## Quick Start Guide

To Finding Data/Imagery for Student Investigations

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### Aerosols: Tiny liquid or solid particles dispersed in the atmosphere; can be caused by natural processes or human activity.
- Air quality and pollution (ESS3.C)
- Earth’s energy budget (ESS2.A)
- Weather & climate (ESS2.D)

### Black Marble/Earth at Night: Nighttime view of Earth, showing visible light emanating from man-made sources, e.g., city lights.
- Urban growth/heat Islands (ESS3.C)
- Power outages (ESS3.C)
- Seasonal migration (LS2.C)

### Blue Marble Next Generation: Composite images showing how the surface would look to a human in space if our world had no clouds and no atmosphere.
- Seasonal changes on land surface (spring greening, snowmelt, drought, etc.) (LS2.A, ESS2.D)

### Climate: Solar Insolation, temperature, precipitation, albedo, greenhouse gases/carbon, aerosols, and topography.
- Factors contributing to global and regional climate (ESS2.D)

### Earth System: Solar insolation, surface temperature, cloud fraction, aerosols, precipitation, and vegetation index.
- Earth system and cycles (ESS2.A)

### Land Cover Classification: Maps displaying the Earth’s natural and human-made landscapes as color-coded categories.
- Land cover changes (ESS3.C, LS2.C)

### Land Surface: Since 1972, Landsat satellites have been observing Earth’s land surfaces and coastal regions.
- Coastal changes (ESS2.C)
- Deforestation (ESS3.C)
- Ecosystems (LS2.C)
- Natural hazards & disasters (ESS3.B)
- Sea ice movement (ESS3.B)
- Water & land use changes (ESS2.C)

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This table lists examples of NASA datasets and imagery that could be used for student investigations related to content and practices in the Framework for K–12 Science Education. Explore the data on the left using the online sources listed on the right. Many datasets are available through multiple sources; each source provides unique features, analytical tools, and time periods. Sources are color coded for relative level/ease-of-use: BLUE (introductory), ORANGE (intermediate), and GREEN (advanced).

For additional information and to link to the resources below, go to the interactive table at: [http://k12datapaths.strategies.org](http://k12datapaths.strategies.org)

www.nasa.gov
### Data examples that students can use…

- **Land Surface Temperature**: Temperature of what is on the land surface (e.g., snow and ice, grass, roads), which is different from air temperature. Land temperature anomaly maps show higher or lower than average temperatures.

- **Precipitation**: Global and regional rain and snow accumulation.

- **Radiation and Energy**: Albedo — relative amount of incoming radiation reflected up; Solar insolation — amount of Sun’s energy that reaches the surface; Solar radiation — amount of sunlight reflected by Earth’s surface, clouds, & atmosphere (shortwave) or absorbed then emitted by Earth’s surface, water vapor, gases, and aerosols (longwave).

- **Sea Ice**: Sea ice changes the normally dark blue ocean into solid white ice. This affects weather and climate — sunlight that would be absorbed by the ocean is now reflected back by the ice, due to its high albedo.

- **Sea Surface Temperature**: Temperature of the very top layer of the ocean and other large bodies of water.

- **Vegetation and Leaf Area Indices**: Measure of the “greenness” of Earth’s landscapes — where and how much green leaf vegetation was growing during a time period.

- **Weather**: Atmospheric temperature, pressure, radiation, and water vapor, precipitation.

### Data examples that educators can use…

- **Global warming (ESS3.D)**
- **Urban heat islands (ESS3.C)**
- **Weather/seasons (ESS2.D)**

- **Natural hazards and disasters (floods, landslides, severe storms) (ESS3.B)**

- **Earth’s energy budget (PS3.D)**
- **Electromagnetic radiation (PS4.B)**

- **Carbon cycle/carbon in ocean (PS3.D)**
- **El Niño (ESS2C, ESS2.D)**

- **Deforestation (ESS3.C, LS2.C)**

### …to investigate these types of phenomena…

- **Global warming (ESS3.D)**
- **Urban heat islands (ESS3.C)**
- **Weather/seasons (ESS2.D)**

- **Natural hazards and disasters (floods, landslides, severe storms) (ESS3.B)**

### …to make connections to K–12 content and practices…

- **Land warming (ESS3.D)**
- **Urban heat islands (ESS3.C)**
- **Weather/seasons (ESS2.D)**

- **Natural hazards and disasters (floods, landslides, severe storms) (ESS3.B)**

### …using these online sources of data.

- **The GLOBE Program**: [https://www.globe.gov/globe-data](https://www.globe.gov/globe-data)
- **MY NASA DATA**: [http://mynasadata.larc.nasa.gov](http://mynasadata.larc.nasa.gov)
- **Precipitation Measurement Missions**: [https://pmm.nasa.gov/data-access/visualization](https://pmm.nasa.gov/data-access/visualization)
- **NEO**: [http://neo.sci.gsfc.nasa.gov](http://neo.sci.gsfc.nasa.gov)
- **Google Earth Engine Time Lapses**: [https://earthengine.google.com/timelapse](https://earthengine.google.com/timelapse)
- **Worldview**: [http://worldview.earthdata.nasa.gov](http://worldview.earthdata.nasa.gov)

### INTRODUCTORY

- **Land Surface Temperature**
- **Precipitation**
- **Radiation and Energy**
- **Sea Ice**
- **Sea Surface Temperature**
- **Vegetation and Leaf Area Indices**
- **Weather**

### INTERMEDIATE

- **Global warming**
- **Urban heat islands**
- **Weather/seasons**
- **Natural hazards and disasters**

### ADVANCED

- **Earth’s energy budget**
- **Electromagnetic radiation**
- **Carbon cycle/carbon in ocean**
- **Deforestation**
- **Forested and crop health**
- **Plant growth patterns**
- **Seasonal changes**
- **Weather and climate**