As we showed you in our slides, there are different tools for cartography available through Mapbox depending on what your needs are.

If you are creating a custom basemap or a more complex overlay, you'd likely want to use Mapbox Studio or TileMill. Both Mapbox Studio and TileMill use CartoCSS.

Mapbox Studio comes with pre-processed OSM data sources and some ready to use styles created by the cartographers and Mapbox.

TileMill requires custom data to be added. There are a few datasets available for use in TileMill specifically Natural Earth data, hosted by Mapbox.

If you are planning on using Mapbox we recommend using Mapbox Studio as in the near future TileMill will no longer be supported.

To use the Mapbox tools, you need an account

DEMO Mapbox Studio:

Download:
https://www.mapbox.com/mapbox-studio/#darwin

Mapbox Studio interface tour:

- Project Data Sources
    - How to create a data source that can be used in Mapbox Studio
    - Upload that datasource to mapbox.com
    - bring it into a map for styling
        - for this example, we can use the same restaurant geojson file and show some CartoCSS to style the points with different colors
- Project Styles
    - How to set-up a default project
    - pre-rendered styles
    - how to use the tools in the interface
    - data vs. style view and how that is useful while designing
    - how to customize pre-exisitng styles
    - how to upload customized style to mapbox.com

- **Let's upload our GeoJSON of restaurants as a vector data source to mapbox.com**
        - From the Home screen, select "Create New Datasource"
        - Next, we'll click on the option to "+ New Layer"
        - Let's navigate to our restaurants.geojson file
        - Then, click "Select"

- The data are now added into our source view
- Next, we'll want to configure some properties for our data source under the "Configure" tab
    - first, let's rename our datasource to "denver_restaurants" by clicking the Rename option under the datasource title
    - we'll type in a brief Description for the dataset "Bars, Cafes, Restaurants, and Pubs in Downtown Denver"
    - You'll want to set the "Buffer size" higher if you are going to be labeling with this dataset. Increasing the buffer allows for extra data around each tile. Let's go ahead and set it to 50.
- Next, let's click on the "Fields" tab and see what information we have there
    - we can see all of our attributes that are in our data and their field type
    - to make these more meaningful, let's type in better descriptions for each field
    - once this is complete, we can click on "Done"
- Before we go much further, let's Save this project
    - Click on "Save as"
    - Navigate to where you want to save the file and name it denver_restarurant_data
- Let's fill out the information in the "Settings" panel
    - We'll name our project Denver Restaurants
    - We'll give it a description
    - and in the Attribution field we'll put OpenStreetMap
    - Let's take a look at the option for setting the minzoom and maxzoom
        - the minzoom is when the data will show up on the map
        - the maxzoom is a little different in that we can set it lower and use the data at 4 or 5 zoom levels larger. this is called overzooming and makes for efficient vector tiles
        - since this is a map of a specific area, let's set the minzoom to 13 and the maxzoom to 14 knowing that we can use this dataset all the way to zoom 19
        - once all the Settings are complete, click Save
- Upload data source to mapbox.com
    - Open the Settings pane and click the option "Upload to Mapbox"
- Ok! Our data is now uploaded to mapbox.com let's take a look at what that means
    - if we click on "View Data" we'll be taken in our browser to our Mapbox dashboard into the Data tab
    - if we expand the Denver Restaurants data source we can see some of its properties

        - type, zoom levels, description and usage
        - specifically under Usage, you'll notice that we need to style this source using Mapbox Studio
- **Next, let's style our datasource in Mapbox Studio**
    - We'll go back to our the Mapbox Studio app and click on Back
        - we're taken back to our data source view, but to style a map, we need to be in the Style view
            - click on Projects in the bottom right hand corner
            - and click on the Styles tab
            - next, click on "New Project"
        - now we're in the New style window
            - here you'll see there are several pre-styled basemaps that we can choose to start with
            - for our restaurant map, we want a map that has a good amount of geographic context but we don't want our overlaid restaurant data to get lost in the map, so let's choose the Mapbox Light option which is a grayscale basemap
    - Once we select the Mapbox Light basemap, we are in the style editor
        - let's take a look around this interface to see what we have
            - we have a map that is styled and fully zoomable and panable
            - we have all of the associated CartoCSS that was used to apply styles to the map in these different style sheets
            - we can see what data sources are being used in the map by clicking on the Layers tab -- these are all curated datasets developed at Mapbox that are using OpenStreetMap data. basically, all of the features you see in here are coming in directly from a vector data source of OpenStreetMap and styled in different ways.
            - there are a set of default fonts that can be used in Mapbox Studio
            - and docs to help
            - on the top left here we have
                - a geocoder to easily find places on the map we can type in Denver, CO and zoom there
                - a full screen option
                - zoom buttons
                - a view to look at the data behind the map
                - and using Places you can preview your map design in different locations and using different themes around the world
    - **Let's customize this map**
        - First, let's zoom in a little tighter to the area of interest for our restaurant map

- next, let's add that custom datasource that we uploaded to mapbox.com
    - click on Layers
    - click on Change Source
    - we are going to add a Remote source
    - let's copy/paste the map id from mapbox.com
    - we'll add a comma to separate the two layers with our layer drawing above the mapbox streets layer
    - click Apply
    - our denver_restaurants data is now added to the layer list
        - if we expand it, we can see all of the attributes in our data
- now, let's style our overlay
    - first, we'll create a new stylesheet for our data and name it restaurants.mss
        - click on the + in the top right hand corner
        - type the name restaurants.mss
    - before we begin to add too much styling, let's first look at our custom data source on the map
        - we'll use the name of the layer #denver_restaurants and simply symbolize the markers
            - #denver_restaurants {
              marker-fill: blue;
              marker-allow-overlap: true;
              }
        - in order to see our changes we'll have to save so let's save this as denver_restaurant_style
    - we have four types of restaurants in our data pub, cafe, restaurant and bar let's symbolize each type differently using our attribute "amenity"
        - #denver_restaurants {
          [amenity='restaurant']{
          marker-fill: #f1c40f;
        - }
        - [amenity='bar']{
        - marker-fill: #34495e;
        - }
        - [amenity='cafe']{
        - marker-fill: #e74c3c;
        - }
        - [amenity='pub']{
        - marker-fill: #16a085;
        - }
        - }
    - let's also apply a global style to all of the point symbols

    - where they have a 1pt white outline
    - we'll set a couple of different marker sizes depending what zoom level you are at
        - [zoom>=15]{marker-width:10;}
        - [zoom>=17]{marker-width:13;}
    - we'll also set marker-allow-overlap: true so we can see all of the markers on the map
- let's modify these neighborhood labels a little bit
    - let's transform the text to uppercase
    - let's decrease the text-size to 11
    - and darken the text a little by 15%
    - and for the zoom levels of our map and our area of interest, we can be a little less aggressive with the wrap width on these labels so let's change that to 100
- you might also notice that there aren't that many roads labeled, let's see if we can add some more
    - here we can see by zoom level, what road labels are being queried
    - let's add a couple of more zoom levels with rules to show more road labels
        - #road_label [len>500][zoom>=16],
        - #road_label[len>0][zoom>=17]
- let's also add some labels for our restaurants at the larger scales
    - you'll notice if we label everything at our opening scale, there are too many labels and things are not clear or easy to read
    - you might also notice that some of the labels are drawing under the points. since we're using the same layer for labeling and symbolizing, we need to do an attachment on the style this will determine the drawing order of symbology within the layer. we'll start this under the end of the symbols we've defined.
    - so what we can do is introduce labels through zoom level in our case, let's label restaurants starting at zoom 16 and then label everything else
        - ::labels {
          [zoom=16][amenity='restaurant'],
          [zoom>=17]{
          text-name: [name];
          text-face-name: "Super Grotesk Offc Pro Medium";
          text-size: 11;
          text-fill: #000;

```
    text-dy:-8;
    text-wrap-width: 100;
}
```

- there are a lot more things we can do, but hopefully that is a good primer on how you can use custom data and use Mapbox styles to create a custom map

- now let's publish this style to mapbox.com
  - in the Settings panel:
    - change the Name to Denver Restaurants
    - and we'll set our minzoom to 15 since the map isn't really useable at smaller zoom levels.
  - next, we'll save and "Upload to Mapbox"

OK, but what if you just want to do something simple and fast? There is also the option to use the Mapbox Online Editor which doesn't require the knowledge of CartoCSS for styling or JavaScript for making a web map.

Mapbox Editor Demo:

- The Mapbox Editor allows you to customize the look of a few different Mapbox basemaps as well as add and style data.
- **Create project**
  - from your dashboard click on the Projects tab
  - click Create Project to make a new project
  - this will take you to the Editor interface
- **Interface tour**
  - Toolbar
    - Style
      - this is where you control which basemap you want to use and can customize its colors
    - Data
      - this is where you can add an existing dataset you have
      - you can also add existing Mapbox map ids
      - or create point, line, and/or polygon data
      - for existing datasets or created data, this is also where you style how that looks and the information contained in the popups
    - Project
      - this is where you define your project's settings
      - this is also where you can find information on your map's id and how to embed it or share it

            - if you add point, line, or polygon data in the Editor, you can also export it in this section
        - Search
            - to search for a specific location
    - Bottom right hand corner
        - zoom controls
        - lat/long coordinates
        - zoom level
- **Customize basemap**
    - We'll choose Mapbox Streets as our baselayer
    - We want to customize the palette, so we'll choose to Discard palette
    - We'll click on the preset palette in the bottom right hand corner the light blue one
    - then, we'll click on basic. I find that this is a good starting point from which to begin customizing the look of the basemap
    - next, let's click on "Customize" to customize this a bit further
    - we want to stick with our monochromatic look so let's adjust a couple of these colors
        - the "Area" features are a little too dark for our map so let's bring their lightness down to about 85%
        - the water is looking too blue, so let's move that over to a darker gray color
- **Add some data**
    - Now that we have our basemap styled, let's add our restaurant data on top
        - drag and drop geojson file
        - in the Import features window, we'll select "name" for the Title
        - and "cuisine" for the Description
        - we'll make our markers Medium and assign them an orange color so they pop off the map
        - and we'll choose the Restaurant symbol
        - then click Finish importing
    - We'll fill out our Project settings and Save the map