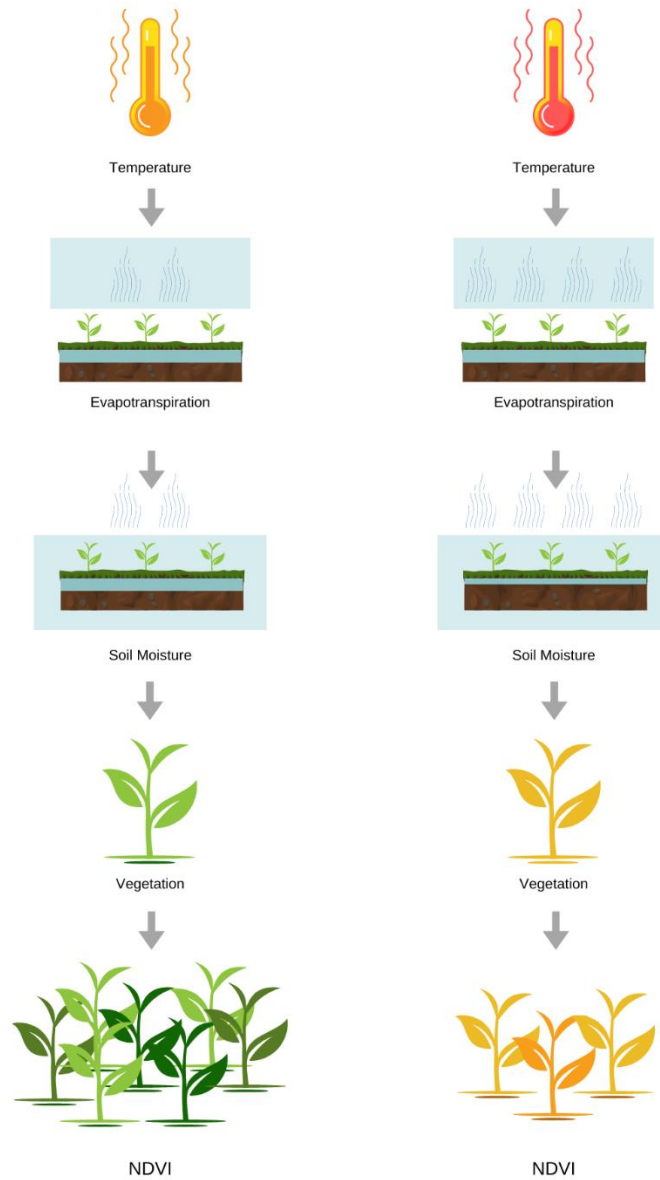
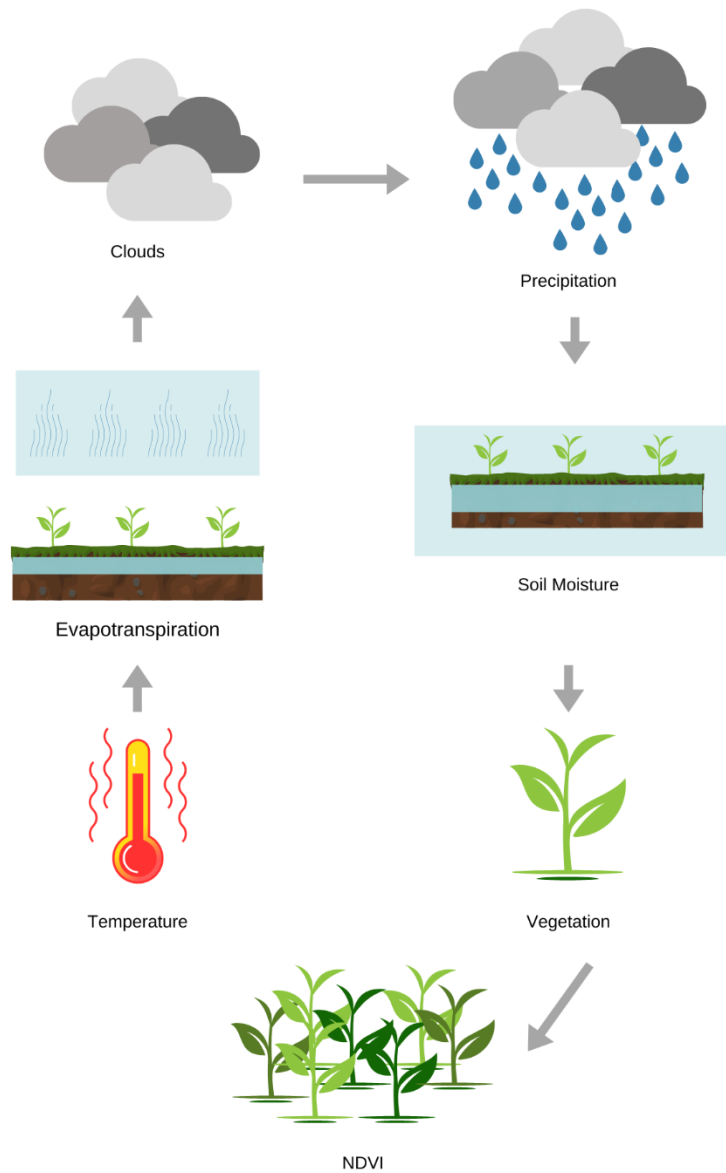


Temperature, Evaporation, and Vegetation

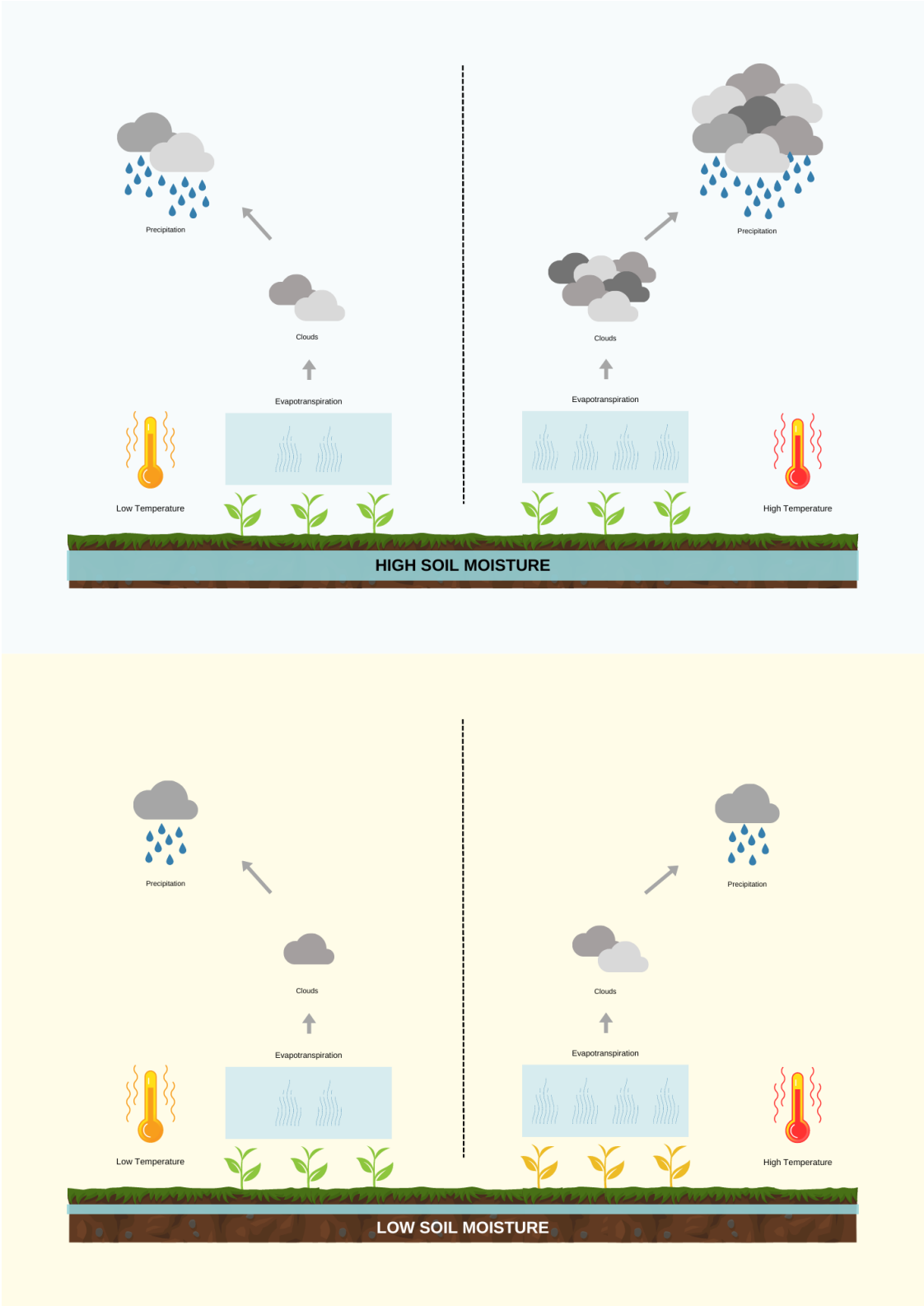


Milder or cooler temperatures leads to less water leaving the ground through evapotranspiration. The soil moisture is preserved and plants remain green and happy. Hotter temperatures causes more water leaving the ground. It reduces soil moisture that can lead to plants experiencing water stress and unhappy.



When temperatures are warmer, more water leaves the ground and clouds starts to form. When the cloud becomes full of water, rain happens and it restores the moisture in the soil. The plants get water and they are happy.

Temperature-evaporation-plant relation



High moisture conditions

In high moisture conditions, lower temperatures lead to less evaporation. Less clouds are formed and less rain is expected. Higher temperatures may lead to more evaporation and more cloud formation which results in more rain. In high moisture conditions, the plants have enough water and they remain happy.

Low moisture conditions

In low moisture conditions, the limited moisture in the soil limits the amount of water that evaporates from the soil. Lower temperatures lead to less evaporation with less cloud formation and less expected rain. Higher temperatures lead to more evaporation but since the moisture in soil is limited, the amount of water vapour in the air to form clouds and rain are also limited. In higher temperatures, if too much evaporation happens, the plants do not have sufficient water and they wilt and become unhappy.

Additional Explanation and information (may be added if possible but not necessary)

PRECIPITATION

What kind of precipitation is expected in today's climate?

In today's climate, more intense but less frequent precipitation is expected. Why?

Higher temperatures lead to more evaporation and more intense precipitation. If the effect continues it can lead to a prolonged drought. When combined with more evaporation, dry periods become more intense causing drought.

Typical questions to ask:

1. How much does it rain today?
2. Does it rain the same amount between the three schools?

Effects between variables:

Precipitation and Temperature

- precipitation decreases earth's surface temperature

Precipitation and Soil Moisture

- precipitation increases soil moisture

Precipitation and Vegetation

- Precipitation provides water for vegetation, so more precipitation increases GPP
- However, precipitation amount depends on intensity and frequency
- Important: even though precipitation intensity is high, if it occurs in low frequency, GPP may decrease because dry periods between precipitation events are too long

Precipitation and clouds

- Rain happens when clouds are becoming too full of water.
- Think about a sponge! A sponge absorbs water but when there is too much water in the sponge, it starts dripping out. A cloud is quite similar to that. When it starts being too full of water, it drips out rain.

EVAPORATION

Typical questions to ask:

1. How much water evaporates today?
2. How much water evaporates today compared to yesterday?

Evaporation and temperature

- Higher temperature results in higher evaporation

- Think about water boiling in a pan. When you just put the pot of water on the fire, not much (or even no) water vapor leaving the pot is visible. Once, the water is hot, more water vapor leaving the pot is visible

Evaporation and precipitation

- Water coming down from the sky also originates from water on the surface of the earth. When there is more water evaporating from the earth's surface, there will be more water coming down as rain. More evaporation leads to more precipitation.

SOIL MOISTURE

Typical questions to ask:

1. How does soil moisture compare in different days of different temperature?
2. How do plants respond to different levels of soil moisture?

Soil moisture and evaporation

- Evaporation takes up water from the earth's surface
- More evaporation means less soil moisture

Soil moisture and vegetation (in longer timescale)

- Plants need water to grow well. When soil moisture decreases, water supply for plants decreases, and plants can experience drought (dry out)

TEMPERATURE

Typical questions to ask:

1. What is the temperature today?
2. How has the temperature change in the past week?

Effects between variables:

- See evaporation and precipitation

CLOUDS

Typical questions to ask:

1. Are there clouds present today?
2. What type of cloud is present today?
3. Do different clouds result in different types of rain?

Effects between variables:

- See precipitation

VEGETATION (GPP) and NDVI

Typical questions to ask:

1. Is the vegetation well-watered?
2. Are there lots of leaves shedding?

Effects between variables:

- See precipitation and soil moisture