

Introduction to Cartography

Introduction to Cartography

The art and science of map-making

1. What Is Cartography?

Aspect	Description
Definition	The discipline concerned with the design, compilation, production, and study of maps.
Purpose	Communicates spatial information, supports navigation, planning, analysis, and storytelling.
Fields of Application	Geography, urban planning, environmental science, transportation, archaeology, disaster management, gaming, GIS, and more.

2. Core Elements of a Map

Element	Function	Typical Representation
Title	Identifies the map's subject or purpose.	Bold text, often at the top.
Scale	Shows the relationship between map distance and real-world distance.	Ratio (1:50,000), graphic bar, or verbal ("1 inch = 1 mile").
Legend (Key)	Explains symbols, colors, and line styles.	Box with symbol–description pairs.
North Arrow	Indicates orientation.	Arrow pointing to geographic or magnetic north.
Inset Map	Provides context or detail for a specific area.	Smaller map placed within the main map.
Source & Credits	Acknowledge data providers and cartographer.	Small text at the bottom or side.

3. Types of Maps

Category	Primary Use	Example
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Topographic	Shows natural and cultural features with contour lines.	Hiking maps, USGS quadrangles.
Thematic	Focuses on a specific theme or variable.	Population density, climate zones.
Reference (General? purpose)	Provides a broad overview of geography.	Road atlases, world maps.
Navigational	Aids in route planning and travel.	Nautical charts, aeronautical maps.
Digital/Interactive	Allows user interaction, layering, and real-time updates.	Google Maps, GIS web apps.

4. Map Projections

Projection	Geometry	Distortion Characteristics	Common Use
Mercator	Cylindrical	Preserves direction; distorts area at high latitudes.	Marine navigation, web maps.
Lambert Conformal Conic	Conic	Preserves shape; good for mid-latitude regions.	Aeronautical charts, state maps.
Albers Equal-Area Conic	Conic	Preserves area; useful for statistical maps.	Census maps.
Robinson	Pseudocylindrical	Balanced distortion (shape & area).	World maps in textbooks.
Polar Stereographic	Azimuthal	Preserves direction from the pole; distorts area away from pole.	Polar research maps.

Key point: No projection can preserve all properties (area, shape, distance, direction) simultaneously; the choice depends on the map's purpose.

5. Symbolization & Visual Design

1. Color

- Use intuitive palettes (e.g., blue for water, green for vegetation).

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- Apply sequential colors for ordered data, diverging colors for data centered around a midpoint.

2. Line Styles

- Solid, dashed, dotted to differentiate roads, boundaries, rivers.

3. Point Symbols

- Simple geometric shapes (circles, squares) for locations; custom icons for specific features (airports, hospitals).

4. Typography