

EXERCISE 1

Arcade Basics and Labels



Introduction

The Arcade expression language in ArcGIS can be used for many purposes. Arcade was designed to support creating custom visualizations, labeling expressions, and pop-up windows in ArcGIS applications across multiple platforms.

Arcade profiles are a set of capabilities that demonstrate what the language supports and the context in which expressions can be executed. For more information about expressions being used as inputs, see the ArcGIS Arcade Guide: [Profiles](#).

The ArcGIS Arcade Playground web application provides an environment to construct and test Arcade expressions for different use cases.

Objectives

- Explore Arcade syntax in the Arcade Playground
- Create a label with an Arcade expression

Prerequisites

- ArcGIS Online Organizational Account
 - User role or [equivalent](#)

If your role doesn't have the privileges of a User role, you must submit a ticket through the [USFS AGOL Account Request/Upgrade](#) to get your role changed by your R\S\A AGOL Administrator(s).



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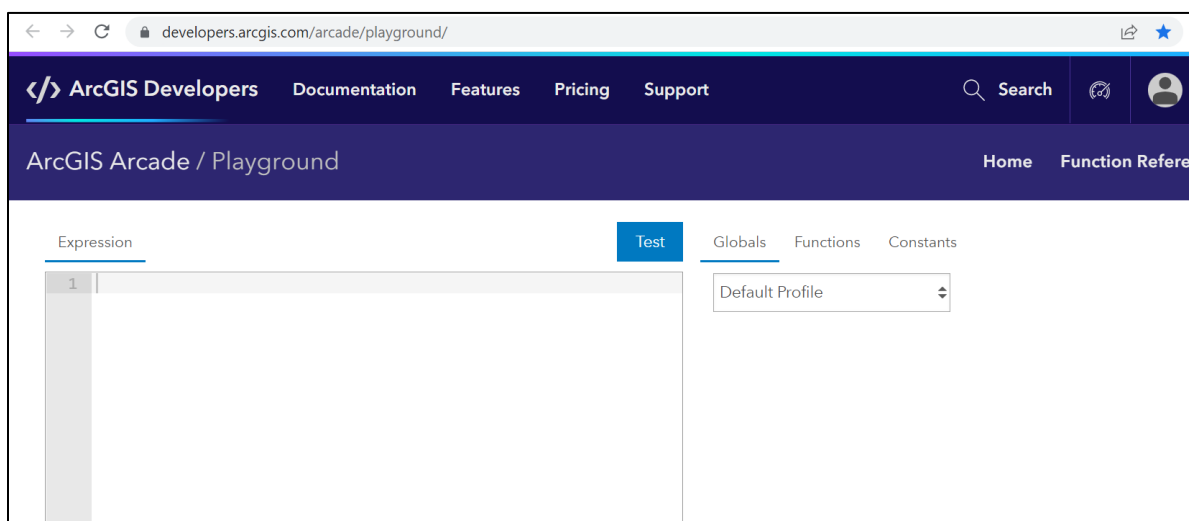
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Part 1: Use Arcade Playground to explore profiles

In ArcGIS Online and ArcGIS Pro, Arcade expressions are created and saved using an expression editor; but Arcade expressions can be created in any text editor. However, the ArcGIS Arcade Playground provides an environment to create and test simple expressions using an intuitive user interface. Expressions can also be used as input parameters for geoprocessing or large data and analytics tools. In this section, you will use the Arcade Playground to explore the built-in features when creating an Arcade expression.

A. Open the ArcGIS Arcade Playground

1. Open a browser and go to <https://developers.arcgis.com/arcade/playground/>.



The Arcade Playground opens with an Expression editor. To the right of the Expression editor are tabs that you can explore and use for each profile: Globals, Functions, and Constants.

B. Explore the Labeling profile

In this step, you will explore the Labeling profile in the Arcade Playground. This profile is created to assist in the creation of custom labels. These labels can be used in ArcGIS Pro and ArcGIS Online maps.

1. If necessary, click the **Globals** tab.
2. Click the dropdown menu and change it from Default Profile to **Labeling**.

Globals can reference data in your map or datastore. All global variables are preceded by a \$. The Arcade language has global variables for each profile that access features and data layers in a map, as well as other important values. The Arcade Playground provides an easy interface that helps the user build expressions that use global variables relevant for each profile.

In the Globals section there are three values: Field: name1, Field: name2, and Geometry. The global variable is \$feature. Remember that all global variables start with a \$.

Because the Arcade Playground does not reference actual maps or layers, the underlying values are sample data values that can be modified.

- Below Field: name, click **\$feature.name1** to add it to the Expression editor box.

The global variable consists of \$feature, which indicates that you will be referencing a feature layer. The .name1 refers to the field name that you will be accessing in the feature layer. For this example, the field is called name1.

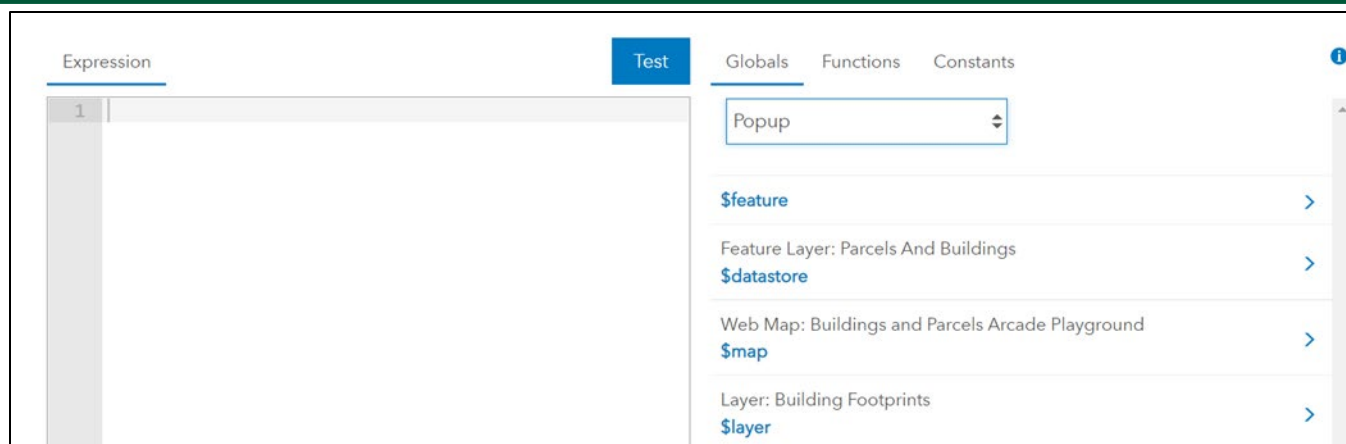
- Click **Test**.
- Notice the **Results** and **Messages** tabs that open below the Expression editor. The text shows value1 as the result of the expression. This result is the default value within the playground. It can be modified by clicking the **Edit** button to the right of the global variables. You can enter any value to represent your desired data in the sample expression.

- In the Globals section, for **\$feature.name1**, click the **Edit** button.
- In the text field, delete value1, type **Coniferous Trees**, and click **Back**.
- Click **Test**. The Result Value should now be Coniferous Trees.
- In the Expression editor, highlight and delete **\$feature.name1**.

C. Explore the Popup profile

In this step, you will explore the Popup profile to notice the similarities and differences between the Labeling profile.

- On the **Globals** tab, click the **Labeling** profile and choose **Popup**.



Notice the available global variables are now `$feature`, `$datastore`, `$map`, and `$layer`. These variables represent layers that might appear in a web map about parcels and buildings. Because pop-up windows are different than labels and can use information from any layer within a map, these variables are different to provide samples that reflect that difference.

The samples represent different layers of access to the data available to be used in the pop-up window, including the specific layer chosen for the pop-up represented by `$feature`, an additional layer not in the map represented by `$datastore`, the remaining layers in the web map represented by `$map`, and another layer in the map represented by `$layer`.

Later, you will learn about `FeatureSets`, which are used to access this data in different ways.

2. Next to `$feature`, click the **blue arrow** to expand the feature.

For each field listed, the field is recognized with dot notation; so, for the Building Height field, the Arcade reference is `$feature.BLDGHEIGHT`.

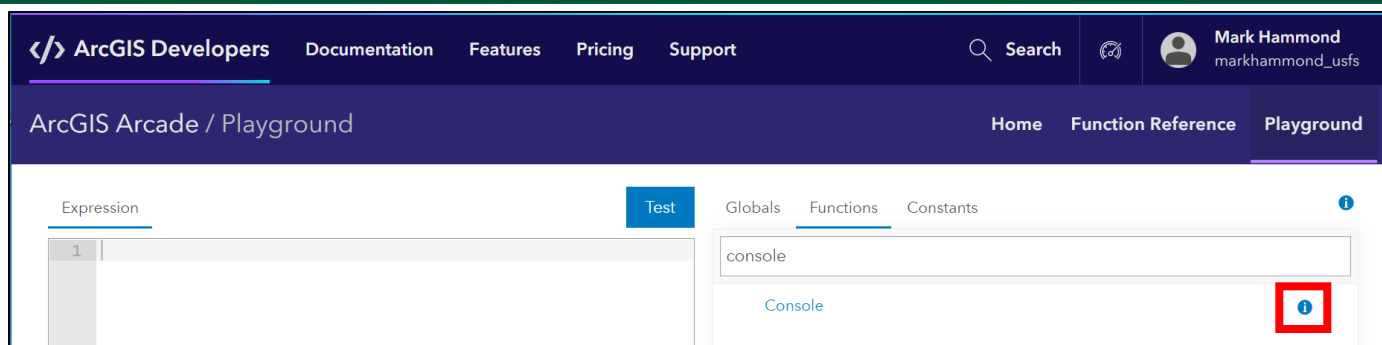
The sample fields are also editable, allowing you to simulate the dataset that you are looking to use in your expression.

3. Click **Back**.

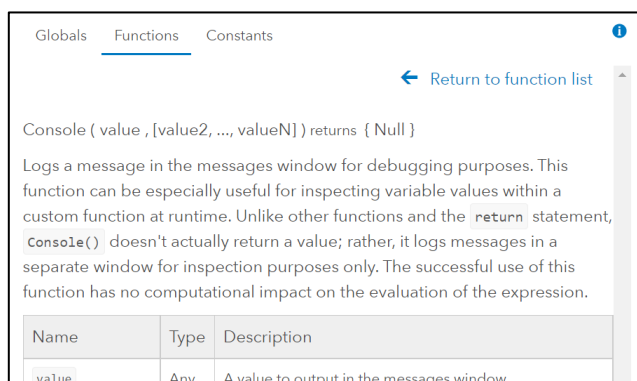
D. Explore Arcade functions

In this step, you will explore functions in the Arcade Playground and learn about how to reference them in your expression.

1. Click the **Functions** tab. A list of available functions will be listed with a filter field to find a particular function.
2. In the **Filter By Name** field, type **console**. The list of functions will filter to show only the Console function.

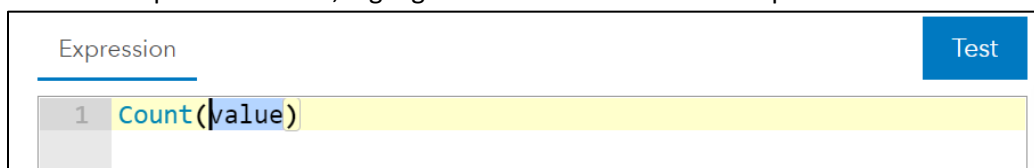


3. Next to the Console function, click the **Information** button Information to expand basic help about the function.



The output of this function will be in the Messages section of the Arcade Playground.

4. Click **Return To Function List**.
5. Clear the filter field and type **count**.
 - i. Examine the help documentation for the Count function. What will the Count function return?
6. Click **Return To Function List**.
7. Click the **Count** function.
8. Click **Test**.
 - i. Notice the result is a 'Identifier Not Found' error. This is because the function does not have a specific data item to evaluate.
9. Click the **Globals** tab to return to the global variables.
10. In the Expression editor, highlight the **value** section in the expression.



11. In the Globals section, click **\$layer** to add it to the expression in place of the highlighted text.
 - i. Verify the expression is now: **Count(\$layer)**.
12. Click **Test**.

The result is **68433** to indicate the sample number of values in the Building Footprints.

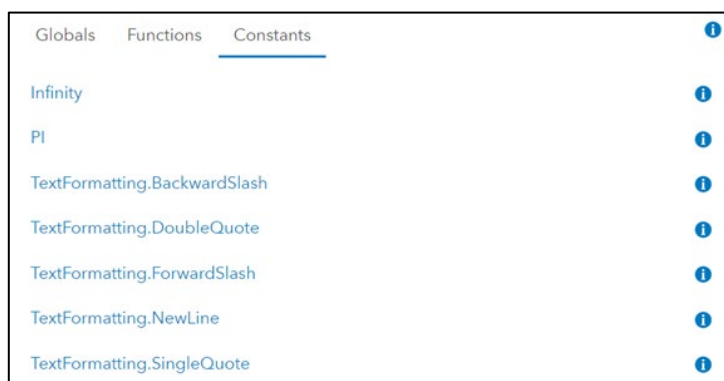
For Arcade to return a desired output, you must enter the proper syntax for your data for each function. The Arcade Playground will provide placeholders indicating the required parameters for each function.

E. Explore Arcade constants

In this step, you will explore the Constants available in the Arcade Playground.

1. Click the **Constants** tab.

The constants in the Arcade Playground can be used for formatting results with added quotes or creating multiline labels. There are also constants for Pi and Infinity. These constants can be used when creating iterators or for geometric calculations.



2. Next to the **TextFormatting.NewLine** constant, click the Information button to expand basic help about the constant.
 - i. Notice the warning that multiline labels are not supported in the ArcGIS API 3.x for JavaScript.

Although Arcade is supported across ArcGIS, depending on the application, some functionality will only be available in those that use JavaScript 4.x. For more information, please see the Esri Community page [Apps that use ArcGIS API for JavaScript 3.x vs 4.x.](#)

The Arcade Playground provides plenty of sample data for many different use cases. Within the Arcade Playground, help is provided for the functions to allow you to create an expression that can be used for different workflows.

3. Close the web browser.

Part 2: Customize a label with an Arcade expression

Now that you have learned how to use ArcGIS Arcade Playground to create custom labels, you will apply those skills to create a label for a fire perimeters layer in a web map.

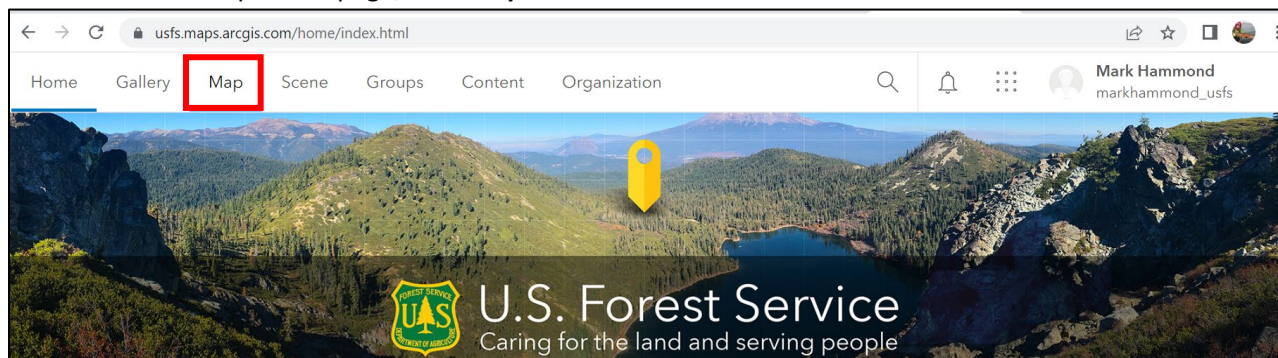
A. Open a fire perimeters layer in Map Viewer

In this step, you will create a web map and add the Region 4 Fire Perimeters layer to the map.

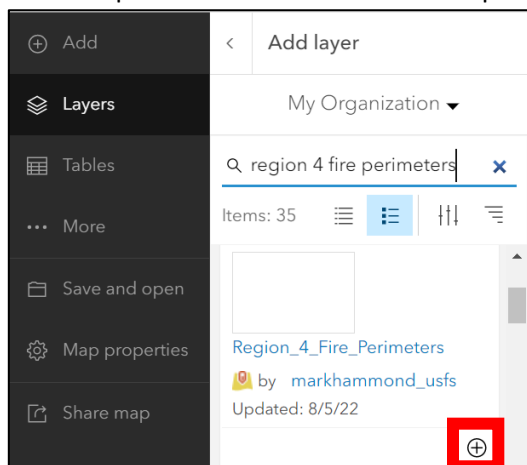
1. Open a web browser and go to <https://usfs.maps.arcgis.com/home/index.html>.
2. If necessary, sign-in to your ArcGIS Online organizational account.

If you do not have an AGOL account, you will not need to request one because every user automatically has an AGOL account associated with their eAuth.

3. At the top of the page, click **Map**.



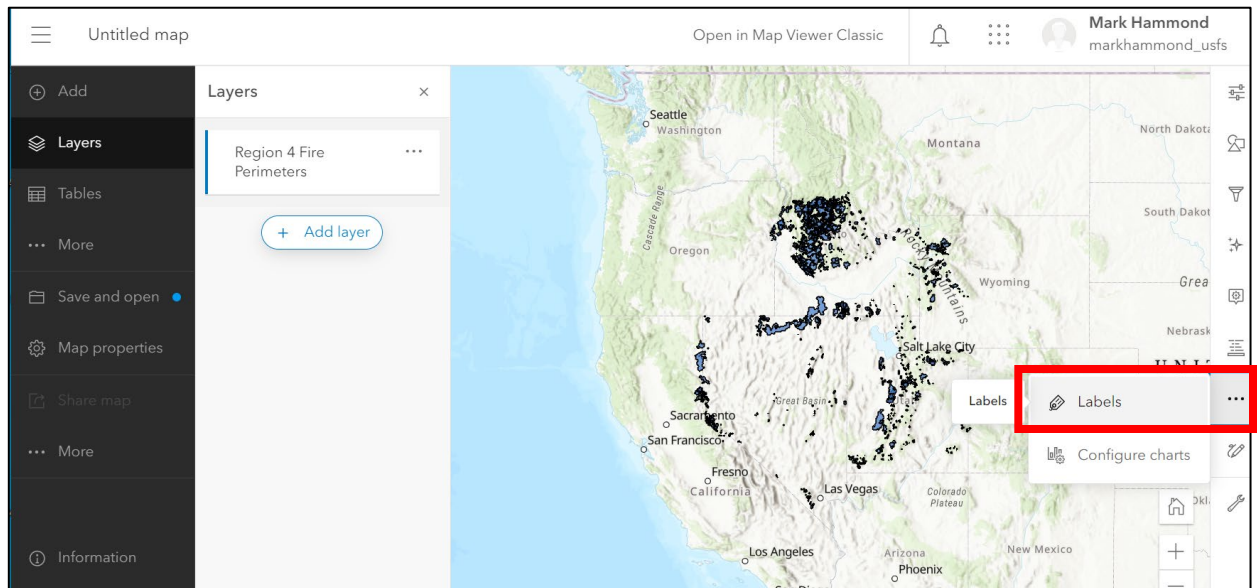
4. If the Layers pane isn't open, click the **Layers** tab on the left side of the page.
5. In the Layers pane, click **Add Layer**.
6. Click the **My Content** down arrow and choose **My Organization**.
7. In the search field, type **region 4 fire perimeters** then press **Enter**.
8. Scroll down to the **Region_4_Fire_Perimeters** layer in the results.
9. Click the plus button to add it to the map.



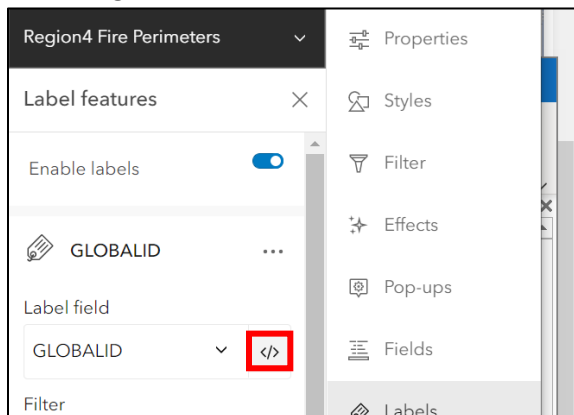
B. Create an Arcade expression for a label

In this step, you will create the Arcade expression for the label. The label will be composed of the fire name, year of occurrence, and areal coverage.

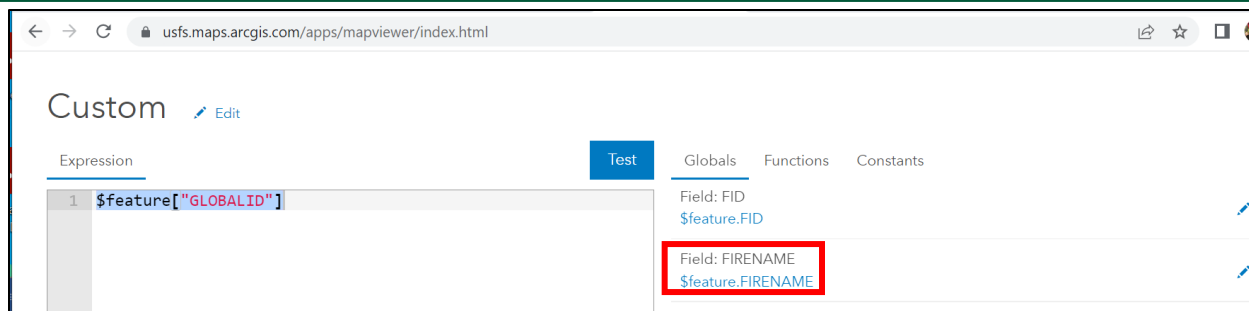
1. If necessary, in the Layers pane, click the **Region_4_Fire_Perimeters** layer to open the Properties pane.
2. On the right-side Settings toolbar, click the **More (3 dot)** button then click the **Labels** button.



3. In the Label features pane, click **Add label class**.
4. On the right side of the GLOBALID field, click the **</>** button to open the expression editor.



5. Scroll down the Globals list and click **\$feature.FIRENAME** so it replaces the current expression.

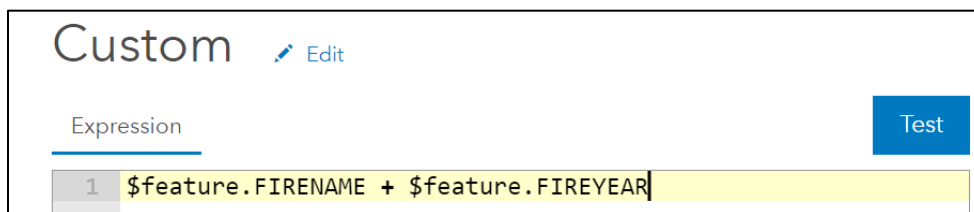


6. In the Expression editor, after `$feature.FIRENAME`, click to place the cursor and type the `+` sign to begin adding another part of the label

You can add spaces before and after the `+` signs to make the expression more readable but it's not necessary.

7. In the Globals section, click `$feature.FIREYEAR` to add it to the expression.

The expression should now read: `$feature.FIRENAME + $feature.FIREYEAR`



8. Click **Test** to see what will be reported as the label in this expression.

The result will be Cherry Creek Fire1986. The problem with this label is the fields run together which makes the label hard to read. Also, it's not clear what the number means so we should include the word "Year" in front of the number.

Result	Value
Result	Cherry Creek Fire1986

9. In the Expression editor, after the `+` and between the two global variables, type `" Year: "`.

Make sure there is a space between `"` and `Y` and also between `:` and `"`.

10. Confirm that the new expression is as follows:

`$feature.FIRENAME + " Year: " + $feature.FIREYEAR`

11. Click **Test**.

The resulting label should have the added space and the word "Year".

Result	Value
Result	Cherry Creek Fire Year: 1986

C. Modify an Arcade expression for a label

In this step, you will modify the label expression to make it easier to read by putting the label information on two lines and removing redundant information.

1. In the Expression editor place your cursor immediately after **\$feature.FIRENAME**.
2. Click the **Constants** tab then click **TextFormatting.NewLine**.
3. Add a + before TextFormatting.NewLine.
4. Remove the space before the first quotation mark and Year.
5. Confirm that the new expression is as follows:
\$feature.FIRENAME + TextFormatting.NewLine + "Year: " + \$feature.FIREYEAR
6. Click **Test** to see how the label information is now displayed on two lines.

Result	Value
Result	Cherry Creek Fire Year: 1986

The label now contains the necessary information and displays it in a clear way. However, to finalize the label, there is one final modification. Because we will give the map a title will indicate that each of the polygons is a fire perimeter, you will remove the word "Fire" from each label with the Replace function.

7. In the Expression editor, before the **\$feature.FIRENAME** global variable, click to place the cursor.
8. In the Functions section, clear the filter field and type **replace** for the Replace function.
9. Click **Replace** to add it to the expression.
10. In the expression editor, highlight **\$feature.FIRENAME** then right-click and select **Cut**.
11. Highlight **fieldOrValue** in the Replace function then right-click and select **Paste**.

In the Replace function, there are two parameters to replace values: the value to be replaced and the value to replace the value with. For more information about the Replace function, click the Information button.

12. For the first parameter, inside **' '**, type **Fire**. Make sure the word 'Fire' is capitalized.
13. For the second parameter, inside **'/'**, delete the **/**.
14. Confirm that the new expression is as follows:

Replace(\$feature.FIRENAME, 'Fire', ' ') + TextFormatting.NewLine + "Year: " + \$feature.FIREYEAR

15. Click **Test**.

The word "Fire" should no longer be in the label.

Result	Value
Result	Cherry Creek Year: 1986

16. Click **OK**.
17. On the Contents toolbar, click the **Save And Open** button then choose **Save As**.
18. In the Save Map dialog box, specify the following parameters:
 - i. Title: Region 4 Fires

ii. Tags: Arcade training, fires, Region 4, Delete.

iii. Summary: Fire perimeters in Region 4.

It's a good idea to add the tag "delete" so you know the map is training material that is ok to delete. Regularly going through your content to delete unnecessary items is best practice to keep your content organized and up to date.

Save map
×

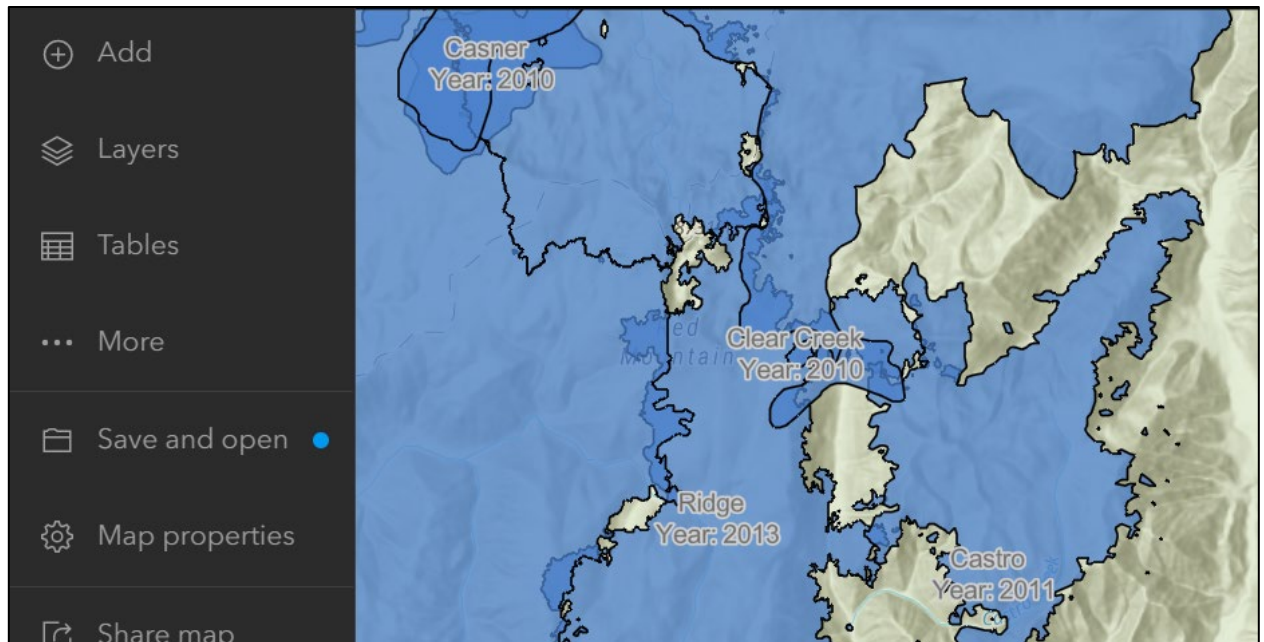
Title

Tags

Arcad ×
fires ×
Region 4 ×
Delete ×
Add tag(s)

Summary

19. Examine the labels in the map.



Congratulations! You have finished this exercise.