



KEY

An Introduction to Satellites

NASA Prequel Unit



Movie: You will find the information to answer these initial questions in the "Intro to Satellites" movie.

1. Not all satellites view visible light. Depending on the mission, measurements may be taken in what ranges?

IN VIDEO
@ 1:20 ish

**VISIBLE LIGHT RANGE, MICROWAVE,
RADAR, OR INFRARED RANGE**

2. Weather and communication satellites are positioned at a point 22,238 miles above the Earth's equator in what is called a geostationary (or geosynchronous) Earth orbit. What is a geostationary satellite?

IN VIDEO
@ 2:24 ish

**A SATELLITE THAT TAKES THE SAME
TIME TO COMPLETE ONE REVOLUTION
AS THE EARTH ROTATES ONCE (APPEARS
STATIONARY)**

3. Give the difference between a geostationary and an orbiting satellite.

Geostationary satellite

Orbiting satellite

IN VIDEO
@ 3:14 ish

**SEES ONE POINT
ON EARTH ALL OF
THE TIME**

**SEES ENTIRE EARTH
OVER A LONG PERIOD
OF TIME**

IN
POWERPOINT

**MEDIUM EARTH
ORBIT**

**LOW EARTH ORBIT
~1000 km**

~10,000 km

PowerPoint: The information for these questions will be covered with the "Introduction to Satellites" Powerpoint.

Slide 2

4. In your answer to question 3, label the position (description and measured value) that geostationary and orbiting satellites are found above Earth.

Slide 3

5. The primary colors of visible radiation are different from the primary colors of paint. The primary colors of visible light are:

RED, GREEN, + BLUE

Slide 4

6. For images, satellites measure the reflectance of radiation in bands of wavelengths. If an image contains a large portion of a wavelength band, how does it appear?

IT APPEARS BRIGHT

Slide 5

7. Predict the colors of the bird in the image.

Majority color of the bird

RED

Color of feathers below claws

BLUE

Color of feathers on top of head/neck

YELLOW

Slide 6

8. Satellites compile visible wavelength data (in red, green, and blue bands) to determine the color of a pixel. Give the color of these pixels.

Primary Light Color Example

Red: dark

Green: bright

Blue: dark

Pixel is **GREEN**

Secondary Light Color Example

Red: bright

Green: dark

Blue: bright

Pixel is **MAGENTA**

Slide 7

9. Satellites measure not only visible wavelengths but also infrared and microwave wavelengths. The image of Rawhide Energy Station was taken in the infrared range. What objects are the warmest? What regions are the coldest?

Warmest

**THE LAKE ON RIGHT
SIDE** (cools plant down)

**THE ROCKS IN
MOUNTAINS/FOOTHILLS
ON THE LEFT**

Coldest

**DARK REGIONS
IN THE MIDDLE OF
PICTURE**

(I suspect native vegetation)
✓

Slide 8 & 9 – no notes

Next, we will analyze satellite images of Fort Collins in the visible radiation range. Later, we will analyze satellite images in the infrared radiation range.