Introduction To Basics In Remote Sensing

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What is Remote Sensing

Science of obtaining information about objects or areas from a distance

Timeline of Remote sensing

1858

First Aerial photograph

Gasper Felix Tournachon ‘Nadar’

1908

Aerial reconnaissance

Aerial reconnaissance cameras were used in airplanes to collect photographs

2019

UAVs

Fixed wing drones and multi rotor drones have revolutionized every aspect of human life.

1903

Breast mounted camera for pigeons

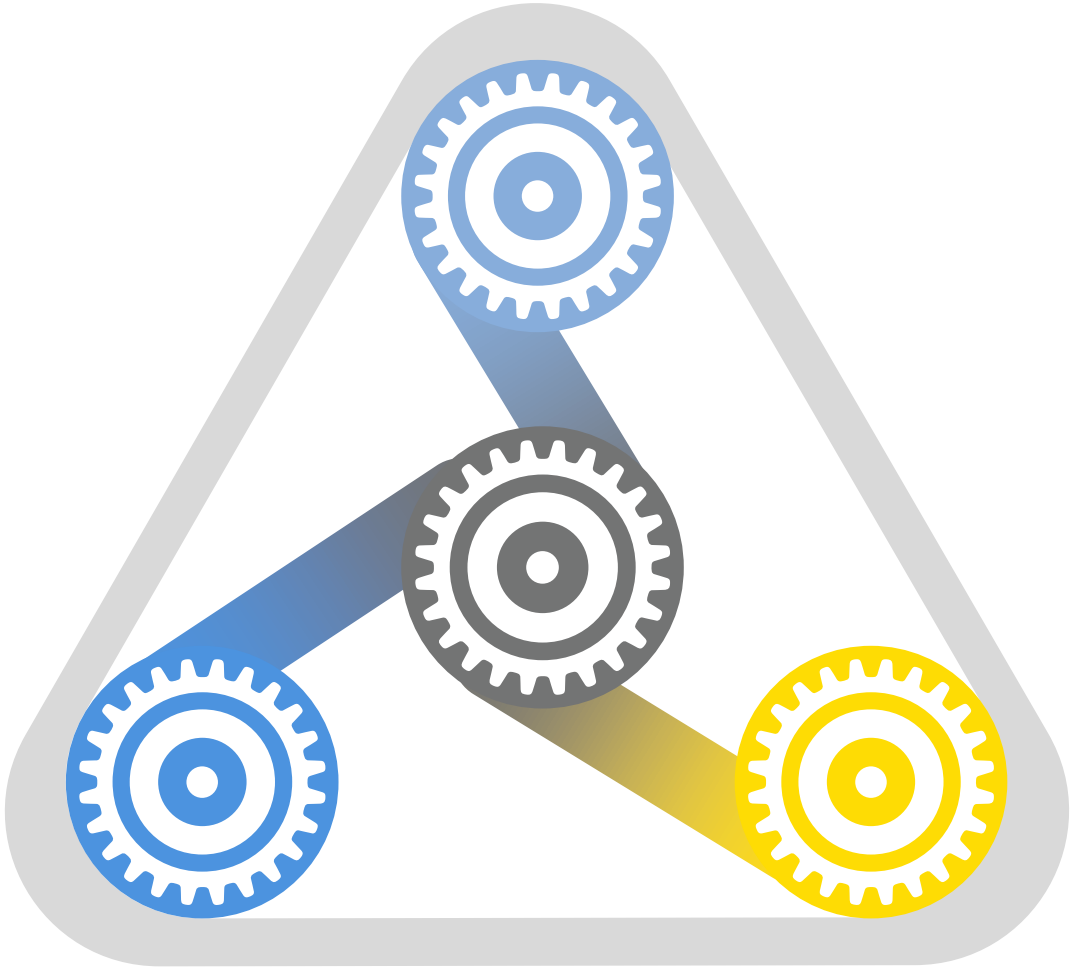
Cameras attached to pigeons were used to collect photographs from higher elevation.

1960

Space photography

Gemini and Apollo space photography through satellite platforms followed by Landsat satellites.

Breaking down Remote Sensing



Remote Sensing Components

Remote sensing in general consist of three main compulsory components for a complete transition from data collection up to useful information which helps in decision making.

Sensor

Sensor will collect scattered or emitted energy from a target.

Platform

The vessel which will accommodate the sensor in ground, air or space.

Image processing

Conversion of raw collected data from sensors to useful information.

Q: Humans have 5 senses.

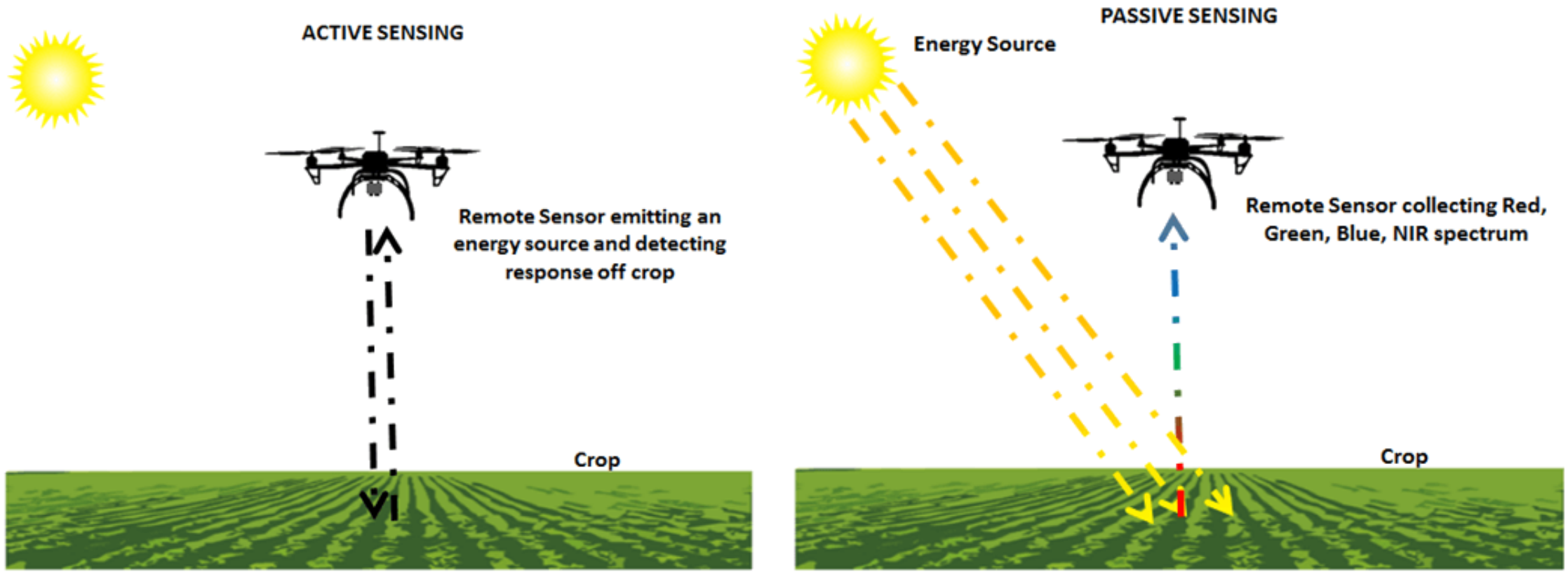
Sight
Hearing
Taste
Smell
Touch

Which of these are remote senses

Everything in the world is due to a transaction of energy

In remote sensing, sensors collect/record electromagnetic radiation **scattered** or **emitted** by a target

Think about an ordinary camera


ACTIVE SENSING
Remote Sensor emitting an energy source and detecting response off crop
Crop
PASSIVE SENSING
Energy Source
Remote Sensor collecting Red, Green, Blue, NIR spectrum
Crop

Q: Human eye is an active or passive remote sensor

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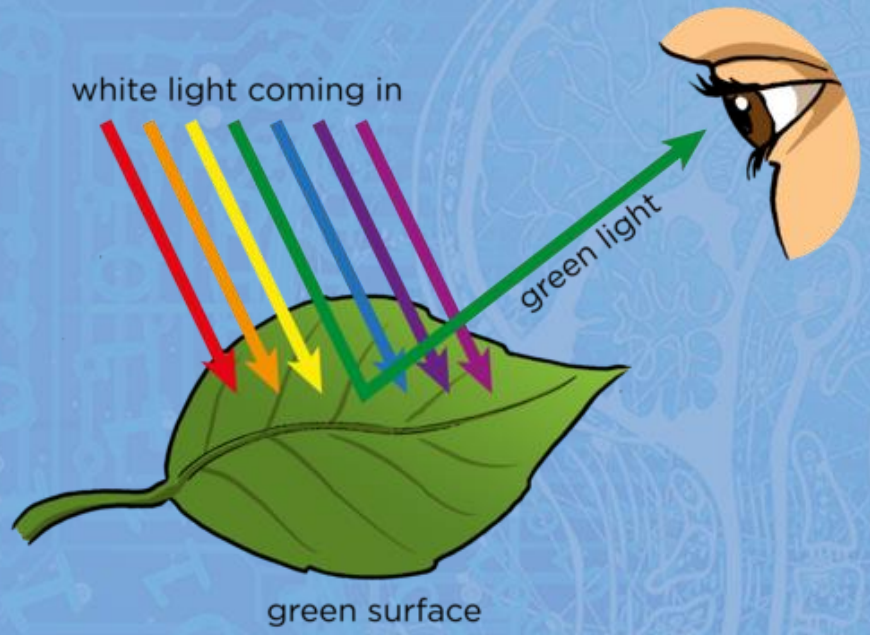
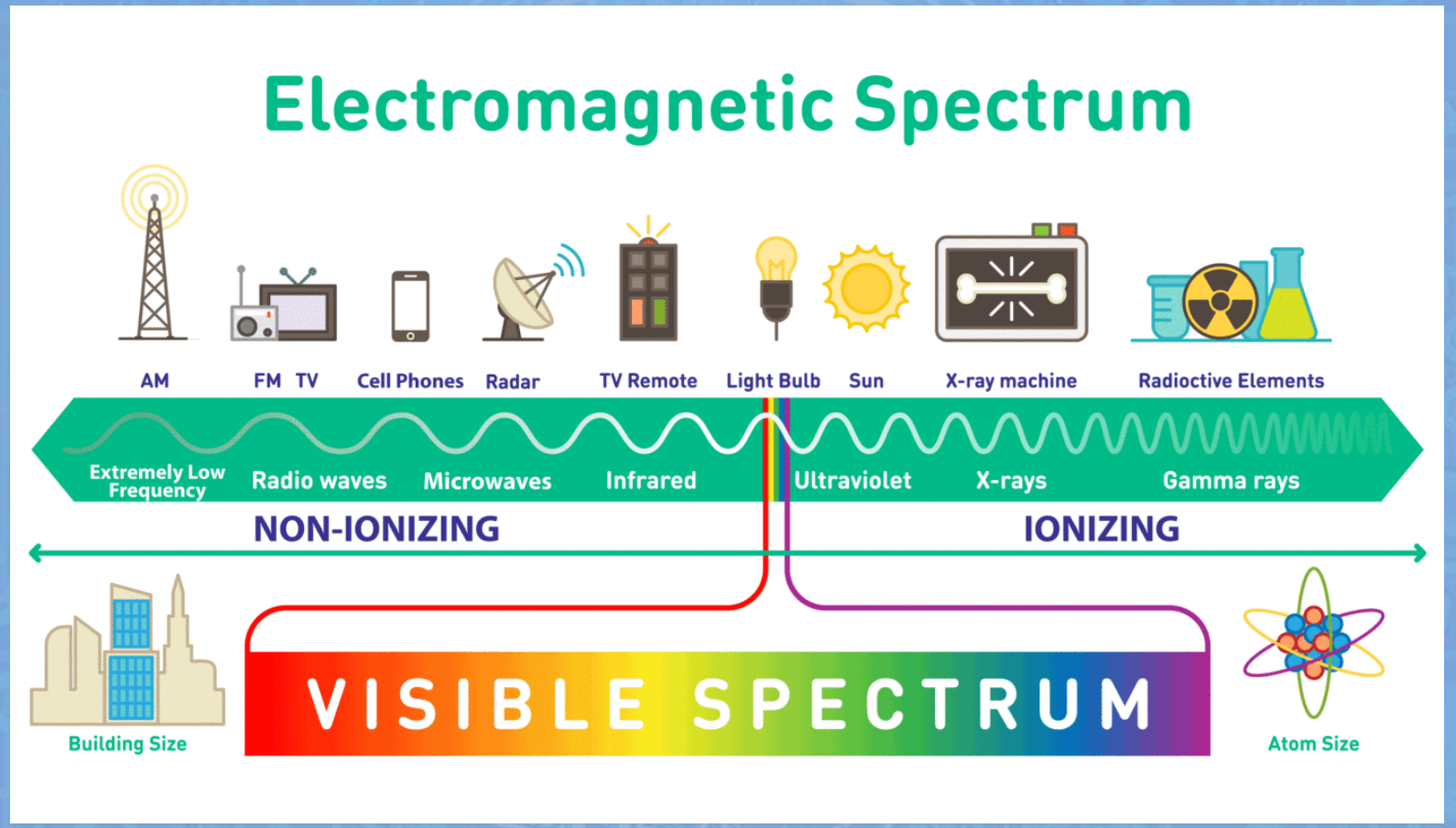


Energy for remote sensing



What energy levels can sensors detect?

Q: Humans can’t see in the dark. But how does a night vision goggle work?

Q: Different sensors can detect more than what the eye can see. How can we use this to detect anomalies in agriculture

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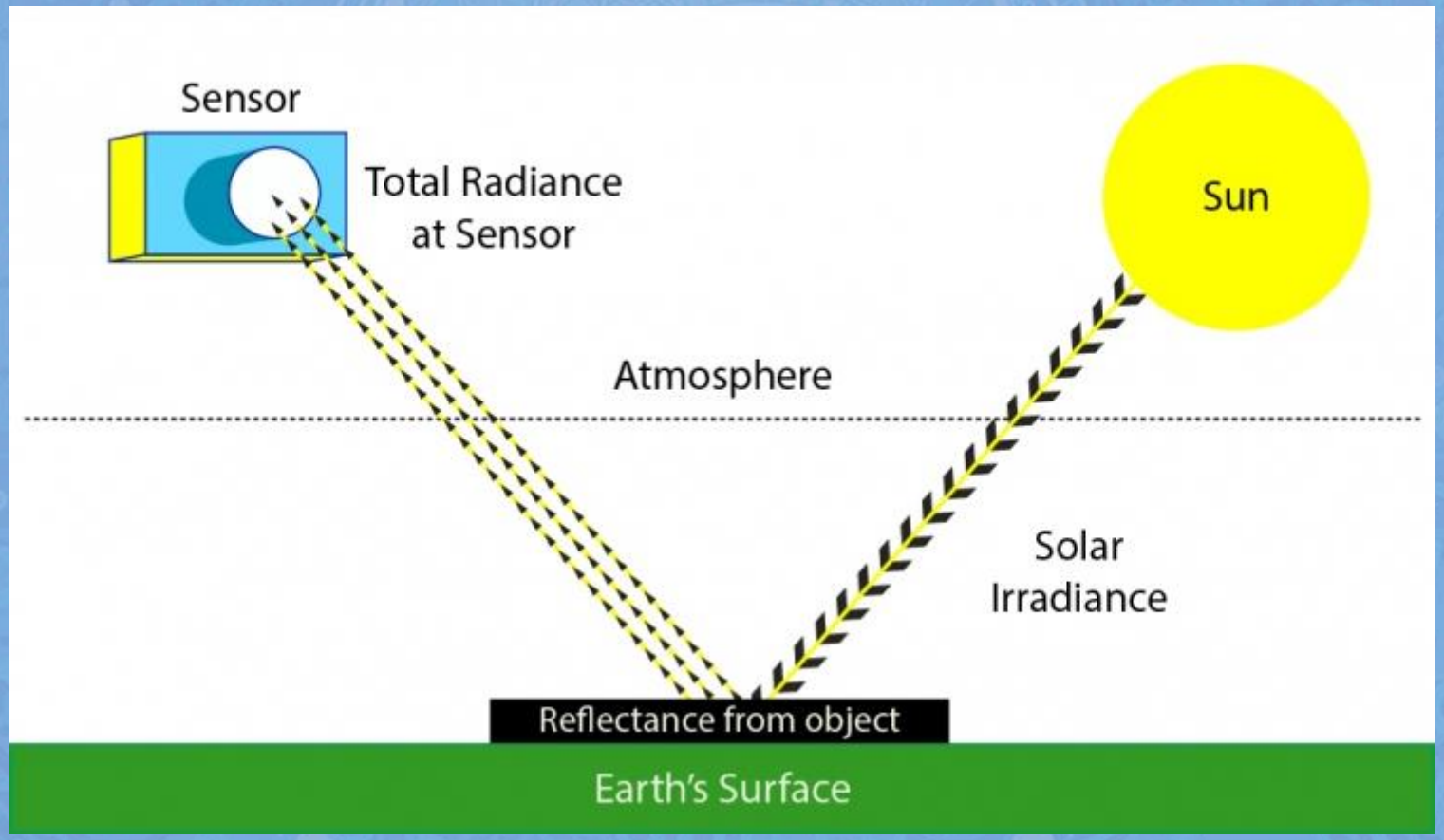
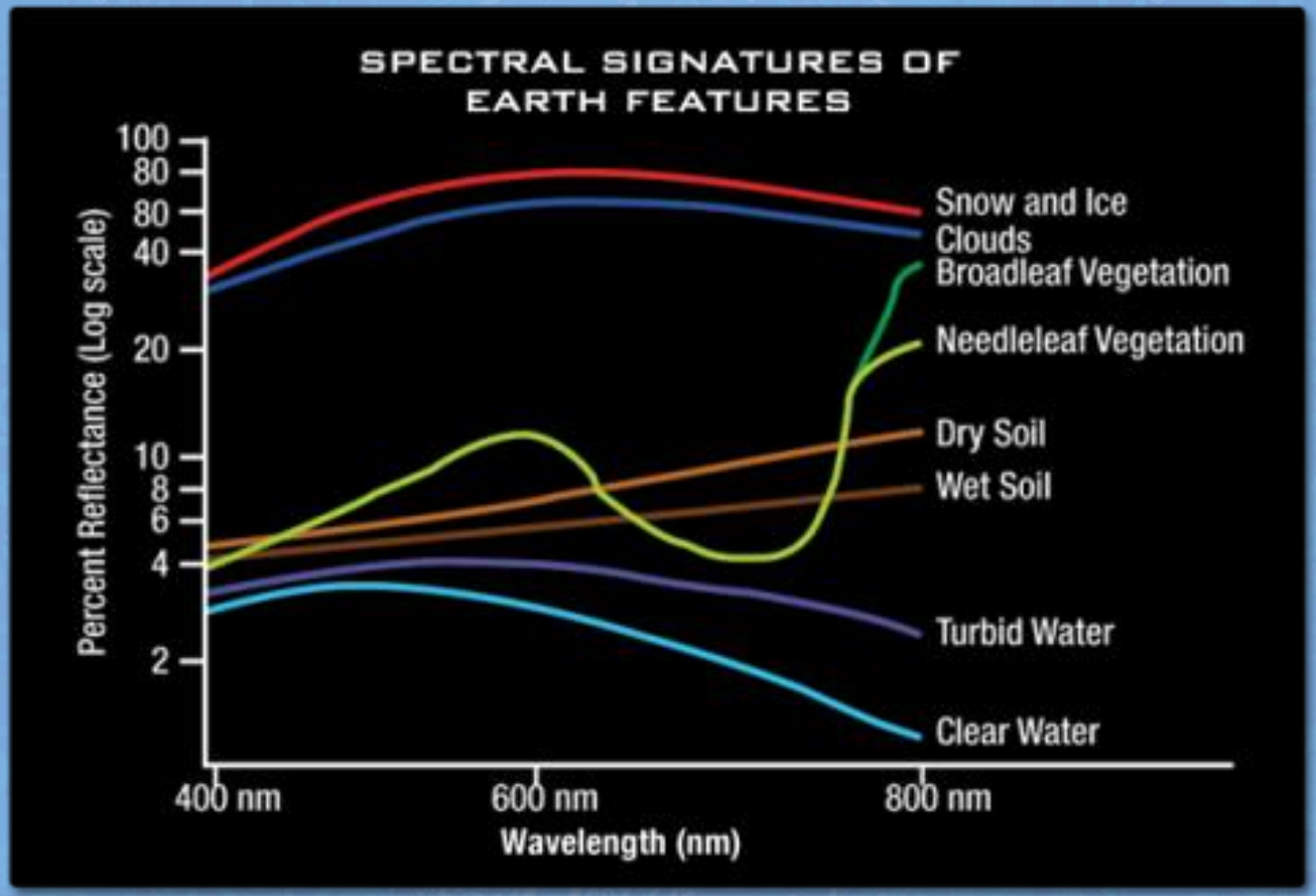
Spectral Signature

Different targets reflect and absorb different amounts of electromagnetic radiation giving them unique response to incident energy




SPECTRAL SIGNATURES OF
EARTH FEATURES
Percent Reflectance (Log scale)
100
80
80
40
20
10
8
6
4
2
Snow and Ice
Clouds
Broadleaf Vegetation
Needleleaf Vegetation
Dry Soil
Wet Soil
Turbid Water
Clear Water
400 nm
600 nm
800 nm
Wavelength (nm)

Thank You