

Module E

Unit 2

Lesson 3

Exploration 2

Describing how Sunlight  
Affects Climate

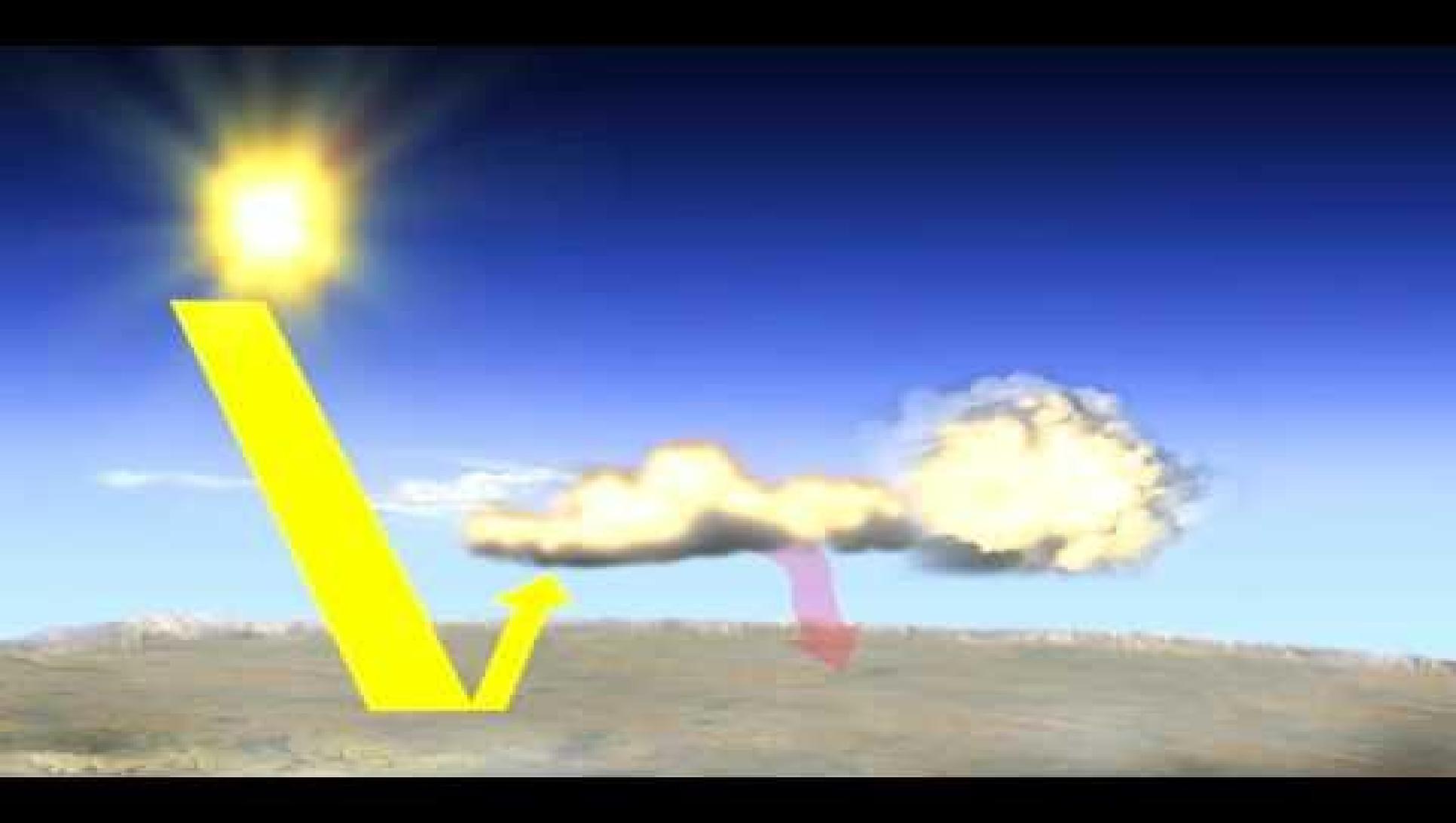
# Objective

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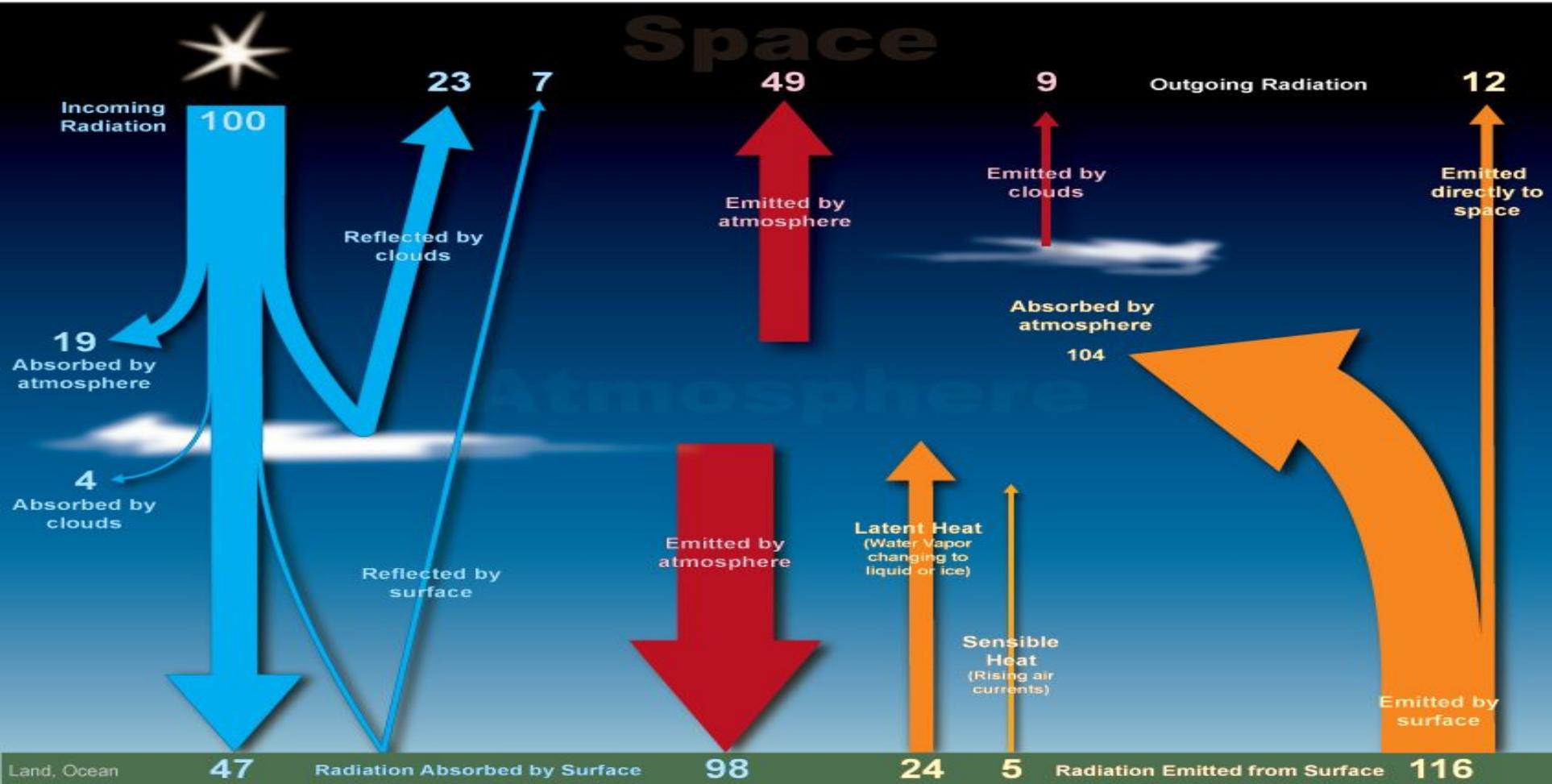
- Explore how Sunlight powers Earth's Climate system
- Examine how different surface types influence the interactions between objects and the sun

# Earth's Energy Balance

- Energy from the sun powers the Earth system and Earth's climate
- Earth emits the energy it absorbs as radiation
- This emitted energy drives currents in Earth's oceans and atmosphere and powers the climate system.
- Eventually, most of the energy emitted by Earth leaves the Earth system and goes back into space.
- The amount of energy coming into the Earth system roughly equals the amount going out.



# Create your own version of this Diagram as a Left side page



# Do Now:

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Log onto your student Ebook and complete Reflection and Absorption of Energy from the Sun Activity

# Sunlight and Latitude

- An area's climate depends on its latitude because latitude determines the intensity and amount of sunlight an area receives.
- Generally, the greater the intensity and the more sunlight received, the greater an area's temperature.
- Solar radiation arrives from the sun in essentially a straight line.
- Earth's surface is curved, some of the sun's rays strike the surface more directly, while others strike at an angle.

# Do Now

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Collaboration activity to demonstrate sunlight and Earth's tilt with flashlights and Student Ebook questions

# Albedos of Earth's Surface materials

- Albedo describes how much sunlight a surface reflects, because different materials absorb and reflect different amounts of sunlight.
- Dark-colored surfaces absorb a lot of sunlight, do not reflect much sunlight and have **low albedos**.
  - The absorbed energy warms the surfaces and the surfaces warm the air above them.
- Light-colored surfaces reflect a lot of sunlight, so they have **high albedos**.
  - Surfaces stay somewhat cool because these surfaces are cool, the air above these surfaces stays cool, too.



HIGH ALBEDO  
REFLECT A  
LOT OF SUN

40 CELSIUS  
104 FAHRENHEIT  
THAT'S HOT!



# Earth's Albedo

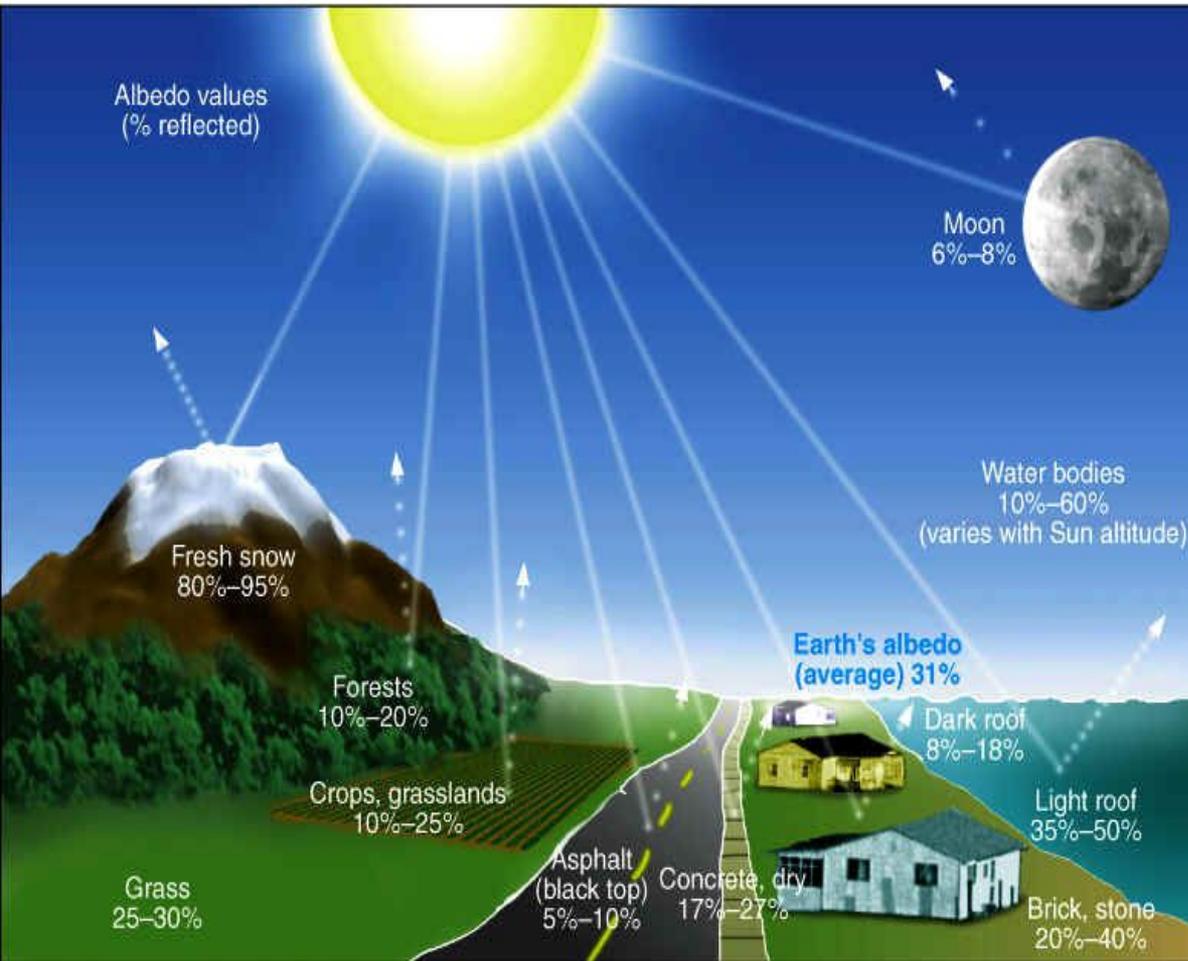


Table showing albedos of different materials from "Fundamentals of Remote Sensing and Airphoto Interpretation" by Avery and Berlin 1992

Material	Percent Reflected
Fresh Snow	80-95
Thick Cloud	70-80
Water (sun near horizon)	50-80
Old Snow	50-60
Light soil	25-45
Thin Cloud	20-30
Dry soil	20-25
Wet soil	15-25
Deciduous forest	15-20
Dark soil	5-15
Asphalt	5-10
Crops	10-25
Coniferous forest	10-15
Water (sun near zenith)	3-5

# Do Now

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1. Albedo Surface type activity in Student Ebook
2. Left side page describing how the albedos of the surfaces in Singapore and the Taklamakan Desert affect their climate?

# Do Now

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1. Complete the Explain the Albedo Affect activity in Student Ebook