8TH grade Climate Notes
Week 24
Monday

Climate: Components

Climate is the characteristic weather conditions in a place over a <u>long period</u>

When we talk about climate we are referring to two main aspects:

Climate: Components

Temperature: the temperature average over a year and/or a monthly temperature average.

Climate: Components

Precipitation: either the amount of total precipitation in a year or a monthly average
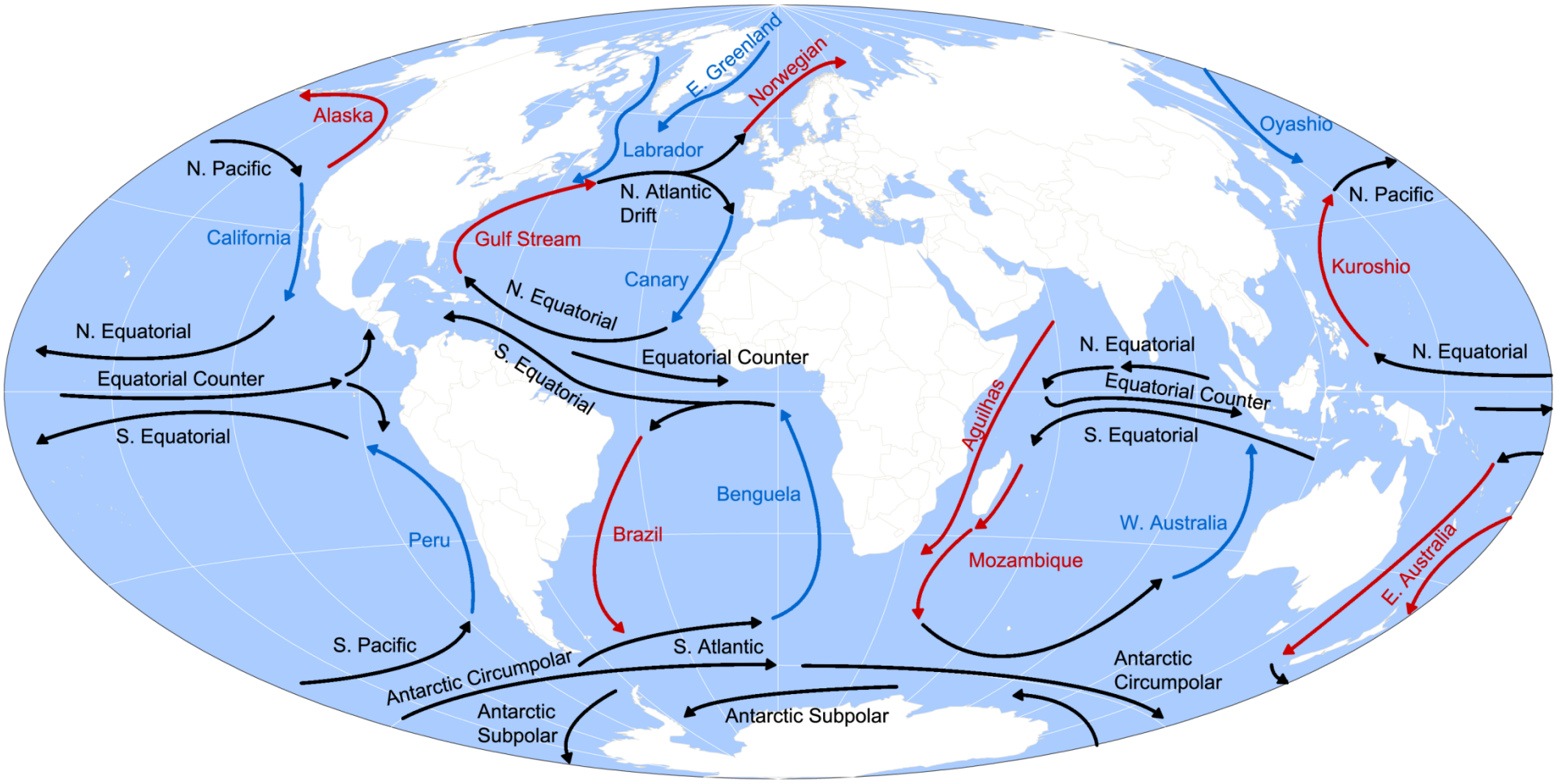
Climate: Factors

Five Factors affect climate

Altitude

Latitude

Large bodies of water

Ocean Currents

Seasonal Patterns

Base map courtesy of http://www.freeworldmaps.net

Climate: Factors

Altitude

As you go higher up in the atmosphere, the colder it gets
Places in high elevation (7000 ft. +) have colder climates
Example:
Mt. Kilimanjaro

Climate: Factors

Latitude

The closer to the equator the warmer the climate is…
Example: south Florida is warmer than Michigan

Climate: Factors

Large Bodies of Water

Oceans, seas affect the temperature and precipitation of coastal cities

Coast → edge of land, next to ocean, sea, lake

Coastal → on the coast

Climate: Factors

Ocean Currents

The TEMPERATURE of an ocean current (warm, cold) affects climate

OCEAN CURRENT → movement of water…

Climate: Factors

Seasonal Patterns

a) TEMPERATE AREAS → have "seasons"...like Michigan

b) PRECIPITATION

Wet or dry seasons

Reading Climate Graphs

Climate graphs show the two components of climate:

Temperature

&

Precipitation

Reading Climate Graphs

Temperature:

The graphs can show the average temp for the month OR the average high and low temp for the month

Units used:

Mostly in Celsius (C) but also sometimes in Fahrenheit (F)

Reading Climate Graphs

Precipitation

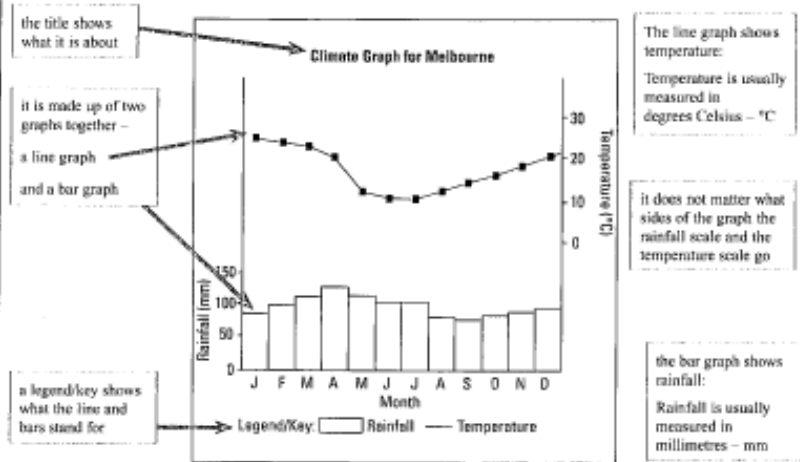**The graphs can show the average precipitation for the month**

Units used:

Mostly in millimeters (mm) but also sometimes in inches (in.)

A graph about climate is called a **climograph**.

Melbourne is a city in the southeast of Australia and in the southern hemisphere. This means it has a temperate climate. For example, its summer is warm-hot, its spring and autumn are balmy and mild, its winter is cool. This is what its climagraph looks like.

EXAMPLE OF A CLIMATE GRAPH

the title shows what it is about

Climate Graph for Melbourne

it is made up of two graphs together –

a line graph

and a bar graph

a legend/key shows what the line and bars stand for

Legend/Key: ☐ Rainfall — Temperature

The line graph shows temperature:

Temperature is usually measured in degrees Celsius – °C

it does not matter what sides of the graph the rainfall scale and the temperature scale go

the bar graph shows rainfall:

Rainfall is usually measured in millimetres – mm

The temperatures and rainfall are the average figures for each month – called **mean temperatures and rainfall**.

1. Colour the bars on the climograph of Melbourne and fill in the following data.

a) The line graph shows _____

b) The bar graph shows _____

c) The 12 measurements for temperature match the 12 _____ of the year.

d) The measurement used to show rainfall is _____

e) The measurement used to show temperature is _____

f) The highest temperature is _____ °C in the month of _____

g) The lowest temperature is _____ °C in the month of _____

h) The highest rainfall is _____ mm in the month of _____

i) The lowest rainfall is _____ mm in the month of _____

2. Use the climate data for Beijing (the capital of China) to fill out the Climate Graph for Beijing. Colour it in.

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temp. (°C)	-5	-2	5	14	20	25	26	25	20	13	4	3
Rainfall (mm)	4	5	8	17	35	78	243	141	58	16	11	3

Beijing, China – Climate Graph
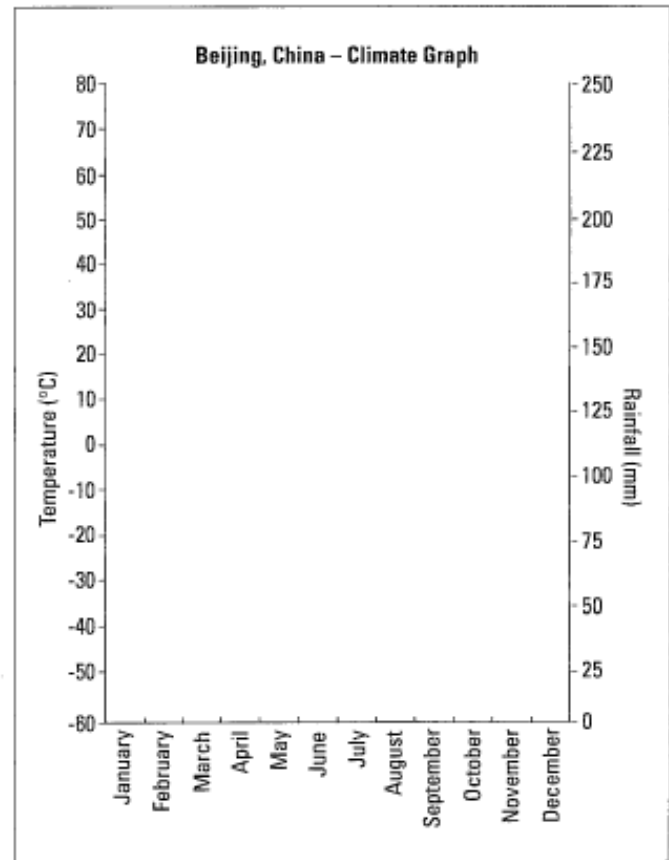
Climate graph template

Station: _____

Latitude: _____   Longitude: _____   Elevation: _____

Temperature (°C)													Rainfall (mm)

Month	J	F	M	A	M	J	J	A	S	O	N	D	Year
Av. max. temp. (°C)													Av.
Av. min. temp. (°C)													Av.
Precipitation (mm)													Total

Month	J	F	M	A	M	J	J	A	S	O	N	D	Year
Average maximum temperature (°C)	3.9	5.8	10.3	16.7	22.0	26.7	29.4	28.6	24.4	18.1	12.6	6.6	Av. 17.1
Average minimum temperature (°C)	-2.8	-1.7	1.8	7.1	12.2	17.6	20.5	19.9	16.0	10.0	5.3	0.0	Av. 8.8
Rainfall (mm)	92.7	78.5	110.7	114	106.4	112	116.8	112.8	108.7	111.8	102.1	101.8	Total 1,268

Figure 1: Climate data for New York City, United States of America

Describing climates: what do the numbers mean?

Average monthly temperatures

Temperature range	Description
above 30°C	very hot
20°C–30°C	hot
10°C–20°C	warm
0°C–10°C	cool
-10°C–0°C	cold
below -10°C	very cold

Figure 4: Describing average monthly temperatures

Annual temperature range

Temperature range	Description
below 5°C	small
5°C–15°C	moderate
15°C–30°C	large
above 30°C	very large

Figure 5: Describing annual temperature range

Annual precipitation

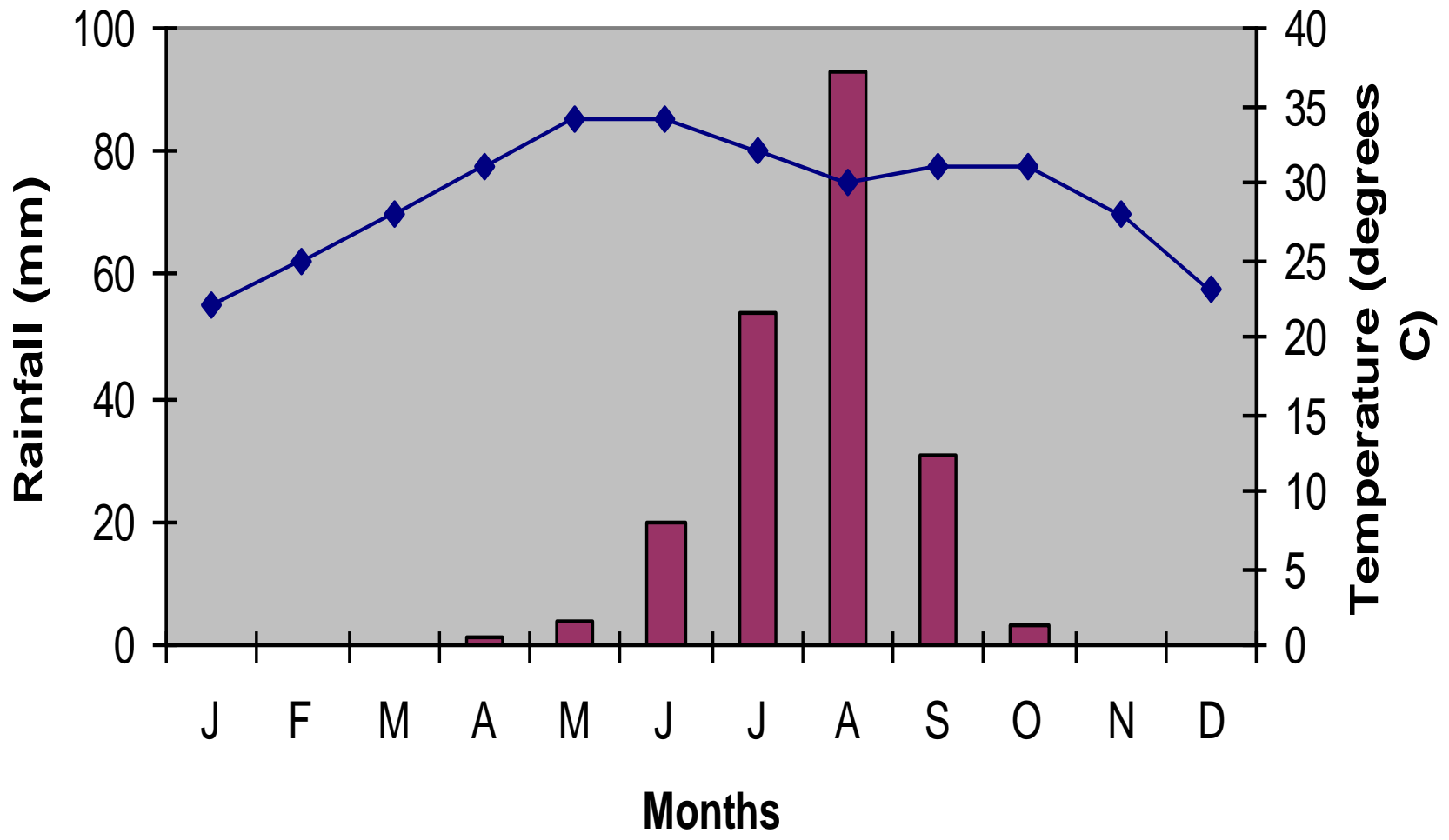| Cold to warm climates	Description	Hot to very hot climates
below 250 mm	slight	below 375 mm
250 mm–500 mm	small	375 mm–625 mm
500 mm–1000 mm	adequate	625 mm–1125 mm
1000 m–1500 mm	large	1125 mm–1750 mm
above 1500 mm	very large	above 1750 mm

Figure 6: Describing annual precipitation (rainfall)

Monthly average rainfall

Amount	Description
below 50 mm	dry month
50mm to 150 mm	wet month
above 150 mm	very wet month

Figure 7: Describing monthly averages

Rainfall distribution

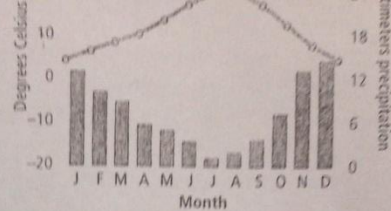| |
|---|
| Summer rainfall maximum: over 60 per cent in the summer half of the year |
| Winter rainfall maximum: over 60 per cent in the winter half of the year |
| Evenly distributed rainfall: no summer or winter maximum |

Figure 8: Describing distribution
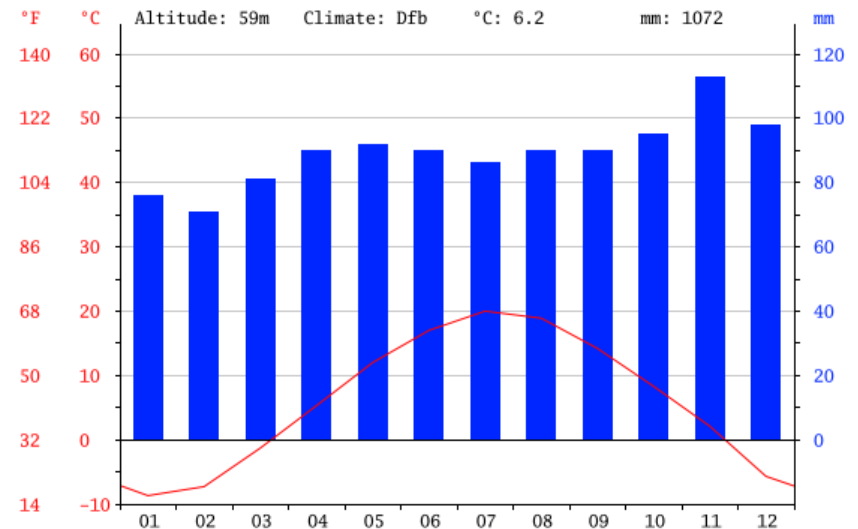
Minneapolis:
Latitude: 44.9° N

Minneapolis (Continental Climate)

SOURCE: National Climatic Data Center

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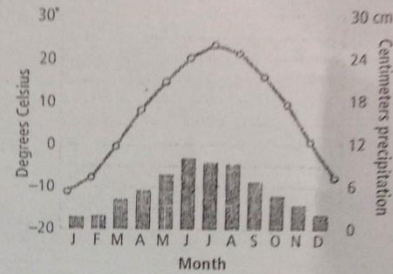LS The bars in the graphs show average precipitation, and the lines show average temperature. Compare each of these patterns in the two cities.

Large Bodies of Water

Land heats up and cools off faster than water. Because oceans and large lakes slow down heating and cooling of the air, coastal regions tend to have milder temperatures than areas far inland. Large bodies of water also affect precipitation. Climates influenced by these factors are called marine and continental climates.

- **Marine climates** occur near the ocean, usually along the west coasts of continents. Temperatures do not drop very far at night. Summers and winters are mild. Many marine climates receive steady precipitation because winds blowing off the ocean bring moisture to the atmosphere. Large lakes can have a similar effect on the climates near their shores.

- **Continental climates** occur in the interior of continents. Weather patterns vary in the different types of continental climates. However, most have large differences between daytime and nighttime temperatures because they lack the influence of nearby oceans. For the same reason, winter months are usually much colder than summer months.

READING How are marine climates different from continental climates?

Ocean Currents

Ocean currents are streams of water that flow through oceans in regular patterns. They influence climates by transferring energy from one part of an ocean to another. In general, warm-water currents carry warmth from the tropics to higher latitudes, where they help keep coastal regions warm. Cold-water currents have the opposite effect. They cool coastal regions by carrying cold water from polar regions toward the equator.

The illustration below shows the paths of ocean currents in the North Atlantic. Find the Gulf Stream on the illustration. The Gulf Stream is a major warm-water current. As the waters that feed the Gulf Stream pass near the Caribbean Sea and the Gulf of Mexico, the concentrated solar rays that strike there warm its water. Water flowing in the Gulf Stream can be 6°C to 10°C (11–18°F) warmer than the surrounding water. The Gulf Stream warms the winds that blow over it. In turn, those winds warm coastal regions.

Like altitude, ocean currents can overcome the effects of latitude. For example, London, England, has an average annual temperature of nearly 11°C (52°F). Natashquan, a town in eastern Canada at about the same latitude and altitude, has an average annual temperature of only 1°C (34°F). London's milder climate is the result of an ocean current carrying warm water to Europe's west coast.

VOCABULARY
A description wheel would be a good choice for taking notes about the term *ocean current*.

Ocean Currents

Ocean currents can cause two places at the same latitude to have different climates.

Natashquan, Canada
Average Temperature: 1°C
Latitude: 50.2° N

London, England
Average Temperature: 11°C
Latitude: 51.5° N

Labrador
E. Greenland
Norway
N. Atlantic
Gulf Stream
ATLANTIC OCEAN
Canary
N. Equatorial
Arctic Circle
60 N
40 N
20 N

This map shows ocean currents that flow in the North Atlantic.
Warm-water currents
Cold-water currents