to-use widgets. The lesson below gives basic instructions on using Web AppBuilder.
 - o Measuring WiFi using the Web AppBuilder

2. Seizing the teachable moment

• **GeoNews**: GeoNews is a presentation that combines current events with geospatial technology. It offers a geospatial focus for a wide range of subjects and can provide

real-world connections to many curriculum areas. It affords students the opportunity to look at geospatial news at all levels: global, regional, and local. GeoNews presentations can be either teacher or student generated.

Try this exercise:

- Current Events in 3D: Using a Virtual Globe to Broadcast the News to see how GeoNews can be applied to a spatial problem.
- Using live data: Esri provides layers of live feeds accessible in the ArcGIS Online Living Atlas. Live feeds provide data in near real-time enabling students to observe and analyze phenomena as they occur. Live feeds can be added to maps, story maps, and web applications provided you are signed in to an ArcGIS account. The Living Atlas provides the following live feeds:
 - Wildfires Weather warning and watches • Hot spots Current wind and • Earthquakes weather conditions • Stream gauges Storm reports Short-term weather warnings • Active hurricane/tropical • World traffic services cyclones o Recent hurricanes/tropical cyclones

Try this exercise, to put live data to work: Real Time Data: National Atlas

3. Story Maps

Everyone has a story to tell. Harness the power of maps to tell yours. Combine interactive maps and 3D scenes with narrative text and rich multimedia content to weave stories that get noticed.

Story maps are an extraordinary educational tool with limitless classroom possibilities. With them, students can describe places, explore change over time, recount history, investigate environmental issues, or write about virtually any other topic they choose. Story maps foster the development of strong communication skills through their ability to combine the spatial visualization of maps with text, photographs, audio, and video data.

Note: Be sure that your students have learned the basic concept of GIS before introducing story maps. It is best to have students produce geospatially accurate maps, using layers of data first, before beginning the story map adventure. Remind the students that the map is the storyteller, not just an illustration for their narrative.

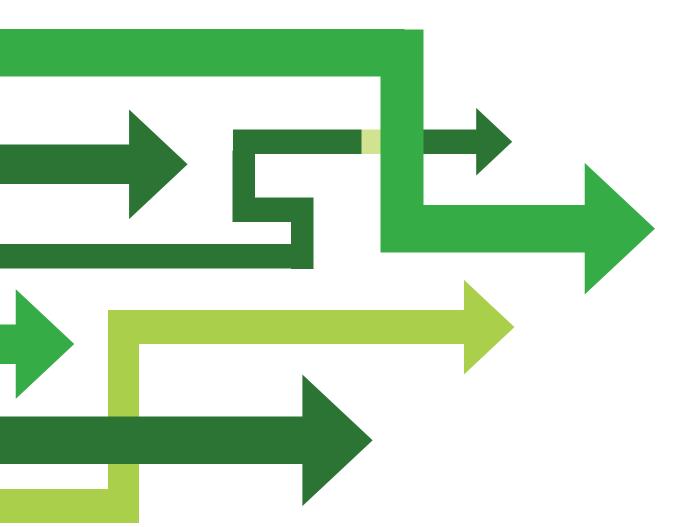
Try this lesson Create a Basic Story Map: Disease Investigations

• **Student presentations**: Story Maps are ideal media for the presentation of student work — particularly the final presentation of a project. Esri provides a series of ready-made and easy-to-follow templates to create story maps. After creating just a few Story Maps with these templates, students will be able to identify the best story map template for their needs. The templates can be accessed from the Story Maps Apps page.

Each template includes a builder (to fill in the template), an overview with further links, a gallery of examples, a tutorial, and FAQs about that template. Introduce your students to the concept of story maps with the Story Maps Gallery. Several lessons in the Curriculum Builder provide practice in creating story maps of different types.

- o Create a Swipe Story Map: Graduation Rates and Unemployment
- Create a Map Series: Cities Through Time
- Create a spyglass story map: Washington, D.C. 1851 and Today
- **Instructional:** Instructors can use story maps as a tool for instruction. This is a unique way to give instructions while exposing the learner to a tool.
- **Class collaboration:** A group of students can work together to create a collaboration story map. This method consists of two parts. Part one is assigning a student a specific map, while part two consists of having someone in the group act as the technical production manager to put all the maps into one story map. The

Chesapeake Bay Land Use lesson could be implemented in this way with each state being assigned to a specific student.



3. How to use the GIS Curriculum Builder

The Curriculum Builder enables you to create your own collection of GIS-enabled exercises for students. In the Curriculum Builder, you can explore, preview, and download classroom-ready lessons. The Curriculum Builder has over 90 lessons available, and more are being added all the time. Structured as a filtered database, the lessons are categorized and tagged, enabling you to identify the lessons that best fit your needs.

The filtering system in the Curriculum Builder is based on four variables. The following table identifies those variables.

Experience Level	Capabilities	Account Required	Subject
First (Beginner)	Visualization	No Account Required	Science
Second (Intermediate)	Analysis	Account Required	Social Studies
Third (Advanced)	Imagery Data Collection Time Enabled 3D Story Map Creating Apps		

Activities and follow-up questions

The Curriculum Builder also includes 10-unit modules with introductory activities and questions for reading comprehension, reflection, and discussion.

Answer key for activities and follow-up questions

Click here to download the answer key for the activities and questions in each unit.

Find the exercises you need in the curriculum builder

Explore the Curriculum Builder						
Select exercises that fit the experience-level and subject matter of your class. All of the lessons are free to download and share.						
Carachi						
Search:	me or keyword like 'Get start	ed'				
Filter by:						
All levels \$	All capabilities	All subjects	Any account requirement 🗢	Reset		

- Search: In addition to the filtered access to the lessons, you can search the lesson database by specific tags that have been selected to provide more detailed information about the lesson. For example, a search for the tag "earthquakes" would identify lessons that are about earthquakes. Below is an illustration of the filter interface.
- **Experience Level:** The most fluid and generalized variable. The lessons that are designated as Beginner provide the user with experience implementing basic software functions in a wide range of contexts. The Advanced lessons emphasize the software's analytical functions in the context of increasingly complex subject matter.
- Capabilities:
 - **3D GIS** can be visualized using the 3D Scene Viewer. The 3D Scene Viewer allows the user to create and interact with 3D maps.
 - Data Collection and Management can be performed in a variety of ways. Two field data collection tools are in the builder: Collector and Survey123. Both apps enable users to collaboratively collect data in the field, allowing GIS to go with us on our smartphones anywhere.
 - **Imagery and Remote Sensing** can be used as a layer to collect quantitative data, as a layer with spectral information, or as a basemap.
 - **Mapping and Visualization,** allows you to explore and vary the way data is displayed using maps. Using symbols, transparency, and different types of classification, your students can present data by many compelling means.

- **Real Time GIS** is live data that can be streamed in from a variety of open sources around the world.
- Sharing and Collaboration allow users to combine maps with narrative text, images, and multimedia content in interactive web apps. The ArcGIS Online App Builder allows users to build unique and specific 2D and 3D web apps.
- Spatial Analytics allows the use of special tools to quantify patterns and relationships in the data and to display the results as maps, tables, or charts. One of the characteristics of analysis is, in most instances, the creation of new data.
- Account Requirements: Refers to software access—specifically, whether the learner will require access to an ArcGIS login. Remember, being a member of an organizational account provides you with access to rich software functionality. However, exercises that do not require an account are instantly available and provide a pathway to begin your exploration of GIS.
- **Subject Matter:** Identifies the best-fit content area for the lesson. Keep in mind, however, that these lessons are very flexible and may fit neatly into multiple curriculum categories. A lesson that fits well in a history class may be just as appropriate for earth science under some circumstances.



4. ArcGIS Organization Management for a Classroom

ArcGIS Online is a formidable yet user-friendly tool for anyone to make maps and display data. However, its power expands exponentially when you combine it with membership in an ArcGIS Online organizational account. An organizational account enables you to save and share your work in many ways and provides access to a multitude of additional mapping and analysis capabilities. Although there are activities in this implementation guide that you can complete without being signed in to an organizational account, we recommend that you get one to experience the power of GIS. You'll be glad you did!

If you do not have an organizational account already, there are two ways to obtain one:

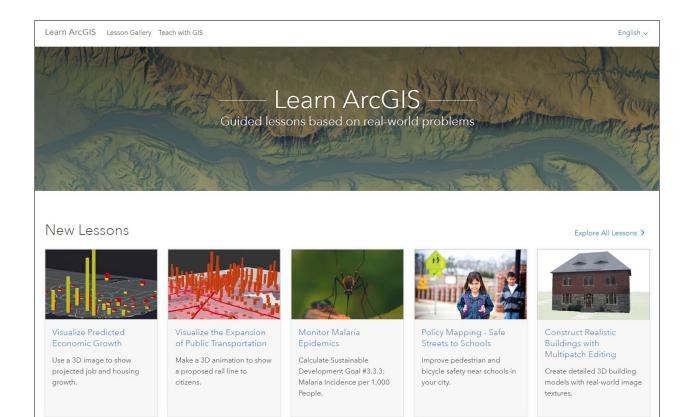
- Esri Schools Mapping Software Bundle: The ArcGIS for Schools Bundle is available at no cost for instructional use to individual U.S. K–12 classrooms, schools, libraries, and districts. Beyond the United States, the bundle is available to schools worldwide through Esri's network of international distributors. Every public school, private school, home school, and youth service club is eligible. The software bundle includes the following:
 - ArcGIS Online organizational and user accounts for teachers and students
 - Ready-to-use web and mobile apps
 - ArcGIS Desktop Advanced licenses
 - Option of 50, 500, 2000, or 10,000 named users (Class, School, District)

Click here to request an ArcGIS Mapping Software Bundle for your school

• Learn ArcGIS: If you're not ready to request your own ArcGIS Organization yet, but would like to try doing GIS, you can also become a member of Learn ArcGIS for 60 days.

The Learn ArcGIS organization is a sandbox for students, teachers, and others just getting started with ArcGIS. All the lessons, data, and web maps on Learn ArcGIS are free and publicly available. If you become a member, immediately begin to use maps, explore data, and share maps to the web. A Learn account is a quick and easy way to experience web GIS through real-world, problem-solving scenarios.





Activate your subscription

ArcGIS Online is cloud-based mapping and analytics software that you can access via a website. You can configure a customized experience that makes sense for your school. For example, you set the security and sharing policies, assign privileges and credits to members based on the work they need to do, and configure your home page and gallery to reflect your school or district. You can also integrate your enterprise single sign-on system.

Main components

A subscription to ArcGIS Online includes the following main components:

- Home page: Your home page will be many people's first impression of your site. Include an appealing banner and your own logo or school symbol, feature your best maps and apps, and provide descriptions, links, or resources to help people get the most out of your site.
- **Groups:** Groups are a way to organize your members and content around different classes, subjects, specific projects, workflows, and initiatives. You can set up groups to allow access to specific items based on your organization's structure.

- **Members:** Add new users (your students or colleagues) to ArcGIS Online by inviting them to join or adding them directly. You can add members in bulk or one at a time. You can set up their accounts for them, let them create their own accounts, or use your existing enterprise single sign-on login system.
- **Content:** ArcGIS Online includes everything you need to create maps, apps, and layers. It also provides resources to effectively store, categorize, edit, and share what you've created.

Tips

You'll need to decide three things when you first set up ArcGIS Online:

- A name for your ArcGIS Online site: The organization name is what appears in the banner on the home page. You should choose a distinct and accurate name that represents your school, since the home page can be public facing and has the capability to display student and teacher work.
- A short name: The short names appear in the URL link to your ArcGIS Online site (for example, sample-org-name.maps.arcgis.com). Carefully consider the name you want to use. You can change it later, but you may need to manually update the URLs of some of your content.
- Administrative contact: Consider having a few administrators as points of contact. These administrators and their email addresses are listed in automatic emails sent from ArcGIS Online when members request password resets, help with their user names, modifications to their accounts, or any issues related to the allocation of credits to their accounts. Contacts also get email notifications about the subscription.

Learn how to activate your subscription

Set up your home page

You'll want to configure ArcGIS Online to meet your school and classroom needs. For example, you can specify whether members can search for and share content outside the organization. Some configuration is done as part of the subscription activation—for example, setting up your organization's URL. As you get started, focus on the appearance of your home page and the security settings of the site.

Customize the appearance

Think about your institution and how to best represent it on your site. Here are a few recommendations for creating an effective home page:

- Make your home page professional looking and well organized. Use a custom banner and logo and provide information about the purpose of your site.
- Showcase your best maps and apps as featured content on your home page.

Learn how to set up your home page.

Security considerations

ArcGIS Online is a secure, reliable, and flexible site. You can configure the privacy and security controls that make sense for your organization. For example, you can configure the password policy, including the password length, complexity, and history requirements. You can choose to allow members to share content outside your organization or only allow sharing within the organization. You can also set up enterprise logins and multifactor authentication.

Esri recommends you allow access to ArcGIS Online, data, and all other assets through HTTPS only. This helps protect your information.

• Learn how to set up your security policies.

You can also review ArcGIS Trust Center for additional details about security, privacy, and compliance.

Personally Identifiable Information (PII)

It is strongly recommended to minimize the sharing of students personally identifiable information (PII). You can avoid issues (legal or otherwise) with sharing student information with the following considerations:

Use a generic admin email when creating logins

An email is required when creating accounts for your students, so you will want to use either the teacher's email address or a generic admin email account. If one of your students forgets their password, this will allow you to reset it for them. If you decide to use your teacher email and you are creating batch accounts, we recommend you select the do not send notification email option to avoid being overwhelmed with notifications.

Create anonymous logins

Use a combination of sequential numbers, school, or class name for each account to generate unique user names.

Create groups

Groups are a way to organize items you want to share with members of your organization and with the public. You can set up groups that are private and by invitation only, or public groups that are open to everyone. With a little bit of planning, you can use groups as a tool to support your workflows and ensure that finished content is shared with the intended audience. For example, you can create a working group and a broadcast group for items related to a project. The working group can be a private group used for sharing in-progress work. The broadcast group can be a public group used for sharing finished content with everyone.

You can also use groups to feature content on the home page and gallery and build custom galleries for basemaps and apps.

• Learn how to create groups.

Add members

ArcGIS Online has a flexible system for adding users, called members, to your subscription. You can add members automatically or invite them to join your organization. You can add and invite members one at a time, or you can upload a file and add and invite members in bulk. You can enable your existing single sign-on enterprise login system, set up member accounts yourself, or let members create their own accounts. As part of the invitation process, you also assign roles.

- Learn how to add members.
- Add a batch of students in 5 steps.

Best practices for adding members

Below are some best practices for adding members. Most can be done as part of the invitation process.

- **Configure enterprise logins:** If your organization uses a single sign-on system, enable enterprise logins. This lets members sign in to ArcGIS Online with the same credentials they use in their enterprise system. Learn how to configure enterprise logins.
- Assign user types: User types determine the privileges and apps you can give members. There are five user types—Viewer, Editor, Field Worker, Creator, and GIS Professional. You should assign user types based on the members' needs and requirements. For example, Creators have access to all the capabilities in ArcGIS Online and most of the apps, while Viewers can only view items that are shared with them and have access to a small set of apps. Learn more about user types.
- Select roles: Consider the privileges each member needs. You assign privileges through a default or custom role. There are four default roles—Viewer, Data Editor, User, Publisher, and Administrator. You can also create custom roles based on the specific privileges you want that role to have. Every subscription must have at least one administrator. Learn how to configure custom roles.
- Automatically add members to groups: Specify the groups you want members to join. Members are added automatically without needing to request membership or accept an invitation. Learn how to add members to groups.
- Allocate a credit budget: You can manage member credit usage by setting a specified number of credits that the member can use. Learn how to allocate credit budgets.
- **Esri access:** Enable Esri access if you want members to use other Esri websites or to manage their email communications from Esri. Learn how to enable Esri access.
- Assign app licenses: ArcGIS includes a wide range of apps. Many come with your subscription and others can be purchased separately. For purchased apps, you assign licenses to specific members. Learn how to assign app licenses.

Managing Licenses for Your Organization

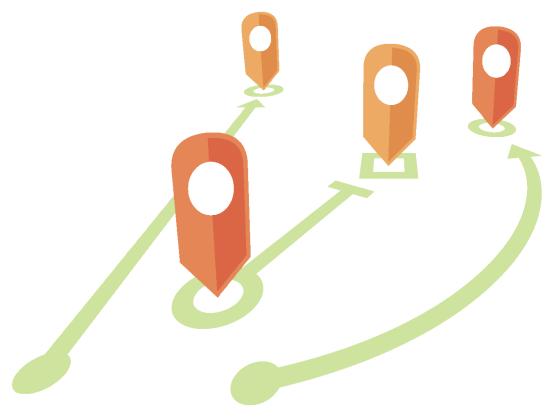
With every ArcGIS Online Organizational account, users have access to Esri's ArcGIS Pro and many other useful products. To access certain ArcGIS tools and products, you as the administrator need to assign a license to the user. A description of these additional products can be found here.

1. To issue a license for these products, under the Organization tab, click on Licenses.

You will see a list of products across the top with the number of licenses available and how many are still available (have not been assigned to a user). These products are associated with ArcGIS Pro, as indicated by the ArcGIS Pro tab being highlighted above the list of products. If you select the Additional Products tab, you will see a list of products that are available within ArcGIS Online.

2. Below the list of products, you will see a list of users in the organization.

To assign a license or set of licenses to All members, simply use the Select All link and select the license or licenses you would like to assign. For assigning licenses to individual users, use the Configure licenses link next to the individual member's name.



Create content

ArcGIS Online includes everything you need to create and share maps, scenes, apps, and layers. You can add existing content such as spreadsheets and ArcGIS Server services, and create new content such as maps, apps, and hosted web layers.

Consider how your content will be used and optimize it for the best experience. For example, refine layers with appropriate transparency, scale ranges, and labels; configure pop-ups in your maps; and create multiple views of your feature layers with different access and editing properties.

Create complete details so the item is easy to find and use. Designate items as authoritative when you want to promote them as reliable and boost them in search results. Set up content categories for your organization and groups so the content is easy to discover.

Tips

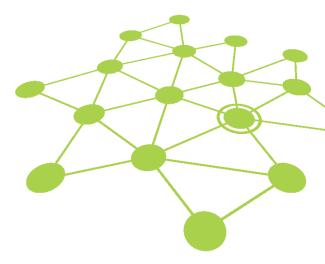
- Quickly create a new map by combining a basemap with your data and applying smart defaults to style the map. Learn how to create maps.
- Access a wide variety of templates and widgets to create focused web apps. Learn how to create apps.
- Use templates to create new layers that you can use in your maps and apps to collect data. Learn how to create new feature layers.
- When you save or add your content to ArcGIS Online, it's stored as an item and assigned a type. For example, when you save a map, it's stored as an item in My Content as a type of web map. Learn how to add items.
- Each item includes a page with information, actions, options, and settings. Use the page to learn more about and interact with the item. Learn how to use item pages.
- You can organize group content and content across your organization in content categories. Learn how to use content categories.
- Once you've added content, you can share it with groups, the organization, or everyone. Learn how to share content.

• If your map is picked up by social media and is viewed by thousands or millions of users at once, you'll want the map to load as quickly as possible. Learn how to optimize maps for high demand.

Featured Content

As administrator of the organization, you can choose to display teacher or student work on the home page of your organization. As a public-facing site, this could be a great way to show student work to the community. A specific group is used to access featured content for display. You must first create a group to populate with work. To access the feature content options:

- In the Organization tab, select Edit Settings
- Click on the Home Page tab
- Choose the group you would like displayed



Gallery

Another way to show off student work is by using a gallery. As with the featured content on the home page, a gallery pulls work from a group. You can set up a group specifically for adding content that you want featured in the gallery, or you can point the gallery to a group that already exists. A gallery is a great way to feature the work for your class after they finish a project, as well as to rotate the group featured in the gallery among different classes.

Tip: Think of the featured content as a sample of all the work being done in your school, and the gallery as a way to feature all students in a class, subject, or grade level.

Learn more

As an administrator, you're responsible for setting up ArcGIS Online. It's equally important to maintain members, items, and groups to keep your organization uncluttered and up to date. The resources in this section can help you with these maintenance tasks. They also help you learn more about ArcGIS Online.

Monitor activity

Access activity-based metrics and real-time usage reports to help monitor content and members. Item reports illustrate how users are creating, using, and sharing geographic content. Member reports reveal how users are contributing to ArcGIS Online. Group reports provide a sense of active collaborations across and within organizations. Learn how to use activity reports.

Credit usage

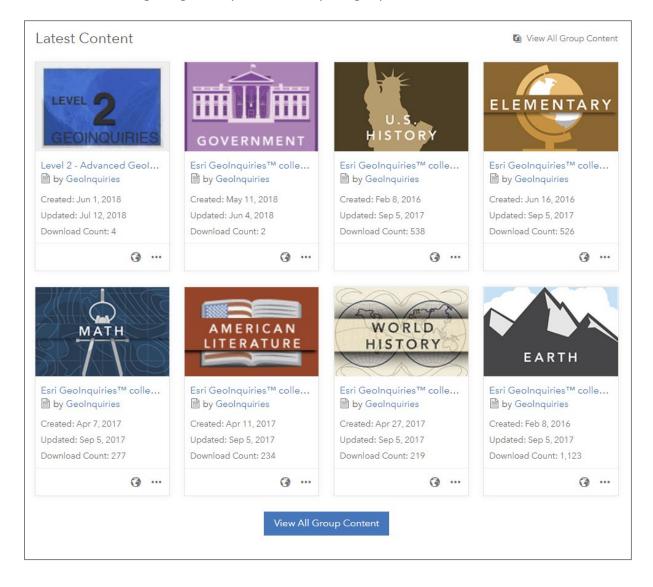
ArcGIS Online is a paid subscription service. Esri assigns each subscription service credits that act as currency. You use credits when using certain content, analytical functions, and data storage. You can enable credit budgeting to manage credits for transaction-based services and tools such as spatial analysis. Assign a flexible allocation of credits to some or all organization members or set a default allocation for new members. Learn more about credit usage.



5. Additional resources

- ArcGIS Online help is a key resource for learning how to use the software in general and to perform specific tasks. It also includes best practices for organization maintenance, what's new, troubleshooting, and FAQ.
- The Learn ArcGIS gallery includes a collection of lessons, articles, story maps, and videos that help you learn about ArcGIS. It also includes paths of related resources about a specific topic such as administration.
- The GIS community, including Esri, shares thousands of ready-to-use authoritative datasets in ArcGIS Living Atlas of the World. Living Atlas covers everything from historical census data to environmental conditions derived from live sensor networks and earth observations.
- ArcGIS API for Python can help you expedite and maintain administrative tasks. For example, use the API to set up the folder structure in My Content. You can also use it to update URLs for service or app items.
- ArcGIS Marketplace includes solutions from Esri partners to help with administrative tasks.
- Get the latest information on service availability from ArcGIS Online Status.
- Story Maps Resource page: Story maps use geography as a means of organizing and presenting information. They tell the story of a place, event, issue, trend, or pattern in a geographic context. They combine interactive maps with other rich content—text, photos, illustrations, video, and audio—within intuitive user experiences.

While many story maps are designed for general, nontechnical audiences, some story maps can also serve highly specialized audiences (for example, for briefing the president). They use the tools of GIS, and often present the results of spatial analysis, but don't require their users to have any special knowledge or skills in GIS. This has resulted in a veritable explosion of story maps. (Go to storymaps.arcgis.com to see them come alive.) As you click through to the various story maps linked in this chapter or at the Story Maps website, take the time to immerse yourself in the various narratives. These are information products that reward exploration. • Esri GeoInquiries for schools: GeoInquiries are short, standards-based inquiry activities for teaching map-based concepts found in commonly used textbooks. These lessons are intended for use in front of class instruction, or the goal of teaching GIS goes beyond the computing capabilities available to the students.



6. FAQ

Can I try ArcGIS Online before requesting the software bundle?

Yes. If you don't have an account yet, you can join the Learn ArcGIS organization for a free 60day membership. Getting a Learn account is an easy way to explore mapping and analysis, but your content is deleted after 60 days and you won't be able to configure the organization. To try setting up and configuring ArcGIS Online, you can get a free trial. With a trial, you act as the administrator.

Can I add more members or credits at any time?

Yes. ArcGIS Online subscriptions have the flexibility to grow with your organization. You can add more members or credits at any time.

How can I provide feedback about this guide?

You can take the guide survey or send an email message to arcgis-guides-feedback@esri.com.

Where can I get answers to more questions?

- Read the ArcGIS Online FAQ, explore GeoNet discussions, or contact Esri.
- For questions about the Schools Mapping Software Bundle, contact k12schools@esri.com.
- For questions about ArcGIS software, visit Esri Technical Support.
- For questions about software orders, downloads, and account and license management, contact Esri Customer Support.

