

# CARTOGRAPHY AND TOPOGRAPHIC MAPS — THE BASICS



# ALL MAPS ARE WRONG

- Why every world map is wrong: <https://www.youtube.com/watch?v=eTYsIePy5zg>
- Why all maps are wrong (globe): <https://www.youtube.com/watch?v=kIID5FDi2JQ>



# GPS

- GPS stands for **GLOBAL POSITIONING SYSTEM**
- It provides location and time information anywhere on or near the Earth that there is an unobstructed line of sight to **FOUR OR MORE** GPS satellites
- GPS satellites orbit the Earth **TWICE** daily
- The **UNITED STATES GOVERNMENT** created and maintains GPS systems for anyone with an available GPS receiver.
- The GPS project was launched in **1973**
- A GPS unit can **DETERMINE A LOCATION, TRACK A ROUTE, CALCULATE SPEED, TRIP DISTANCE AND DETERMINE ELEVATION** among other things
- A standard GPS unit is accurate to **15 METRES**, on average



# A BRIEF HISTORY OF CARTOGRAPHY AND MAPS

- <https://www.youtube.com/watch?v=fLdvInDrQ2c>
- What are three things you have learned from “A Brief History of Cartography and Maps?”



# TOPOGRAPHIC MAPS

- A topographic map is a detailed and accurate illustration of MAN-MADE and NATURAL features on the ground such as ROADS, CONTOURS AND RIVERS
- The topographic map is a TWO-DIMENSIONAL representation of Earth's THREE-DIMENSIONAL landscape.
- The most frequently used topographic map is at the scale of 1:50 000
- The map of Whitehorse at the back of the class is at the scale of 1:250 000



# TOPOGRAPHIC MAP - GENERAL INFO

- The following 7 categories can be found on a topographic map
  1. **RELIEF**: mountains, valleys, slopes, depressions as defined by contours
  2. **HYDROGRAPHY**: lakes, rivers, streams, swamps, rapids, falls
  3. **VEGETATION**: wooded and alpine areas
  4. **TRANSPORTATION**: roads, trails, railways, bridges, airports, seaplane anchorages
  5. **CULTURE**: buildings, urban development, power transmission line, pipelines, towers
  6. **BOUNDARIES**: international, provincial/ territorial, recreational
  7. **TOPONYMY**: place names, water features names landform names



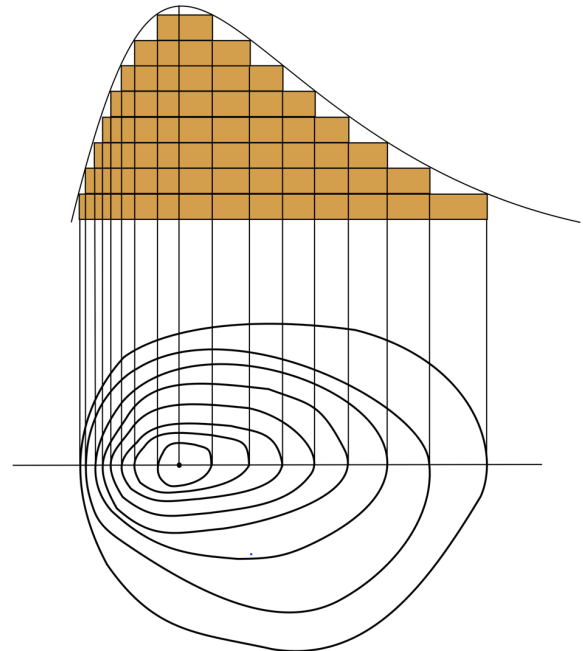
# TOPOGRAPHIC MAPS - COLOURS

- **BLACK**: shows cultural features and toponymy, geographic coordinates and precise locations
- **BLUE**: represents water features such as lakes, rivers, falls, rapids, swamps and marshes; the names of water bodies and courses are also shown in blue, as are magnetic declination and UTM grid information
- **GREEN**: indicates vegetation such as wooded areas, orchards and vineyards



# TOPOGRAPHIC MAPS — CONTOUR LINES

- Contour lines connect a series of points of **EQUAL ELEVATION** and are used to illustrate relief on a map.
- Numerous contour lines that are close to one another indicate **HILLY OR MOUNTAINOUS** terrain while further apart indicate a **GENTLE SLOPE**. Contour lines that are far apart indicate **FLAT TERRAIN**.
- The closer the lines are together, the **STEEPER** the slope





# TOPOGRAPHIC MAPS - SCALE

- Map scales represent the ratio of a **DISTANCE ON THE MAP** to the actual **DISTANCE ON THE GROUND**
- Standard Canadian topographic maps are produced at 1:50 000, where **2 CM** on the map represented **1 KM** on the ground
- **FORMULA:** 
$$\frac{\text{MAP DISTANCE}}{1 \text{ km}} = \frac{2 \text{ cm}}{100\,000 \text{ cm}} = \frac{1}{50\,000} *$$
- **MEDIUM SCALE MAPS** (e.g. 1:50 000) cover smaller areas in greater detail, whereas **SMALL SCALE MAPS** (e.g. 1:250 000) cover large areas in less detail



# TOPOGRAPHIC MAPS - MEASURING DISTANCE

- The **SCALE BAR** found at the bottom of topographic maps is used to determine distances between points or along lines on the map sheet
- Use the **SECONDARY DIVISION** on the left of the scale bar for measuring fractions of a kilometre
- **1 CENTIMETRE** on the map represents **500 METRES** on the ground
- Each degree of latitude is approximately **69 MILES (111 KILOMETRES)** apart
- Each minute of latitude is, therefore, approximately **ONE NAUTICAL MILE**



# TOPOGRAPHIC MAPS - GRIDS

- A grid is a regular pattern of **PARALLEL LINES** intersecting at **RIGHT ANGLES** and forming **SQUARES**
- Grids are used to identify **PRECISE POSITIONS**
- Topographic maps have two kinds of referencing systems
  1. **UNIVERSAL TRANSVERSE MERCATOR** (UTM) projection (easting/ northing)
  2. **GEOGRAPHIC**: degrees and minutes (longitude and latitude)
- [Latitude and longitude video](#)
- The symbols for representing latitude and longitude are as follows:
  - Degrees: °
  - Minutes: ′
  - Seconds: ″



# TOPOGRAPHIC MAPS — UTM COORDINATES

- UTM coordinates are expressed in METRES and can be determined on the map by using the UTM grid lines
- NORTHING values can be read along the east or west edges of the map
- EASTING values can be read along the north or south edges of the map
- Tip: find your easting FIRST and your northing SECOND



