This module’s topic is geocoding.
Learning Objectives

- Understand the concept of geocoding and the steps in the geocoding process
- Identify important geocoding considerations and potential challenges
So far when we’ve added data to the map, it’s been a shapefile that already displays location for you, or it’s been a table with an X and Y field. You simply use the “Display XY Data” function to place the points on a map... But how many of you can tell me what lat/long you live at? I bet most of you would tell me where you live using an address, right?

There are two means by which a table of records could be assigned coordinates: either recorded using GPS unit or through the processes of geocoding.
Geocoding is a process by which textual information, such as an address, is converted into spatial data and assigned a location i.e. latitude/longitude coordinates.

A popular example of this that you’ve likely used is Google Maps which searches by street address to find a location.

It’s important to know where things are happening. Geocoding allows us to map locations where events of interest occur. Once these locations are displayed on a map you can determine relationships between these points as well as possible connections with something else.
There are several steps in the geocoding process.

A table of addresses you are preparing to geocode should have fields for Address (includes street number, name, direction, type), City, State, and ZIP code as well as a unique ID for each record.

The address locator is the mechanism by which your addresses are matched to a reference dataset (usually a network of streets).

First round of matching occurs automatically – may take minutes to hours depending on the volume. We recommend a match score of 100 to ensure the highest quality matches on the first round.

When the matching process is completed, you will have the opportunity to review and rematch addresses. You can do this automatically by sending them through the address locator again or interactively via the interactive rematch dialog box.
Prepare table of addresses and choose an appropriate address locator

Set geocoding options

Auto-run addresses through locator with match score of 100

Review and rematch unmatched addresses by hand
Because there are a number of different address locators, choosing the right one depends on what format the addresses you want to map are in, and the type of reference data you are matching your addresses to.

Local address locators come along with your ArcGIS software in the Data and Maps package. They can be installed directly to your individual computer or to a shared network for your organization. Using these locators for geocoding does not require internet use. And therefore they are essential for geocoding if you have security concerns.

Online locators are also available and can be useful, but should ONLY be used if your data is publicly available and should never be used for confidential data.
Geocoding with ArcGIS 3

1. Prepare table of addresses and choose an appropriate address locator
2. Set geocoding options
3. Auto-run addresses through locator with match score of 100
4. Review and rematch unmatched addresses by hand
After you select your address locator, you will have the ability to specify the geocoding options. You will want to set your geocoding options carefully as they can determine the precision and accuracy of your results.

**Matching Options:** When an address locator has generated a set of potential candidates, it scores each candidate in order to determine how closely each one matches the address that you are geocoding.

**Spelling sensitivity setting** controls how much variation the locator allows when it searches for likely candidates in the reference data.

**Minimum candidate score** determines the set of candidates that will be potential matches for an address.

**Minimum match score setting** allows you to control how closely your input addresses have to match their most likely candidate in the reference data to be considered a match.

The **intersection** connectors setting allows you to specify all the strings that the address locator will recognize as intersection connectors. There are default symbols, but you can add additional symbols or words.

**Output Options for street address locator style**
Address locators that use reference data with street centerline geometry, divide street features into segments that have beginning and ending addresses. The address locator tries to find the correct street segment (address range), and then interpolates/estimates
where along the line, the plot point would be. You can use the output options to specify where the points will be placed in relation to the street segment.

**Side Offset**: places a point at a specified distance to the side of the street segment. Address locators with reference data containing address range information for each side of the street, can determine on which side of the street an address is located.

**End Offset**: places a point off of the end of a street segment at a user defined-distance in order to prevent points from falling on top of cross streets.

**Match if best candidates tie**: If a locator finds two or more reference features that have the same highest match score but different geometries, you can specify whether to match randomly to one of these features.

**Output Fields**: Some locator-specific fields can be displayed when you geocode an address. These fields are used to provide additional information of the candidates. They do not participate in the score calculation.

**We recommend that you discuss and document guidelines for setting the geocoding options to ensure consistency among your team/department, and help to standardize your geocoding products.**
Geocoding with ArcGIS

1. Prepare table of addresses and choose an appropriate address locator
2. Set geocoding options
3. Auto-run addresses through locator with match score of 100
4. Review and rematch unmatched addresses by hand
The result will show you how many records are matched/tied/unmatched and what percent of your total dataset that is.

A new shapefile will be added to your map with all the matched records as points but retains the unmatched records in the table.
Prepare table of addresses and choose an appropriate address locator

Set geocoding options

Auto-run addresses through locator with match score of 100

Review and rematch unmatched addresses by hand
If you elect to rematch interactively, you will be working in the Interactive Rematch dialog box to review candidates and see if you can find a possible match...

1. Before you begin, take a look at the **statistics panel** to see how how many of your original addresses are matched, tied, or unmatched.

2. In the **Geocoding results panel**, start by specifying a set of addresses you want to rematch, usually those that failed to match. You can select individual addresses by clicking a record in the table or using the Record selector on the lower left side of the panel.

3. **Output attributes**: Status (M, U, T), Score (100), Match_type (A, M, PP) Side: (L, R) and Match_addr.

4. The **Address panel** displays the selected record's address that is used as input for matching. You can edit the information in the text box to possibly find a better match.

5. The **Candidates list panel** displays the candidates for the address you selected.

6. The **Candidate details panel** shows you the same attributes as the Candidates list but displays only one record at a time so it is easier to read.

7. You can use the **Pick Address from Map** tool if you know where some addresses should be on the map, but for which no candidates were found.

8. **Zoom to Candidates**: click to zoom to the set of candidates on the map

9. **Match** button: click to rematch the selected address to the candidate you think matches. Use **Unmatch** if an address has been matched incorrectly.

You can spend a considerable amount of time reviewing and rematching addresses manually. You will need to decide how much time you want to spend and evaluate the tradeoff between time and additional matches.
While not perfect, a useful tool in the geocoding process is standardization.

The standardization tool in ArcToolbox will parse your address into its core component fields. Many elements of an address, such as direction or street type, will be abbreviated. It may also eliminate non essential address information such as apt numbers so that the address is easier for the address locator to recognize.
• Locators and reference datasets are constantly improving. If you are using an old one, it might not have current street names, numbers, or new subdivisions.
• Some addresses are simply not geocode-able if they are missing key address information.
• Match scores only reflect address agreement and NOT accuracy.
• Positional accuracy differs if you geocode to a street address (interpolated) versus a parcel location.
• With sensitive data, you should NEVER use an online locator and should ALWAYS use masking techniques when displaying data.
The Balance of Geocoding

http://www.brainpickings.org/index.php/2012/04/25/e-o-wilson-on-art/