

Midterm Concept and “Things to Know”

Week 1: Introduction to weather and climate, Introduction to the Pacific Islands

What are the four main parts (or spheres) of the Earth?
What is the difference between Weather and Climate?
What are the main variables (types of information) we associate with weather?

Which island in the Hawaiian Island Chain is the oldest? Youngest?
List the Hawaiian Islands from oldest to youngest.
How does the scientifically derived ages of the Hawaiian Islands differ from the mythological ages?
Describe the general starting point and direction of Polynesian colonization of the Pacific Islands.
In approximately what year were the Hawaiian Islands colonized?
What are the three main cultural subgroups of the Pacific Island region?
What are some of the environmental issues faced by small island nations?

Week 2: Temperature, Clothing, and Fabrics

What is the general composition of gases air (in percentages)?
What are the four main layers of the atmosphere? What are the dividing layers?
How does temperature change in each layer (increase or decrease with altitude)?
Why do we have seasons?
What is the tilt of the earth in degrees?
How is the tilt of the earth related to the seasons?
What are the three temperature scales? What values mark freezing and boiling on each?
How does temperature vary on a 24 hour cycle? (when is it warmest, coldest)?
List the main controls for temperature. How does each control modify temperature?

What are the four main types of islands?
What type of clothing is characteristic of each climate zone?
What is the main type of tree used to make bark cloth? What is the Hawaiian word for this tree?
What did Hawaiian Chiefs (Ali'i) traditionally wear that commoners did not?
How is Maori clothing different than the clothing worn by Pacific Islanders to the north (e.g. Samoa, Hawaii)?

Week 3: Water in the Atmosphere, Clouds, and Stability

What are the 4 ways we discussed in class to describe moisture in the air?
What are the 4 ways to make air rise?
What are the main ways we classify clouds?
How does the water cycle work? During which processes is energy released into the atmosphere? During which processes is energy absorbed from the atmosphere?
How do changes in humidity relate to changes in temperature?
Why are the Dry and Wet Adiabatic Lapse Rates different?
What are the three types of stability discussed in class?
How is a cloud formed? What three things do you need?

What are the different types of fog?

How are clouds used in myths and proverbs?

How does the Hawaiian word *pua'a* relate to clouds?

Week 4: Precipitation Processes and Precipitation Types

What is the name of the process that causes precipitation in warm clouds?

What is the name of the process that causes precipitation in cold clouds?

How big are cloud drops? How big are rain drops?

On average, how many cloud drops does it take to make a single rain drop?

What are the three ways mentioned in class to take area averages of precipitation?

What are the different types of precipitation?

How does temperature change with height for each type of precipitation?

Who is Kane? Who is Kanaloa? Why are they important?

What was the meaning/importance of the story of Kawaihapai?

Based Global Precipitation Distribution Map, what is the average precipitation amount for the majority of Pacific Islands?

What type of precipitation is most common on the Pacific Islands?

What Islands have snow?

Week 5: Pressure and Wind

What are the main forces that cause wind to blow?

The pressure gradient force causes wind to blow in what direction? (hint: think of different regions of pressures, high and low).

What causes horizontal differences in pressure?

What type of air is more dense, warm or cold air? What type of air is less dense, warm or cold air?

What direction does the Coriolis Force pull wind in the Northern Hemisphere? In the Southern Hemisphere?

What two things determine the magnitude of the Coriolis Force?

What's the difference between a Gradient Wind and a Geostrophic Wind?

How does friction modify the direction of the wind at the surface after PGF and Coriolis are already accounted for?

In which direction do winds blow (clockwise, counter clockwise, spiraling in or spiraling out) for anticyclonic flow around a High pressure system in the Northern Hemisphere and the Southern Hemisphere?

In which direction do winds blow (clockwise, counter clockwise, spiraling in or spiraling out) for cyclonic flow around a LOW pressure system in the Northern Hemisphere and the Southern Hemisphere?

Which direction do the Westerlies and Trade Winds blow?

What is El Nino?

How are global wind patterns related to ocean currents?

How does El Nino and La Nina affect the Pacific Islands? Hawaii?

How do subtropical highs and the equatorial low relate to weather in the Pacific Islands?

How do the westerlies and trade winds relate to the colonization of the Pacific Islands?

Week 6: Local and Hawaiian Winds

Be able to describe why the sea breeze and land breezes blow.

Be able to describe why the mountain and valley breezes blow.

Explain how a country breeze works.

Explain how Chinkook (Foehn), Katabatic, and Santa Ana breezes are related.

How do the large scale winds relate to the discovery of the Pacific Islands, like Rapa Nui (Easter Island)?

What local winds do we typically see in the Pacific Islands?

What types of local winds do we not typically see in the Pacific Islands? Why is this the case?

What role does topography of the Pacific Islands play in determining local winds?

Explain the “rain shadow” effect we see on islands with mountainous terrain. How is this related to local and prevailing wind directions?

How did locals learn the local winds for their area? Why is this important to the Hawaiian culture?

What type of information about an Hawaiian wind can be included in the name?

What determines the strength of the trade winds on the various Hawaiian Islands?

Which islands have the highest mountains? What do these mountains do to the trade wind flow?

Why is the city of Hana on Maui so wet?

How does the spacing of the islands effect the speed of the trade winds? Where do we see these changes?

Week 7: Ocean Currents and Waves

How are winds and wave size related?

What three parameters are used to describe waves?

How does a water molecule move as a wave is passing?

What are spring tides and neap tides?

What are the three types of tidal cycles? Which one(s) is the type we observe in Hawaii?

What is the main factor that determines the type of wave break you see at a beach?

What ocean properties are related to ocean currents?

What is the thermohaline circulation? Why is it important for climate?

What ocean gyre are the Hawaiian Islands located near? What ocean gyre are the majority of Pacific Islands located near?

What are the six main types of Hawaiian surf sports? How are they different?

What are the main types of surf boards? How are they different?

What four men can be credited with making surfing popular again in the early 1900s?

Who is the most famous Native Hawaiian surfer?