Introduction to GIS with ArcGIS Pro

Coordinate Systems: Understanding Coordinate Systems

Session 5

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Lecture Outline

- Introduction & Recap (5 minutes)
- Understanding Coordinate Systems (25 minutes)
- **Coordinate Systems** in ArcGIS (20 minutes)
- Guided Student Exercise & Q&A (10 minutes)

Course Outline

Week 0: Pre-Course Setup (Self-Paced)

- **Task:** This self-paced module must be completed before the first live class.
- **Topics:** Reviewing system requirements, understanding license options, downloading and installing ArcGIS Pro, and successfully signing in using the provided guidance.

Week 1: Getting Started with ArcGIS Pro

- **Class 1:** Introduction to ArcGIS Pro and Project Structure
- **Class 2:** Map Navigation and Data Exploration

Week 2: Working with GIS Data

- **Class 3:** Connecting to Data Sources
- **Class 4:** Populating a Geodatabase

Week 3: Coordinate Systems

- **Class 5:** Understanding Coordinate Systems
- **Class 6:** Managing Projections and Transformations

Recap of Season 4

Geodatabase in ArcGIS Pro

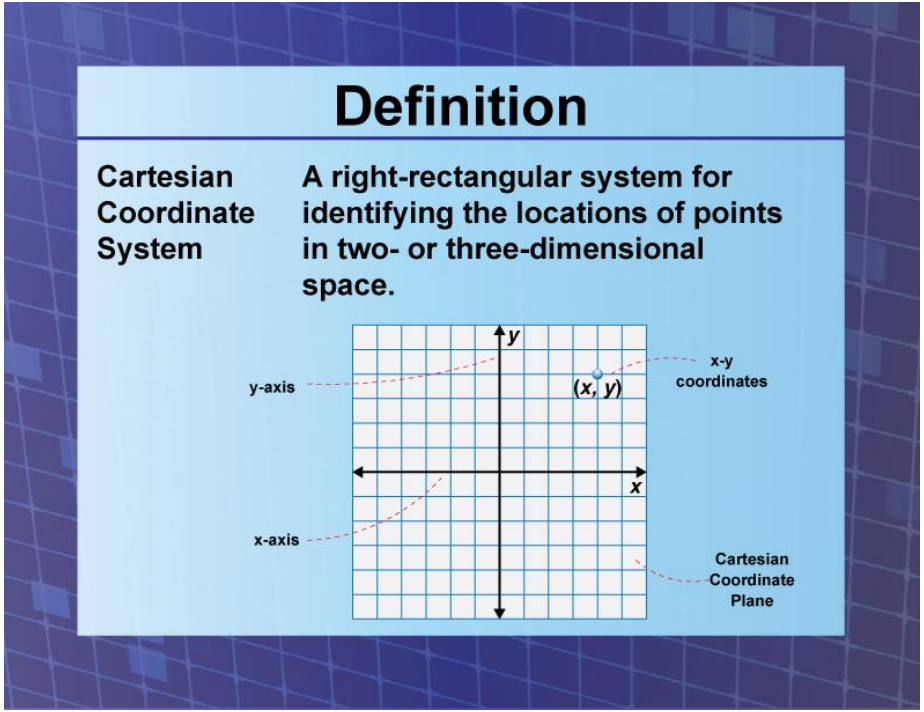
Work with File Geodatabase

Coordinate Systems

in ArcGIS

Coordinate system

A coordinate system uses numbers (coordinates) to assign a unique position to points in space, often with a defined origin, axes, and units of measurement.



https://en.wikipedia.org/wiki/Coordinate_system

Geographic Coordinate System

A **geographic coordinate system (GCS)** is a reference framework that defines the locations of features on a model of the earth. It's shaped like a globe—spherical. Its units are angular, usually degrees.

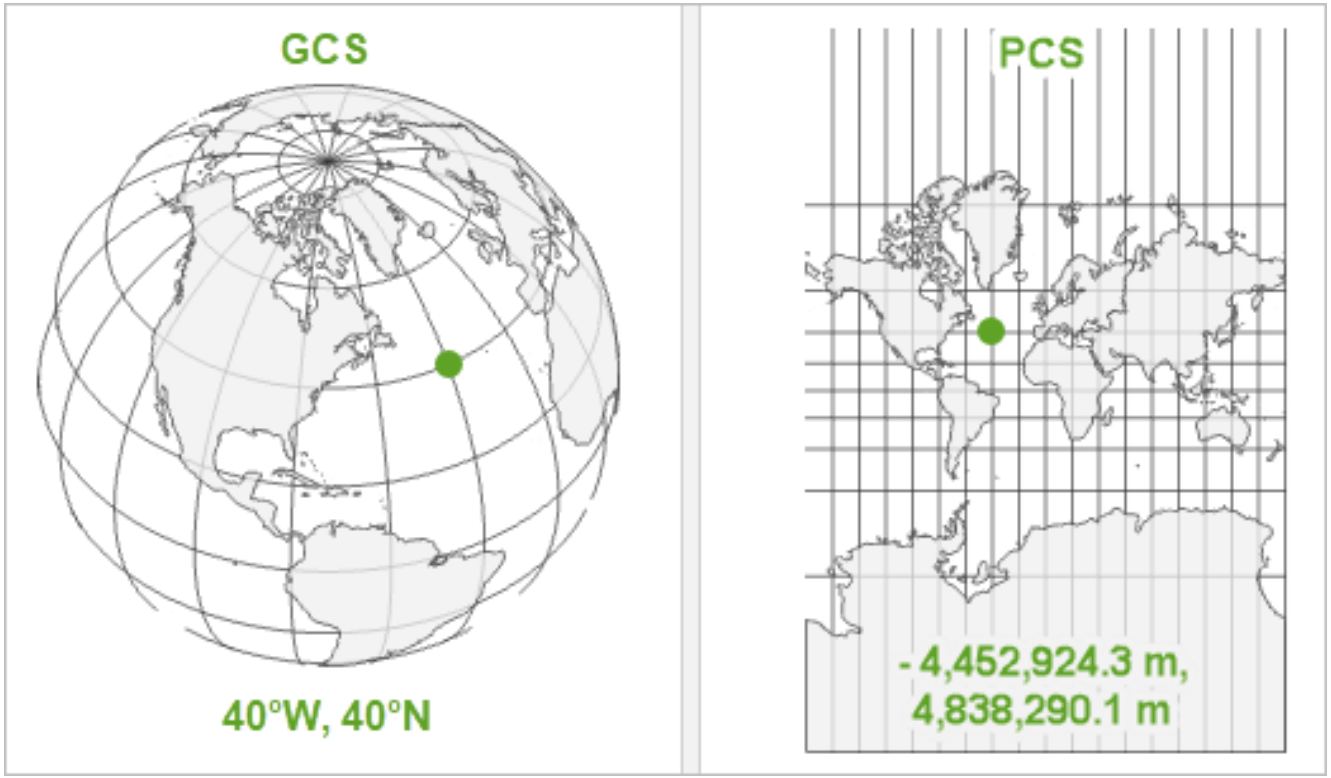
https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/coordinate-systems-difference

Projected Coordinate System

A **projected coordinate system (PCS)** is flat. It contains a GCS, but it converts that GCS into a flat surface, using math (the projection algorithm) and other parameters. Its units are linear, most commonly in meters.

https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/coordinate-systems-difference

Geographic vs. Projected coordinate system

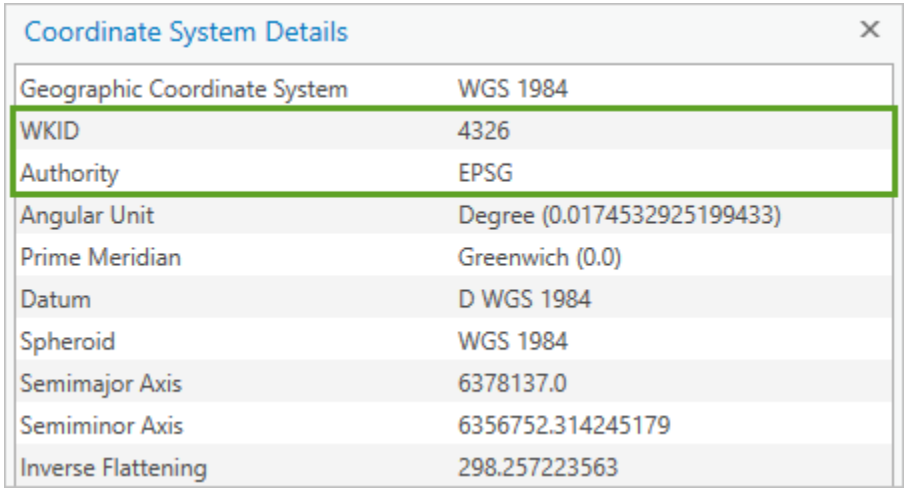


https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/coordinate-systems-difference

WKID (Well-Known ID)

A unique number assigned to a coordinate system.

Authority of WKID will either be EPSG (European Petroleum Survey Group) or Esri.



https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/coordinate-systems-difference

WKID Database

Search more about a coordinate system from EPGS website.

https://epsg.io/

Demo

Demo

- Explore coordinate system of a Feature Class or Dataset
- Find information about GCS and PCS
- Explore WKID Database

Exercise

1. Discover the Coordinate System of a Feature Class.
2. Find more information about the **GCS** (based on WKID or name) from https://epsg.io/
3. Find more information about the **PCS** (based on WKID or name) from https://epsg.io/

Key terms

Coordinate System

Map Projection

Spatial Reference (SR)

Geodetic Datum

Preview for Season 6

- Managing Projections in ArcGIS Pro.
- Coordinate Transformations.

References

What is a Geodatabase?

https://pro.arcgis.com/en/pro-app/latest/help/data/geodatabases/overview/what-is-a-geodatabase-.htm