

## Topo Match and Topo Bingo

### Description

In this activity, class participants (youth or adults in a professional development workshop) will get to know each other as well as get to know about map and GIS concepts and features.

### Goals

- (1) Serve as an 'icebreaker' activity with students or adults in a GIS, geography, environmental studies, geology, or other Earth-related class.
- (2) Serve as a fun way to get familiar with mapping and GIS concepts.

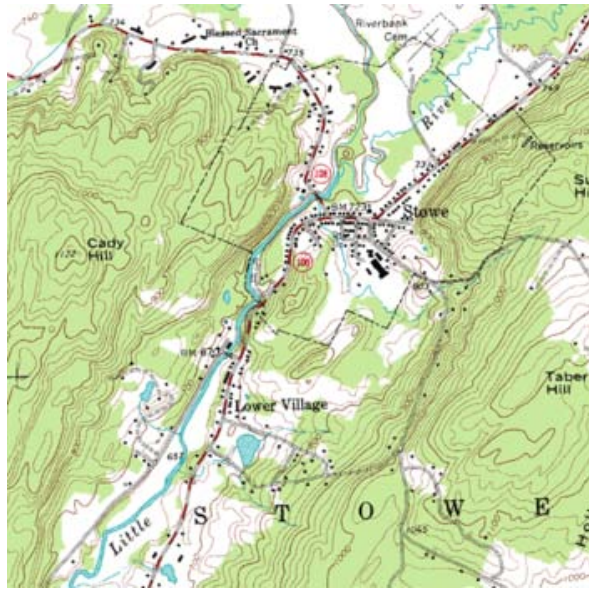
### Materials Needed

- (1) A class set of different USGS topographic maps (no two alike). 1:24,000-scale works best because it is the most challenging, but 1:250,000-scale is second best and 1:100,000-scale is OK as well (although the 1:100,000-scale maps are folded, so you would need to unfold and flatten them).

You can obtain surplus (overstock or superseded) topographic maps from public libraries, geology, or geography departments of local colleges and universities, or the USGS in Denver, Colorado. Contact Joseph Kerski, ESRI, [jkerski@esri.com](mailto:jkerski@esri.com), for the USGS contact information. You may have to pay for shipping. Because the maps do not come with a legend, you might also want to display or print the USGS topographic map symbols from this site: <http://egsc.usgs.gov/isb/pubs/booklets/symbols/>.

- (2) A cutting board, roller trimmer, or scissors. A roller trimmer works best due to the large size of the topographic maps. Cut each topographic map into two halves (north-south, or east-west). Thus, for a class of 20, you will need 10 topographic maps.
- (3) Post-it notes, tokens, coins, lima beans, buttons, iron-on patches, or other items.
- (4) Pieces of paper with topographic features inscribed (including the squares included in this lesson).
- (5) A bowl or other object to place the pieces of paper in and draw from.

*Extension.* For an extra challenge, instead of topographic maps, use aerial photographs, satellite images, or large thematic flat USGS maps of earthquakes, geology, oil and gas, gravity anomalies, magnetism, hydrology, or other themes.



In this activity, class participants get to know each other and are introduced to GIS and map concepts through matching topographic maps and identifying features in a game-like environment.

### **Topo Match**

1. Distribute the topographic maps randomly around the room among the participants. Each participant receives one half of a topographic map.
2. Set a timer and give the participants a set amount of time in which they have to find the person with the other half of “their” topographic map so that they can join them together and make a complete map.
3. Once each person finds the person and the other half of their map, they need to write down the name of the map, the state, and the map scale.
4. Discuss how the features on the map are represented as vector (point, line, polygon) data (DLG, NHD, etc) data and raster (NLCD, DEM, DRG) data within a GIS. How are topographic maps different from GIS base data? (for example, topographic maps are cartographic products rather than true geographic products; if roads and railroads are too close, to make it cartographically appealing, the road was offset from the railroad.). Discuss how accuracy standards affect the analysis done in GIS where the base data is derived from a topographic map.

### **Topo Bingo**

Now that the pairs of participants have matched their topographic maps and found their partner, they are ready for the next activity—Topo Bingo. Bingo is a game where random numbers are called by the leader, and the participants mark these numbers on their own card. The first person to match the numbers called in a linear or other pattern on their card calls out “Bingo!” and is the winner.

In Topo Bingo, instead of using Bingo cards, each participant will use the topographic map that they have now matched with their classmate. Instead of the leader calling out things like “I-28” or “B-5,” in Topo Bingo, the leader, using the game pieces, calls out map symbols and topographic features. When the required number of items on a participant’s map is covered, the participant shouts, “Topo!” (rather than “Bingo”).

On the map, it will obviously be difficult to cover five squares lined up in a row, so the participant only needs to cover any five items on the map. For an added challenge, you could require them to use the nine 2.5-minute squares on 1:24,000-scale topographic maps, which make an excellent 3x3 tic-tac-toe type of grid. They could then be required to win only when they line up squares horizontally, vertically, or diagonally.

Make color printouts of the game pieces. Use the ones included in this lesson for starters. Cut apart all the pieces along the solid lines and you may choose to fold each piece along the dotted line depending on whether or not you want to show the symbol for each land feature. Throw the game pieces into a hat, bag, bowl, or other object.

Adjust the level of difficulty of the game by choosing which pieces to put in the hat. Game pieces that say “church,” “school,” or “railroad” are simple, and all levels of participants should be able to find them on a map. “Depression contours” and “steep cliffs,” which require knowledge of topographic map reading, are for the intermediate or advanced participant. Game pieces such as “lava beds” or “sand dunes” require knowledge of the landform itself and what it looks like on a topographic map. The level of your participants should dictate which of the game pieces to start with in the hat. You may choose to hide or show the symbol on the game pieces to participants by folding them.

Don't feel confined to just using the features at the end of this lesson. For example, consider using the following as "features" to call:

An elevation between 3,000 and 4,000 feet.	A town of more than 20 square blocks.	An interstate or US highway that, when followed, would end in a state adjoining the Atlantic Ocean.
An area that you suspect is underlain by limestone.	An area that you suspect is highly vulnerable to <natural hazard> (such as tornadoes, floods, wildfires).	An area that you suspect is either experiencing population stagnation or population loss.
An elevation range on the map of over 2,000 feet.	An area in more than one county.	A river that, when followed, would flow into other river(s) and eventually terminate at the Gulf of Mexico.

If you are teaching a GPS or GIS-based workshop, you may wish to include questions such as the following:

A UTM zone of 13 or 14.	An area covered by the Public Land Survey System.	An area containing a range line in the Township and Range system.
A state plane coordinate system in feet.	A map containing over 6 benchmarks and/or triangulation stations.	An area containing at least 1 piece of federal public land.
A UTM northing of more than 4,000,000 meters north of the Equator.	An area more than halfway to the North Pole from the Equator.	An area exactly halfway between two full degrees of longitude.

Distribute to each participant a map, a small handful of tokens or place markers, and (optional) map legend.

Shake or mix up the bag of game pieces and draw one. Read it to the participants. If they find that feature on their maps, they should use a token and cover the feature or symbol.










Continue drawing game pieces out of the bag and calling them. Do not return the game pieces to the bag as they are called. Leave them out to avoid duplication and to verify winners.

When a participant covers five items (or as many as the leader decides), he or she shouts "Topo!" and gets a prize (teacher's discretion).





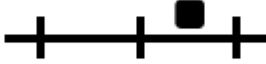


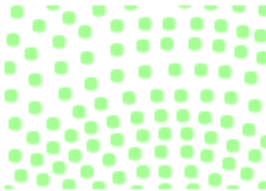

Play should continue to allow several participant winners. Consider handing out geography, GIS, or GPS-related prizes to heighten the interest.



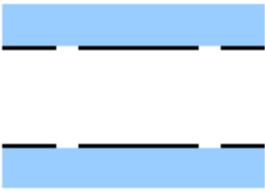

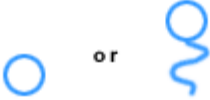
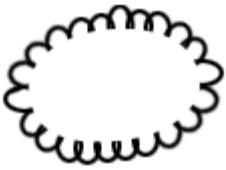


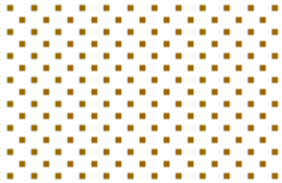

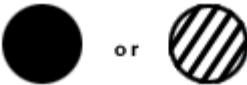
TOGO BINGO GAME PIECES. Cut along lines and fold along dash lines.

		
<p>Submerged Marsh or Swamp</p>	<p>Wooded Marsh or Swamp</p>	<p>Submerged Wooded Marsh or Swamp</p>
		
<p>Elevation Below Sea Level</p>	<p>Elevation 200 Feet or More Above Sea Level</p>	<p>Elevation 500 Feet or More Above Sea Level</p>
		
<p>Elevation 2000 Feet or More Above Sea Level</p>	<p>Elevation 5000 Feet or More Above Sea Level</p>	<p>Depression Contours</p>




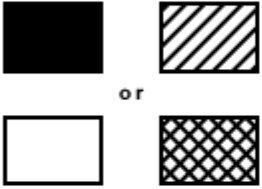
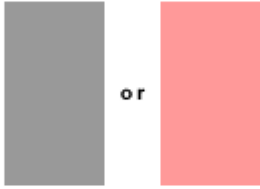

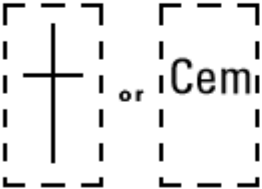

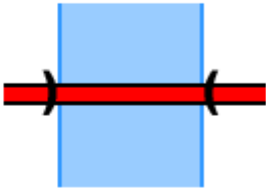
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<p>Primary Highway</p>	<p>Secondary Highway</p>	<p>Dual Highway</p>
		
<p>Trail</p>	<p>Single Railroad Tracks; Station</p>	<p>Woods</p>
		
<p>Orchard</p>	<p>Scrub Land</p>	<p>Marsh or Swamp</p>



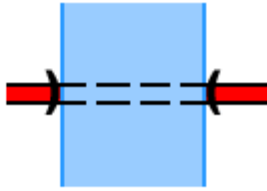

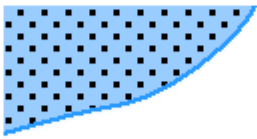




TOGO BINGO GAME PIECES. Cut along lines and fold along dash lines.

		
<p>Shipping Channel</p>	<p>Shipwreck</p>	<p>Well</p>
		
<p>Coral Reef</p>	<p>Intermittent Lake</p>	<p>County or Equivalent Boundary</p>
		
<p>Sand Dunes</p>	<p>Perennial River</p>	<p>Tanks</p>

TOGO BINGO GAME PIECES. Cut along lines and fold along dash lines.

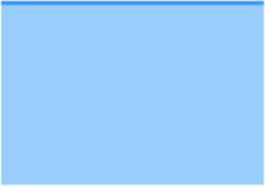
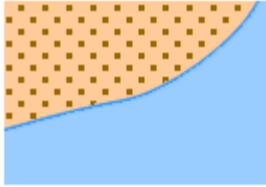
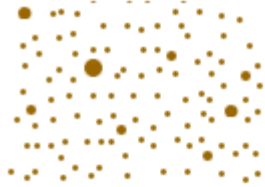


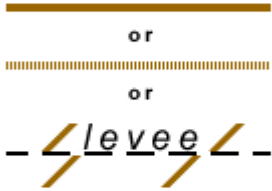




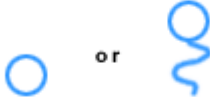
 <p>Parks, Reservations, or Monuments Boundary</p>	 <p>Church</p>	 <p>School</p>
 <p>Buildings</p>	 <p>Built-up Area</p>	 <p>Small Park Boundary</p>
 <p>Cemetery</p>	 <p>Campground</p>	 <p>Bridge</p>

TOGO BINGO GAME PIECES. Cut along lines and fold along dash lines.

		
<p>Covered Reservoir</p>	<p>Pier or Jetty</p>	<p>Tunnel</p>
		
<p>Glacier</p>	<p>Foreshore Flat</p>	<p>Rock Bare or Awash</p>
		
<p>Cliffs</p>	<p>Mountain</p>	<p>Crater</p>



TOGO BINGO GAME PIECES. Cut along lines and fold along dash lines.

		
<p>Ocean</p>	<p>Sandy Beach</p>	<p>Gravel Beach or Glacial Moraine</p>
		
<p>Perennial Lake</p>	<p>Stream</p>	<p>Levee</p>
 <p>or</p> 	 <p>or</p> 	
<p>Canal</p>	<p>Waterfalls</p>	<p>Spring</p>