

**TD°04 : Climate Factors****1. The Earth's energy budget refers to:**

- a. The total solar energy absorbed by the oceans only
- b. The balance between incoming solar radiation and outgoing terrestrial radiation
- c. The energy produced by Earth's internal heat sources
- d. The sum of all albedo values on Earth

2. .... refers to the proportion of incoming solar radiation reflected by a surface

**3. Which of the following surfaces has the lowest albedo?**

- a. Fresh snow
- b. Desert sand
- c. Tropical forest
- d. Sea ice

**4. When albedo increases, the amount of absorbed solar energy:**

- a. Increases
- b. Decreases
- c. Remains constant
- d. Depends on the latitude

5. The albedo of fresh snow is approximately .....

6. During the night, air moves from the ..... toward the ....., forming a land breeze.

**7. During the day, a sea breeze develops because:**

- a. The sea surface warms faster than the land surface
- b. The land heats up faster, creating a low-pressure zone
- c. The air above the sea is warmer and rises.
- d. The land temperature is higher than the sea temperature.

8. The Foehn effect involves a cold, .....air mass that becomes ..... and ..... as it passes over a mountain range.

**9. The Foehn effect is characterized by:**

- a. Cold, dry winds on the windward side of a mountain
- b. Warm, dry winds on the leeward side
- c. Heavy precipitation on the windward slope of the mountain.
- d. A drop in temperature on the leeward side.

9. The temperature near the ground is mainly controlled by energy exchanges between the ..... and the .....

- **True or False (justify briefly)**

1. Dark surfaces have a higher albedo than light surfaces.
2. Clouds generally increase the Earth's overall albedo.
3. The soil has high thermal conductivity, allowing heat to penetrate deep layers rapidly.
4. The adret slope in the Northern Hemisphere receives less solar energy than the ubac slope.
5. Land cools more slowly than the sea at night.

- **Complete the table**

Feature	Land	Sea
Rate of heating and cooling		
Thermal capacity		
Daytime breeze		
Nighttime breeze		

✚ **Draw a diagram to explain Foehn effect.**

- **Provide explanations for the following:**

1. Explain how surface albedo influences the local and global climate
2. Why does vegetation cover reduce the daily temperature range of the soil?
3. Describe the processes that lead to the formation of a sea breeze during the day.
4. Why do adret slopes favor different types of vegetation compared to ubac slopes?

- **Case study:**

1. Suppose a region is gradually losing its snow cover due to global warming. Explain the feedback mechanism involving albedo that could amplify local warming.
2. If the Earth's average albedo increased from 0.30 to 0.35, what general climatic effect would you expect? Explain the reasoning in terms of energy balance.

