

## Tutorial Overview

In this tutorial, you will learn how to use Arcade to create new information from real-time COVID-19 data in a web map and pop-ups.

Arcade is an easy-to-use expression-based scripting language that is used in ArcGIS to create custom visualizations and labeling expressions, perform mathematical calculations and much more. An expression is a combination of values and functions that are combined and interpreted by the computer to create a new value.

Imagine you found a data layer in ArcGIS Online that includes information that you are interested in using for a project, but to display the exact data you want involves creating a new field and performing a calculation to populate it with values from existing data (e.g., population density). Since you are not the owner of the data layer, you are unable to make the changes to it.

This is where Arcade can help you. In a few easy steps, you can add expressions to create new information from existing fields in a data layer to symbolize a web map and to enhance pop-ups instantly. These are just a few examples of what you can do.

Keep in mind, Arcade can be used to present data in a myriad of ways. This tutorial covers only two ways it can be used to display data.

If you do not have ArcGIS Online accounts for yourself or your students, you can request them here: [k12.esri.ca](https://www.esri.com/arcgis/arcgisonline/arcgisonline-accounts). Student accounts can be requested only by an adult (age 18 and over).

## Part A: Explore web maps that include Arcade scripting

Before you begin creating Arcade expressions, explore some web maps that already have custom expressions included to present data from existing fields. You will see there are many ways Arcade is used to display data in interesting and fun ways.

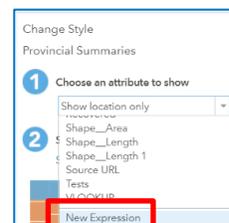
- [Basic Arcade Conversion: Celsius to Fahrenheit](#) : created by Lisa Berry from Esri
- [Arcade Expressions and You Gallery](#): created by Lisa Berry from Esri

## Part B: Create a custom expression to change symbology on your map

In this part of the tutorial, you will create a custom expression in the *Change Style*  window to display COVID-19 tests that have been administered per 100,000 population in Canada. The data are included but must be calculated using Arcade, so the results can be displayed on the web map.

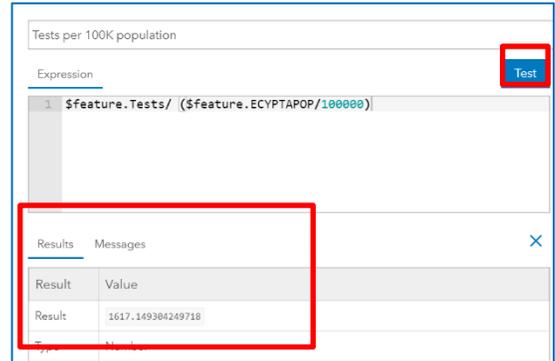
1. Open this web map: <https://bit.ly/2WgHF4L> and sign into your ArcGIS Online account.
2. Click **Content** to view the layer called **Provincial Summaries** that you will be working with.
3. Hover your mouse over the layer and click **Show Table** . Explore the data in this table.
4. **Close** the table.
5. Hover your mouse over the layer and click **Change Style** .
6. Go to *Choose an attribute to show* and scroll down to **New Expression**.
7. In the new expression window, click on **Edit** next to *Custom* to include a new title for the expression you will create. Name it *Tests per 100K population*.

You are now ready to set up your expression.  $\text{Tests} / (\text{Total Population} / 100000)$



# Introduction to Arcade

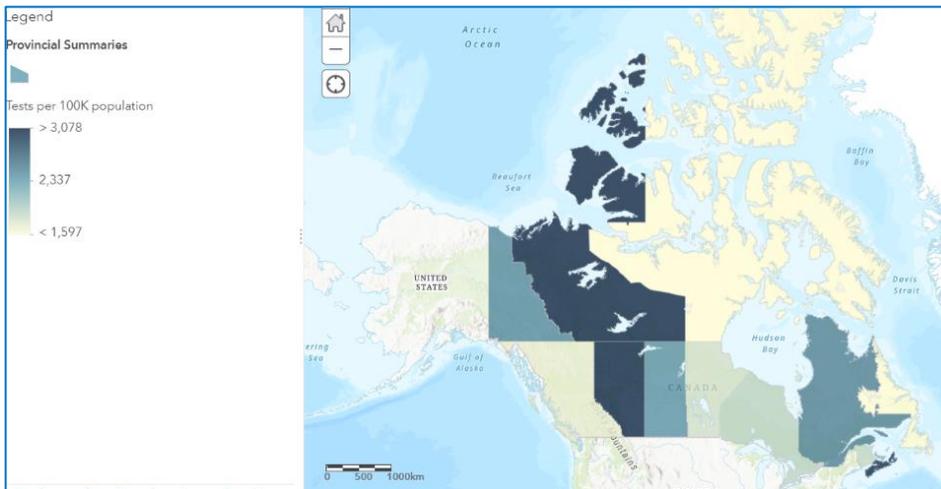
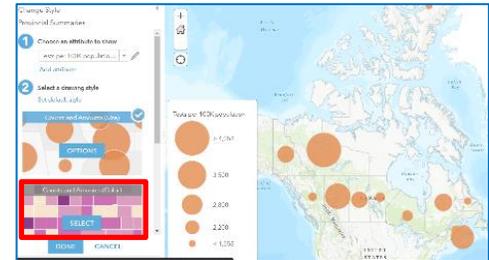
- Begin by selecting the text in the *Expression* window and deleting it.
- On the first line, type in the expression `Tests/ (Total Population/100000)` in the window.
- Now you will look for the fields in the *Global tab* to fill in the expression to create the script:  
`$feature.Tests / ($feature.ECYPTAPOP / 100000)`
  - In the script window, select the text “Tests”
  - In the Global tab, scroll down to find the field: **Tests - \$feature.Tests** and single click on the blue text `$feature.Tests` to add it to your expression window on the left side of the window.
  - Do the same for “Total Population” and select **\$feature.ECYPTAPOP** from the *Global tab*.
  - Click **Test**.
  - In the **Results** window below, look to see if the script was put together correctly.



- Click **OK** to run the script.

Smart mapping should now appear with options for you to select from.

- Select **Counts and Amounts**.
- Click **Done** to make the changes.
- Click **Legend**.
- Explore the data on your map to see the breakdown of the tests per 100k in each province and territory.



What factors do you think contribute to the variation in number of tests being administered across Canada? This article will give you a better understanding of why there is a variation in the rate of testing in Canada - <https://bit.ly/3dfZBne>.

- Save**  your map. Add your first initial and last name to the title.

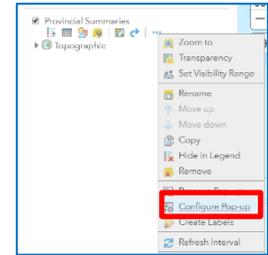


# Introduction to Arcade

## Part C: Create attribute expressions to appear in your pop-up

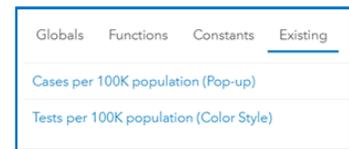
In this part of the tutorial, you will create an attribute expression to include additional information to your pop-up from existing fields in the Canadian COVID-19 data layer.

1. Click **Content** to return to the data layer.
2. Hover over the *Provincial Summaries* layer and click the three dots ... to select **Configure Pop-up**.

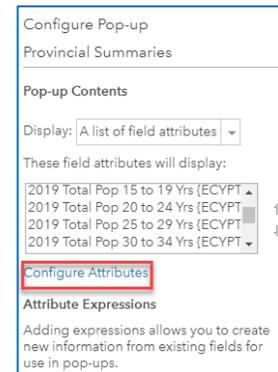


In this window, you will create an attribute expression to include **Cases per 100K population and Tests per 100K population** to the pop-up.

3. Scroll down to *Attribute Expressions* and click **ADD**.
4. **Edit** the name of the custom expression to *Cases per 100K population*.
5. Add the expression  $\$feature.Case\_Total / (\$feature.ECYPTAPOP/100000)$  to the window. Refer to step 10 in Part B if you have forgotten how to do this. Remember to test and save.
6. Create another expression to show **Tests per 100K population** that have been administered in Canada, but this time you can go to the *Existing* tab in the *Attribute Expressions* window to select the same expression you used in Part B.
7. When you have completed both expressions, scroll up in the *Configure Popups* window and click on **Configure Attributes**.
8. Click on the **Display** box twice to remove all selected fields.
9. Scroll down to select  the following fields to show in your pop-up: **Cases, Death, Recovered, Tests, Cases per 100K population and Tests per 100K population**.
10. Click **OK** twice.
11. Click on a province or territory on the map to view the pop-up information.



<input checked="" type="checkbox"/>	{Case_Total}	Cases
<input checked="" type="checkbox"/>	{Deaths}	Deaths
<input checked="" type="checkbox"/>	{Recovered}	Recovered
<input checked="" type="checkbox"/>	{Tests}	Tests



12. **Save**  your map.

## Next Steps

You now have a glimpse into how Arcade can help you display data you thought you weren't able to edit. Learn more with the following resource: ArcGIS Arcade - <https://bit.ly/2yYL5BI>

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