# Effect of Atmosphere

Pages 88,89

| | | | | |
|---|---|---|---|---|
| 4 | Identify how the atmosphere interacts with Earth's other systems. | | **Unit 3 Page 88** | **4** |
| | | | | |
| 5 | Identify how the atmosphere interacts with Earth's other systems. | | **Unit 3 Page 89** | **5** |

| | |
|---|---|
| 4. | Define weather. |
| 5. | Describe air mass. |

# Hydrosphere

Sea
Ocean

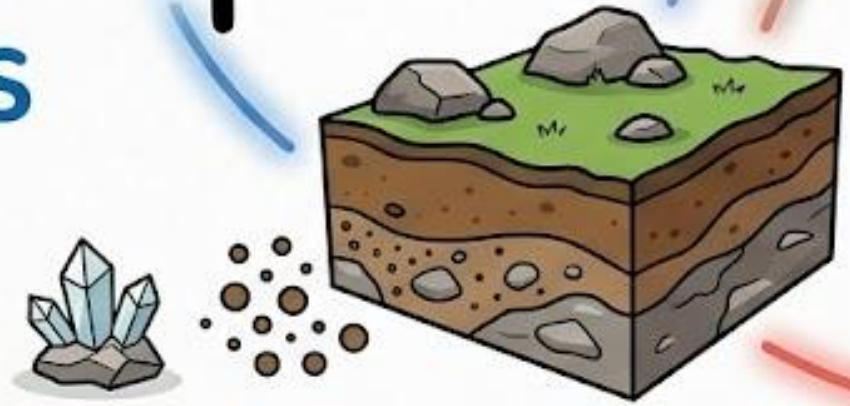
[water]

# Atmosphere

air
clouds

# Geosphere

rocks
Soil



# Biosphere

Class itinerary

Starter

Outcomes

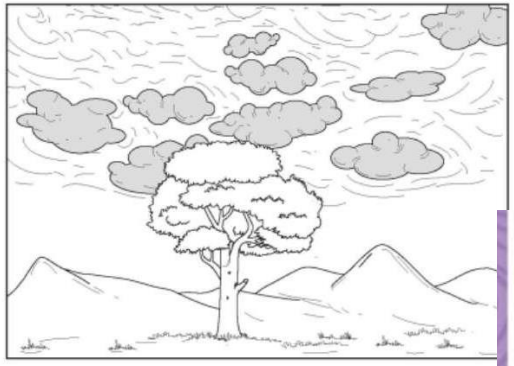
Vocabulary

Explanation

Exit card

LESSON 2 LAUNCH

# Where Do Thunderclouds Come From?



5 minutes

Textbook - 83

Three friends noticed thunderclouds forming. It looked like a thunderstorm might be coming. They wondered where the thunderclouds came from. They each had a different idea:

Julie: *I think strong winds blew them here from another state.*

Doug: *I think they sank down from heavy clouds high up in the sky.*

Carlos: *I think they formed from warm air rising up into the sky.*

Who do you think has the best idea?

Explain your thinking.

You will revisit the Page Keeley Science Probe later in the lesson.

# Vocabulary

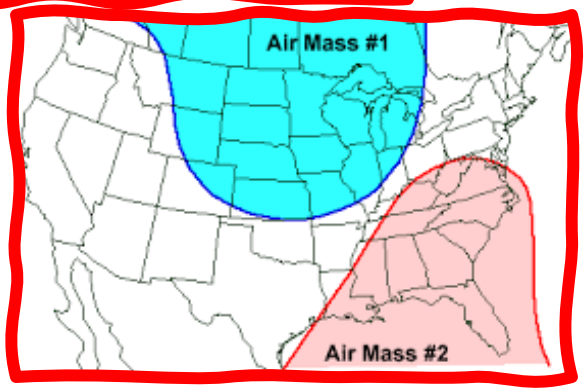
Textbook Page - 86

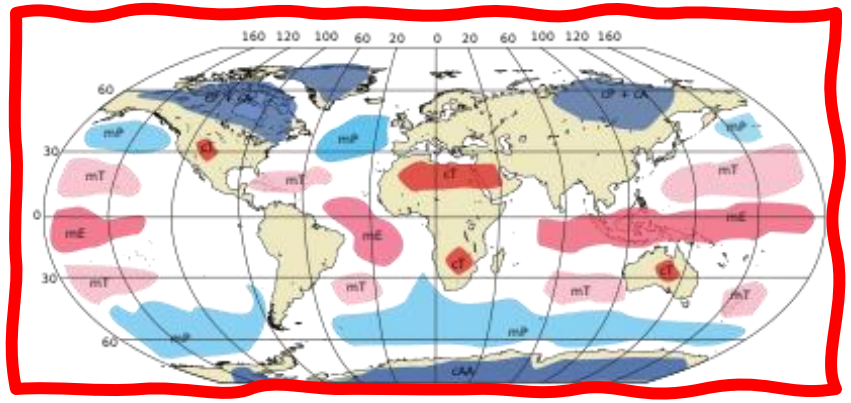
## Air mass

a large volume of air in the atmosphere that is mostly uniform in temperature and moisture.

Outcome!

Explore air-masses types
Explore air- masses characteristics

# Warm and Cold air masses

40 minutes

Textbook
Page - 86,87

INQUIRY ACTIVITY

Hands On

## Warm and Cold Air Masses

Think about the sandstorm you just saw. The way the atmosphere moves can help predict the weather. Air is a fluid, just like water is a fluid. Using water of different temperatures, you will investigate how air masses move.

**Make a Prediction** What happens when air masses of different temperatures meet?

they will not mix because they have different density.

### Materials

- piece of cardboard
- aluminum foil
- clear plastic bin
- 2 measuring cups
- 4 cups of warm water
- 4 cups of cold water
- red food coloring
- blue food coloring

### Carry Out an Investigation

1. Wrap the piece of cardboard in aluminum foil. Place the cardboard in the center of the plastic bin so it forms a wall.
2. Add three drops of red food coloring into the measuring cup of warm water.
3. Add three drops of blue food coloring into the measuring cup of cold water.
4. Hold the cardboard tightly against the bottom of the bin as you pour the warm water into one side of the wall and the cold water into the other side of the wall.
5. **Record Data** Observe the water from the side as you remove the wall. Record or draw your observations in the box at the top of the next page.
6. Repeat the investigation with water of the same temperature, and only one side with food coloring. Record your observations.





Record Data


Communicate Information

7. Think about the water cycle. Could a cold air mass meeting a warm air mass cause precipitation? Explain.

yes, warm air mass. ① rising up. ② clouds form ③ precipitation (rai

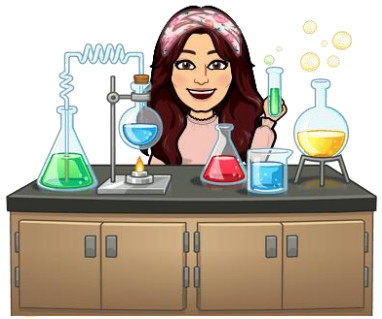
Explain how the system model in the investigation models an interaction of the atmosphere and hydrosphere.

yes, hydrosphere (clouds) on the Atmosphere (air).

Talk About It

Did your results support your prediction? How does tracking air masses





Outcome!

Explore air-masses types
Explore air- masses characteristics

Class itinerary

Starter

Outcomes

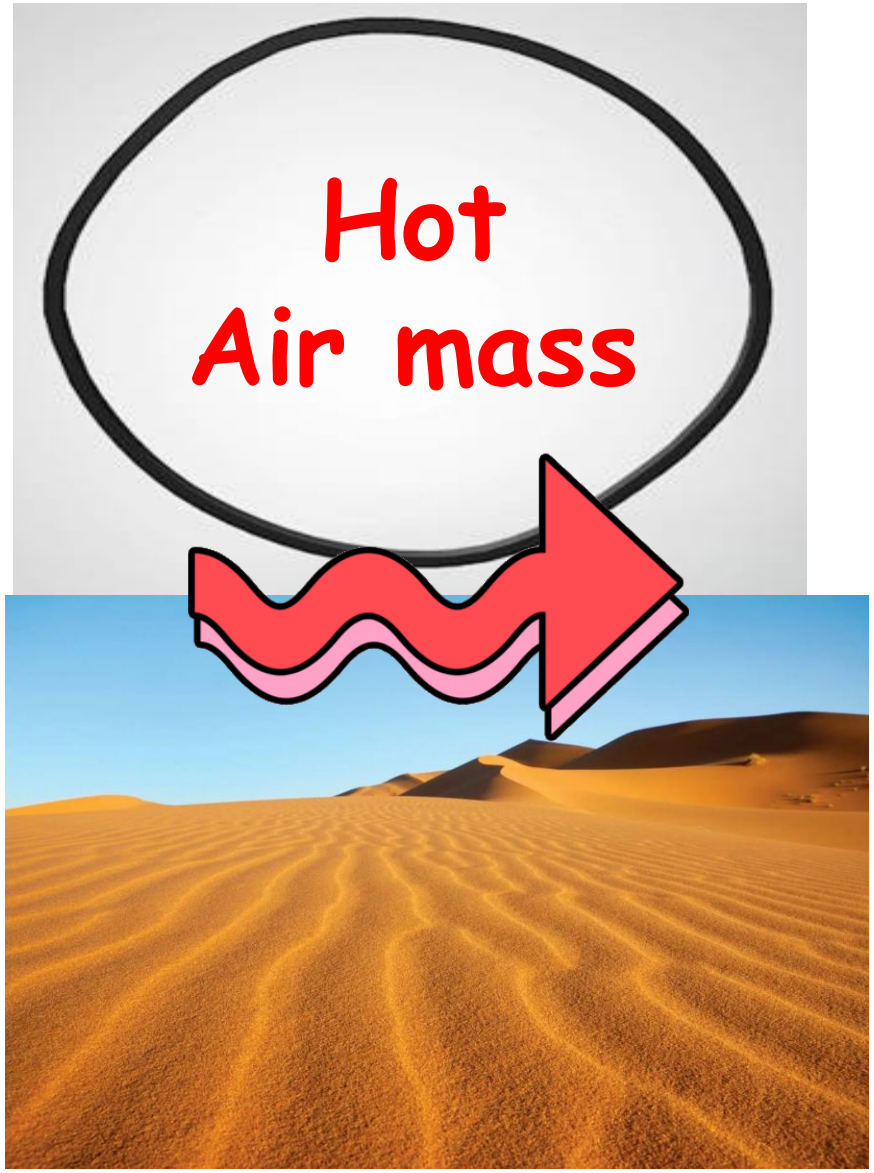
Vocabulary

Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 89





**Air mass**

a large volume of air

**Outcome!**

- Identify air mass
- Identify front
- Differentiate between fronts types

Class itinerary

Starter

Outcomes

Vocabulary

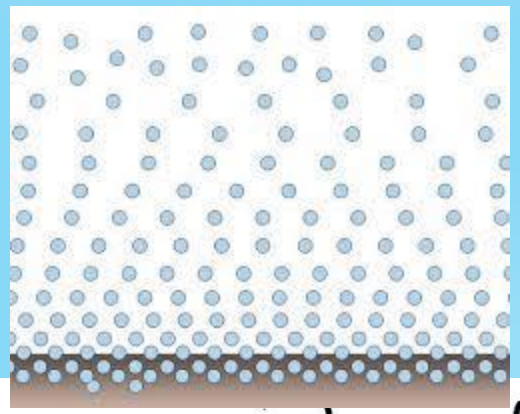
Explanation

Exit card

Plenary

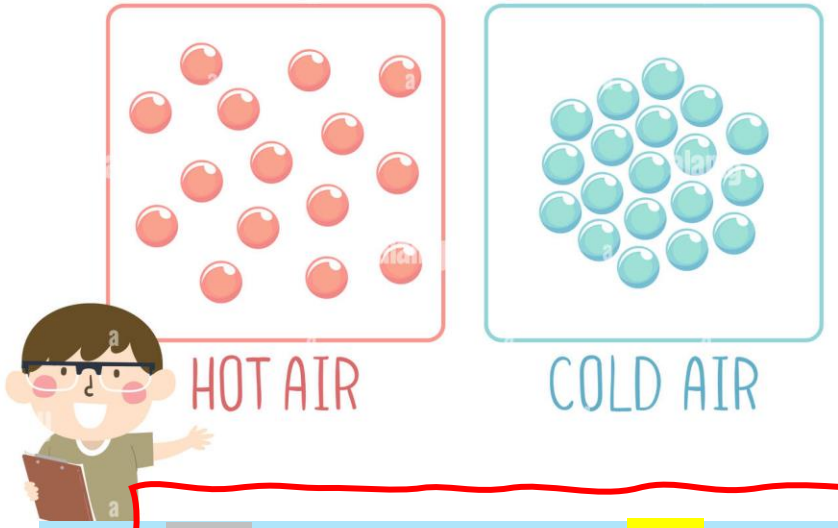
# Earth's Atmosphere

Textbook Page -87

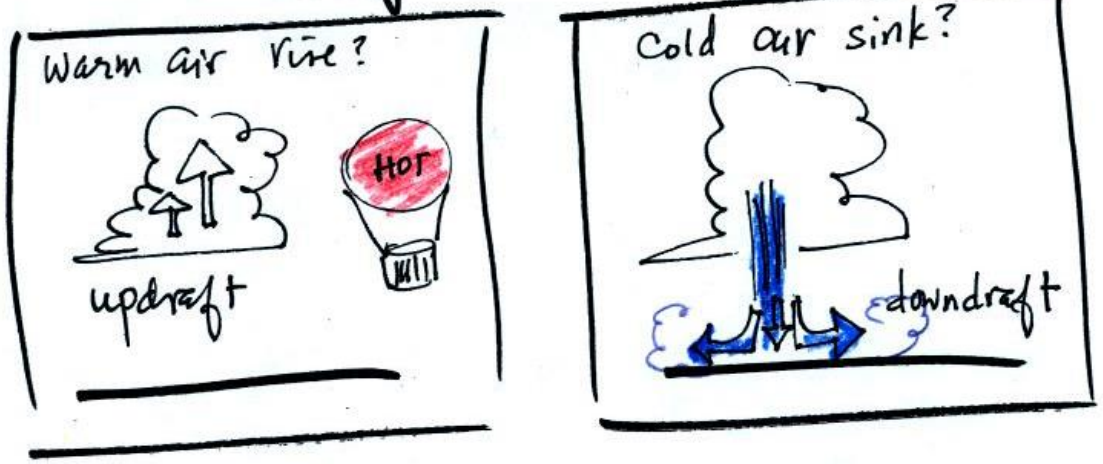


gas

( Particles )




Why does




Hot air particles is far-------,

so density is low----

cold air particles is -close----,

so density is high---

density is low-------

**Hot** air will Rise-----

density is High-----

**cold** air will --Sink---

Outcome!

Explore air-masses types

Explore air- masses characteristics

***Select the correct answer.***

Which statement about the atmosphere is **NOT true**?

- Earth's atmosphere has different layers.
- The atmosphere is the layer of gases around Earth.
- Earth's gravity gives air in the atmosphere weight.
- Air particles in the atmosphere have **do not** have mass.

What type of air mass would **most likely** form over the area as shown in the image?

desert regions

- cold, moist air mass
- cold, humid air mass
- hot, dry air mass
- hot, moist air mass

When the atmosphere is humid, there is _____ in the air.

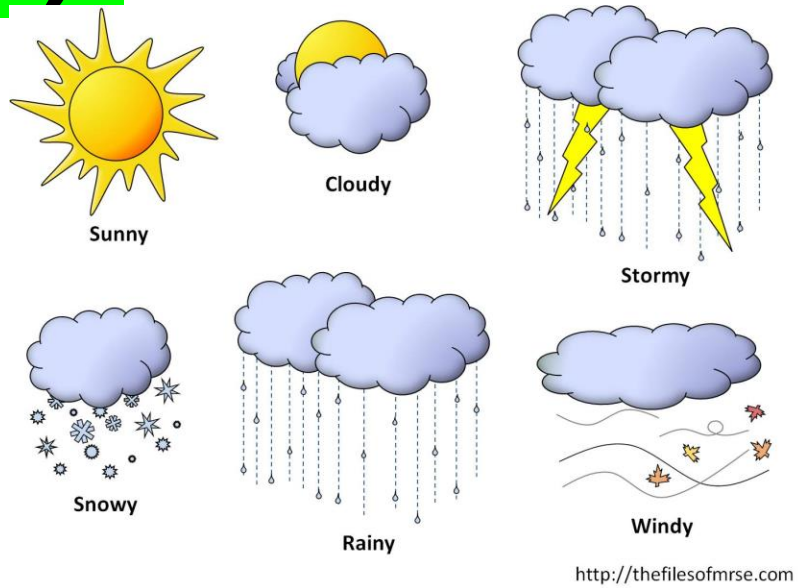
- no gases
- a small amount of water
- a high amount of water
- no water

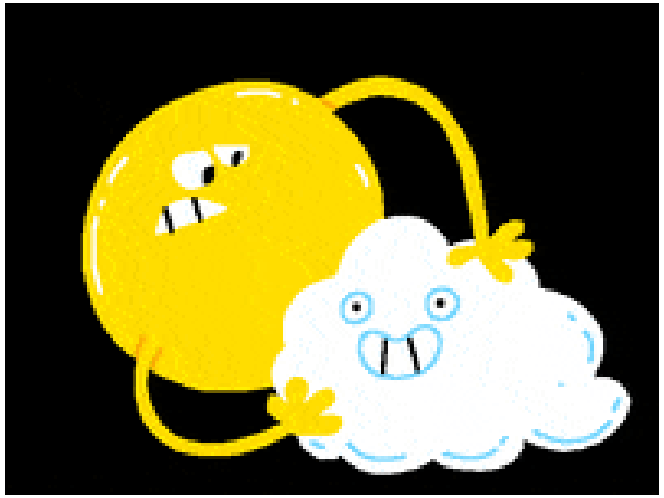
# Vocabulary

Textbook Page - 88

**Weather**

the condition of the atmosphere at a given place and time.



which of the following describes what is happening in the atmosphere at a certain place and time.

- Weather
- Fronts
- Climate
- Air masses

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 88

VOCABULARY

Look for these words as you read:

air mass

climate

weather

## Earth's Atmosphere

Recall what you explored about air masses. The temperature of the atmosphere can determine activity within it. Even though air in Earth's atmosphere looks empty, it contains matter. The air particles in the atmosphere have mass and weight. There are different layers in Earth's atmosphere, which vary in temperature.

**Weather** is the condition of the atmosphere at a given place and time. Weather can vary depending on the time of day, season, or location. Weather can involve different forms of precipitation. When water vapor in clouds cools, it condenses and falls to the ground as rain, hail, sleet, or snow.

A shelf cloud like this one is a good sign that a strong line of storms will be moving through the area.







Outcome!

- Identify weather
- Identify front
- Differentiate between fronts types

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

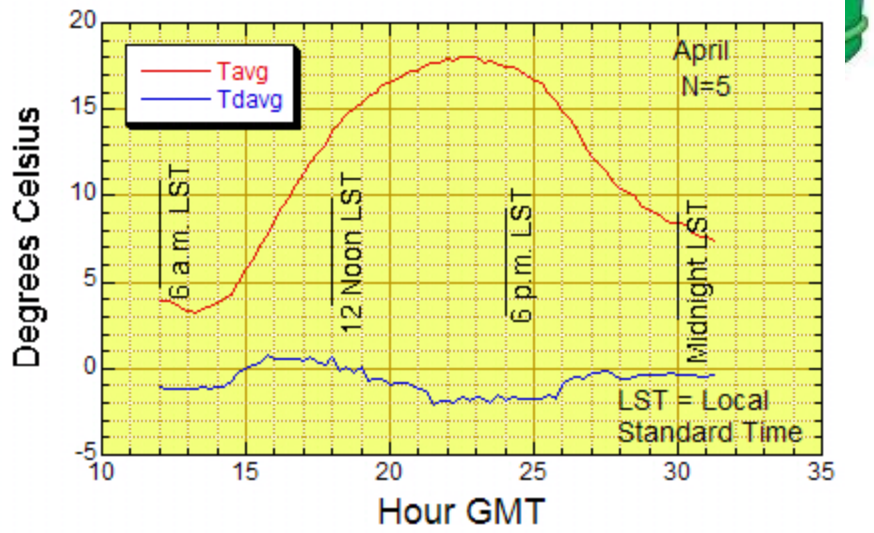
Exit card

# Earth's Atmosphere

Textbook Page - 88

**Weather**
the condition of the **atmosphere** at a given place and time.


Weather is changing from day to another.





Weather is changing during the same day

ther
nt
Different ate between fronts types

Look at the image describing the weather in Abu Dhabi on a certain day.
Which statement about the weather is **TRUE**?


- There will be no sunshine.
- There will be no rain.
- There will be no humidity.
- There will be no wind.

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 88

## Weather

## Precipitation

## How precipitation form?!

Water (ocean)

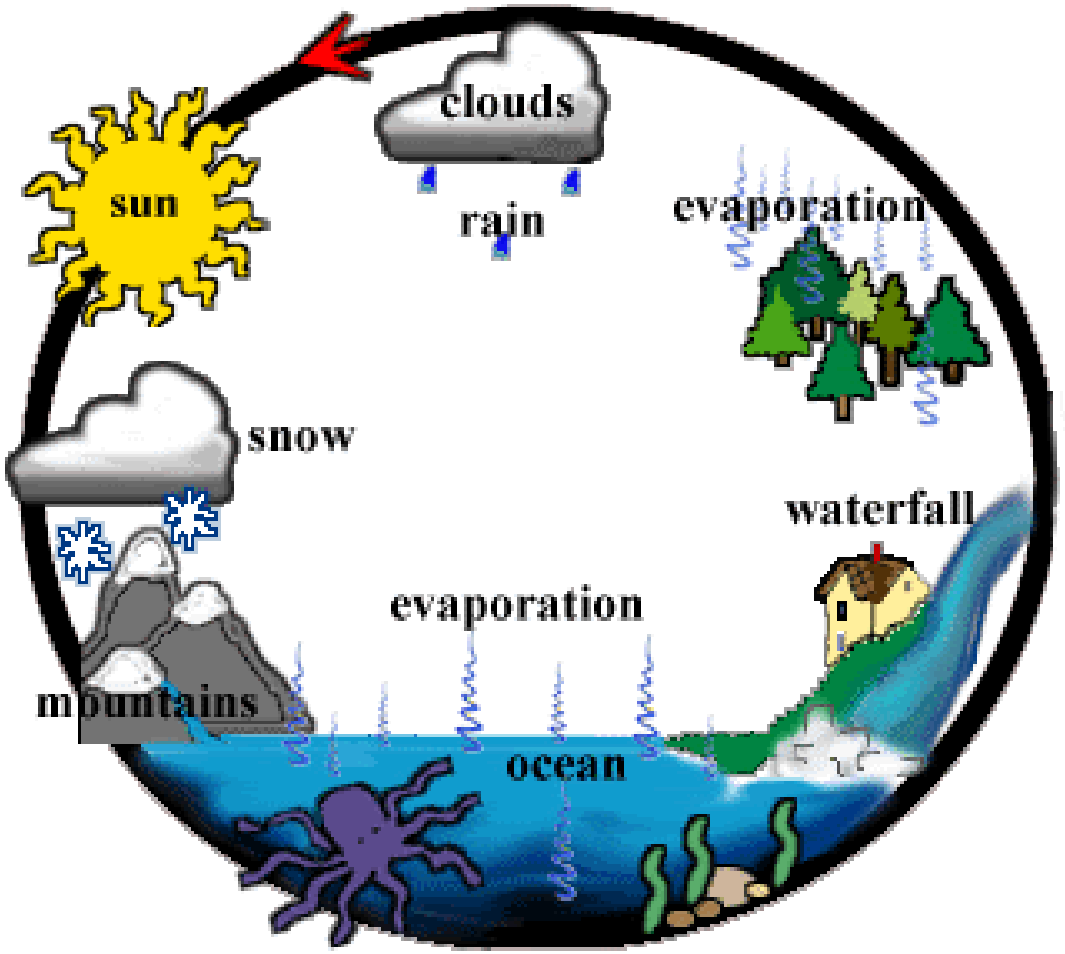
Water Heat (evaporation )

Vapor

Vapor cool (condensation)

Cloud

Precipitation




Outcome!

- Identify weather
- Identify front
- Differentiate between fronts types

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

# Earth's Atmosphere

Weather

Textbook Page - 88

Water (ocean)

Water Heat (evaporation )

Vapor

Vapor cool (condensation)

Cloud

Precipitation

## Precipitation

Rain

Hail

Sleet

Snow

Outcome!

- Identify weather
- Identify front
- Differentiate between fronts types

Which of the following are forms of precipitation?

***Select 3 choice(s)***

- [ ] soil
- [ ] temperature
- [ ] warm front
- [ ] hail
- [ ] snow
- [ ] cold front
- [ ] sleet
- [ ] wind

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

Plenary

# Weather

Textbook Page -88

( 3 ) Vapor

( 5 ) Cloud

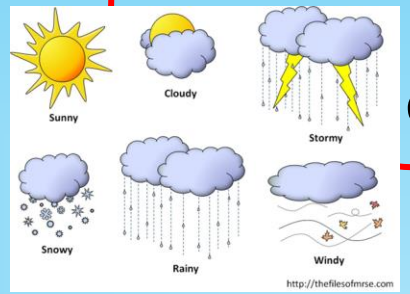
( 1 ) Water (ocean)

( 4 ) Vapor cool (condensation)

( 2 ) Water Heat (evaporation )

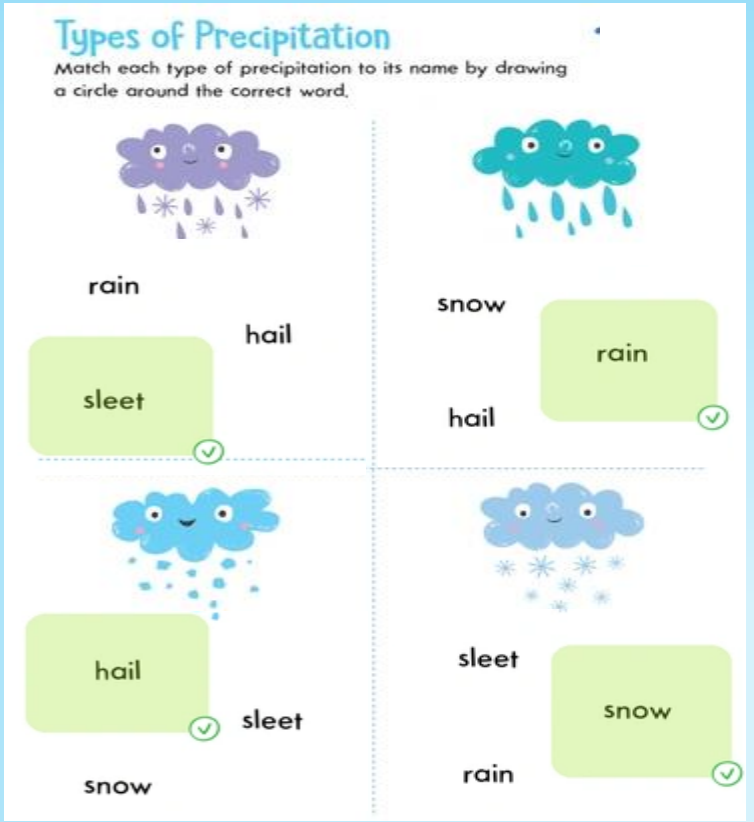
( 6 ) Precipitation

( ):the condition of the ---------- at a given place and ----------.




Ice Pellets

Freezing rain




Water

Ice

Outcome!

Explore air-masses types
Explore air- masses characteristics

***Select the correct answer.***

Which of the following is the **BEST** description of an air mass?

- a large body of air with mostly the same temperature and moisture throughout
- it is the average weather patterns in an area over time
- what is happening in the atmosphere at a given place and time
- a large body of air with different temperature and moisture throughout

An **air mass** forms over land in the United Arab Emirates (UAE).

Which of the following most likely describes this air mass?

- ○ The air mass is cool and moist.
- ○ The air mass is hot and moist.
- ○ The air mass is cold and dry.
- ○ The air mass is hot and dry.

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

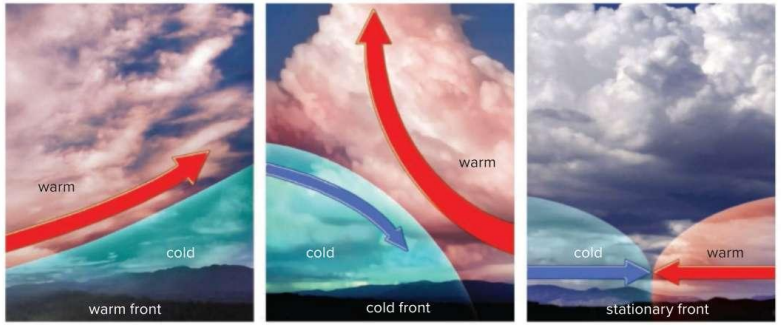
# Earth's Atmosphere

Textbook Page - 89

The air mass that is passing over an area affects the weather in that area. An **air mass** is a large region of air that has a similar temperature and humidity. Depending on where they form, air masses can be cool, warm, dry, or humid.

When one air mass meets a different air mass, the meeting place is called a front. A front is the boundary between two air masses that have different temperatures. Along fronts, weather can change rapidly. Look at the diagram below to see the difference between three different types of fronts: warm fronts, cold fronts, and stationary fronts.

**Different Fronts**




**Read a Diagram** The arrows in the diagram indicate temperature as well as the direction of movement. Red arrows indicate warm air movements. Blue arrows indicate cold air movements.

**Warm Fronts** A warm front forms when a warm air mass pushes into a cold air mass. The warm air goes up and over the cold air mass. It often brings light, steady rain.

**Cold Fronts** A cold front forms when a cold air mass pushes under a warm air mass, forcing the warm air quickly upward. It often brings stormy weather.

**Stationary Fronts** Sometimes rainy weather lasts for days. This is caused by a stationary front, which is a boundary between air masses that does not move.





Outcome!

- Identify air mass
- Identify front
- Differentiate between fronts types

Class itinerary

Starter

Outcomes

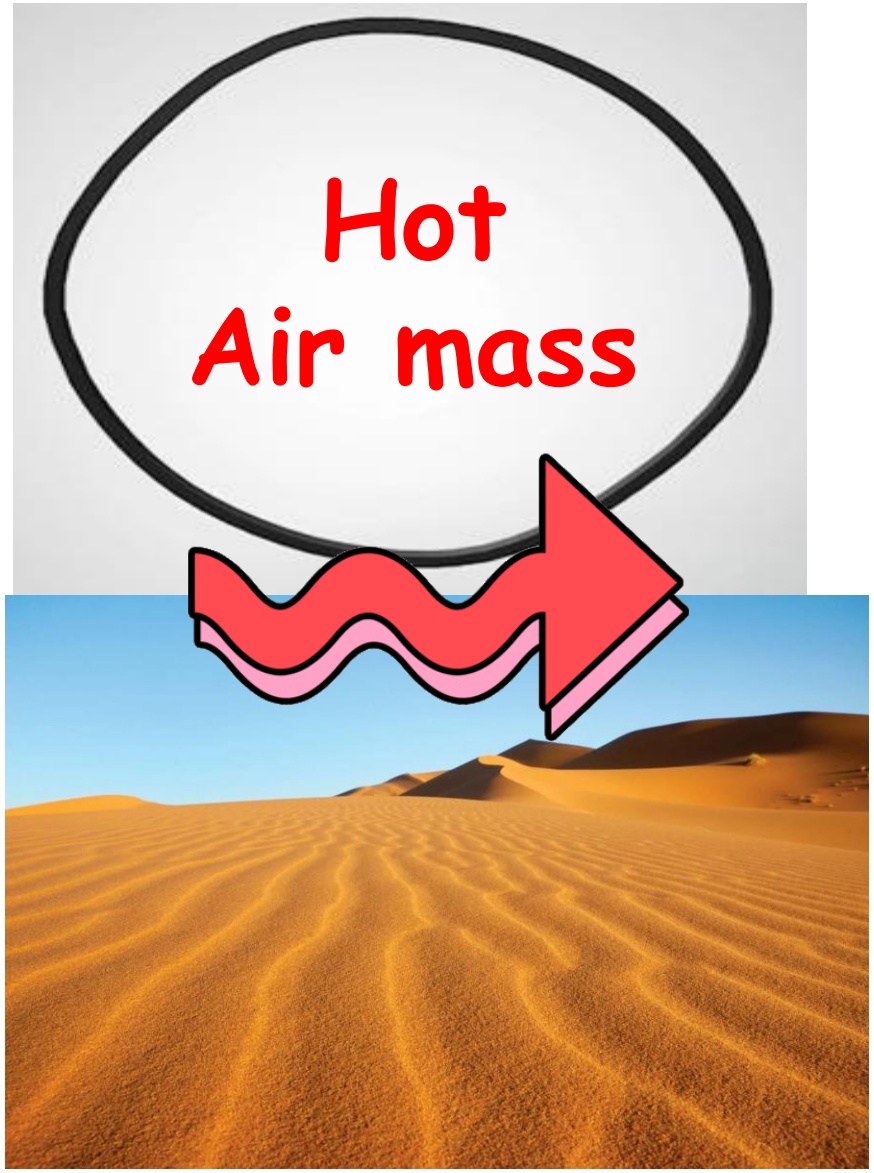
Vocabulary

Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 89





**Air mass**

a large volume of air

**Outcome!**

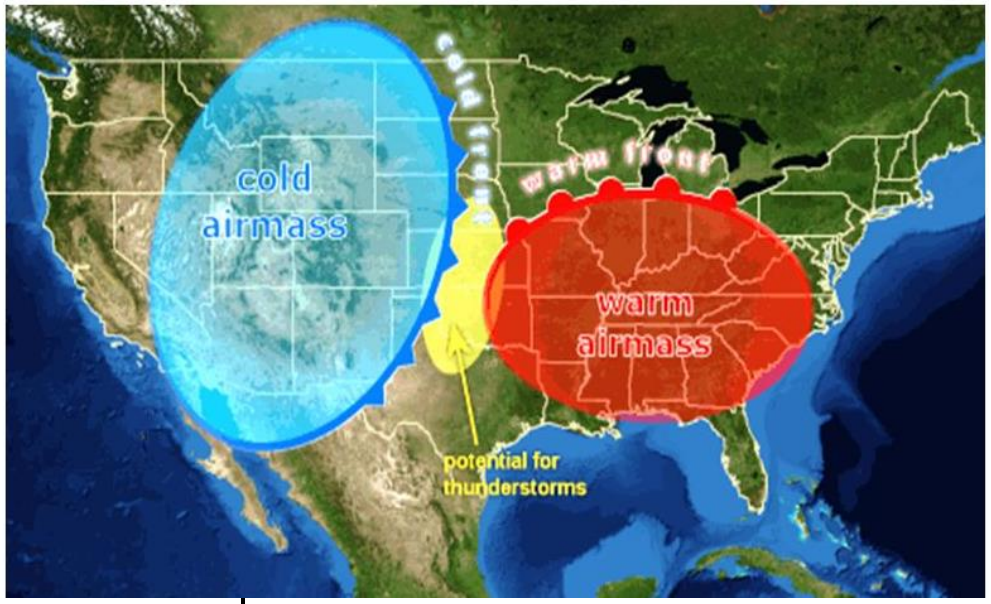
- Identify air mass
- Identify front
- Differentiate between fronts types

# Vocabulary

Textbook Page - 89

## Air front

The boundary between tow air masses




Outcome!

- Identify air mass
- Identify front
- Differentiate between fronts types

Class itinerary

Starter

Outcomes

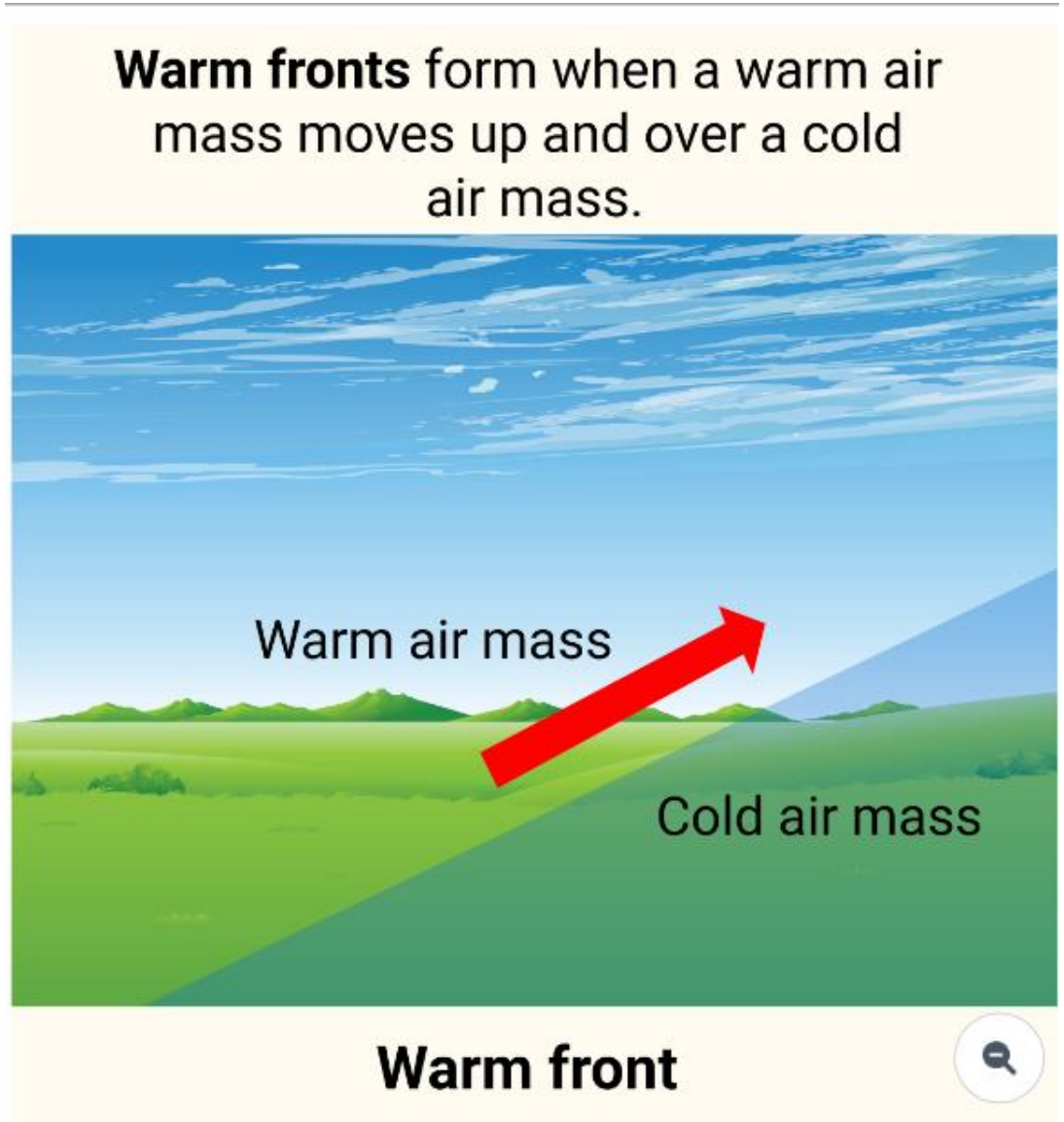
Vocabulary

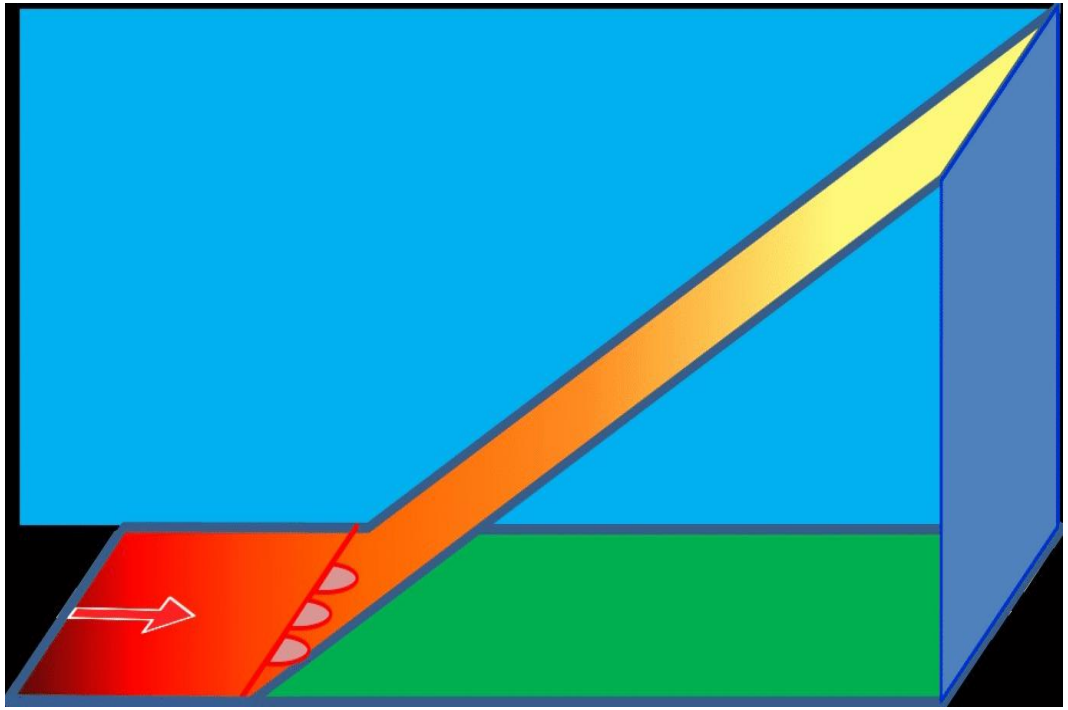
Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 89



( Warm ) front

Warm air – Pushed into / moves over --- cold air mass

Light, steady Rain ---

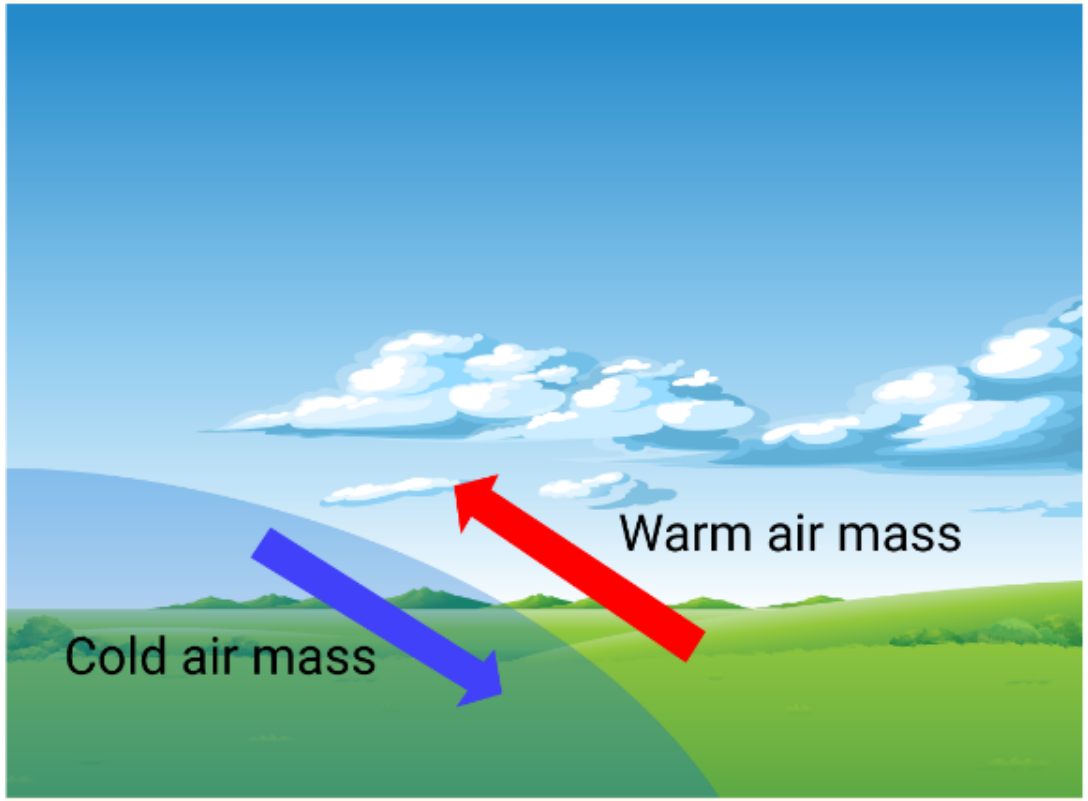
Outcome!

- Identify air mass
- Identify front
- Differentiate between fronts types

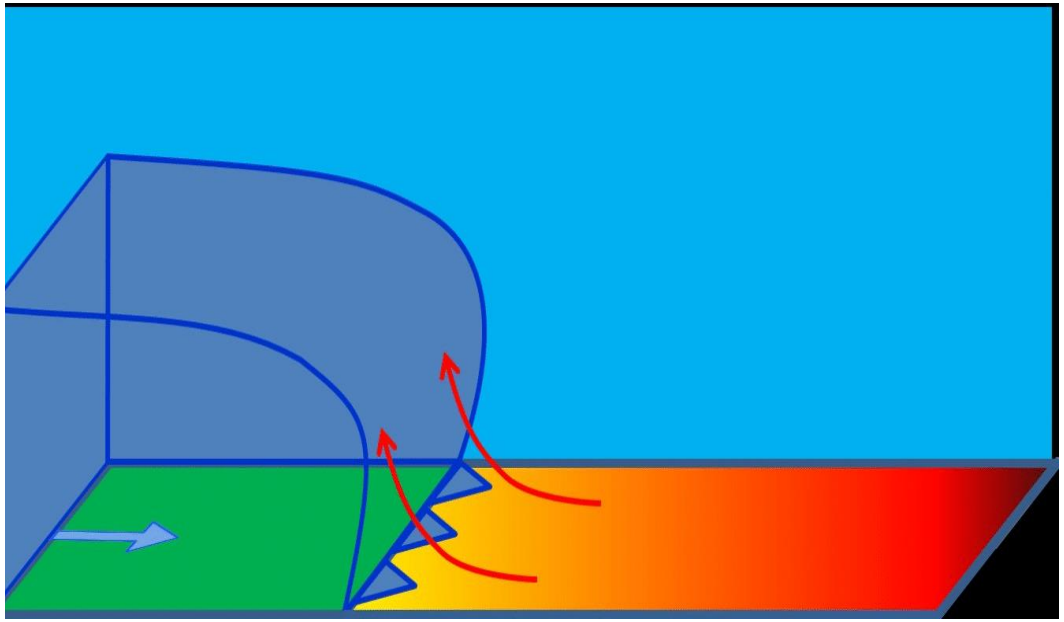
# Earth's Atmosphere

Textbook Page - 89

**Cold fronts** form when a cold air mass moves under a warm air mass pushing the warm air up quickly.




**Cold front**



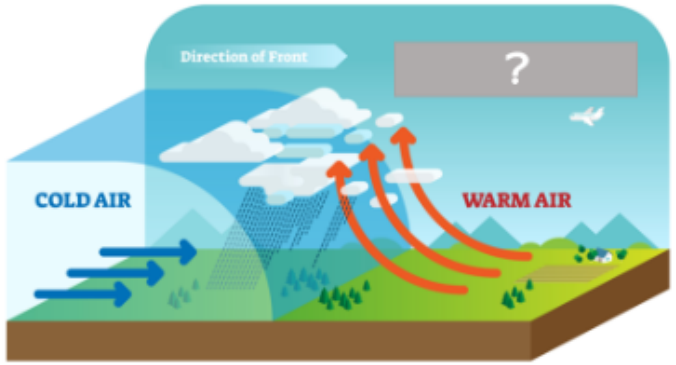
| |
|---|
| ( Cold ) front |
| ( Cold ) air --Pushed under warm air mass |
| ---Stormy-weather |

Outcome!

- Identify air mass
- Identify front
- Differentiate between fronts types

***Select the correct answer.***

What type of front is forming in the image?




- warm front
- rain front
- cold front
- stationary front

Class itinerary

Starter

Outcomes

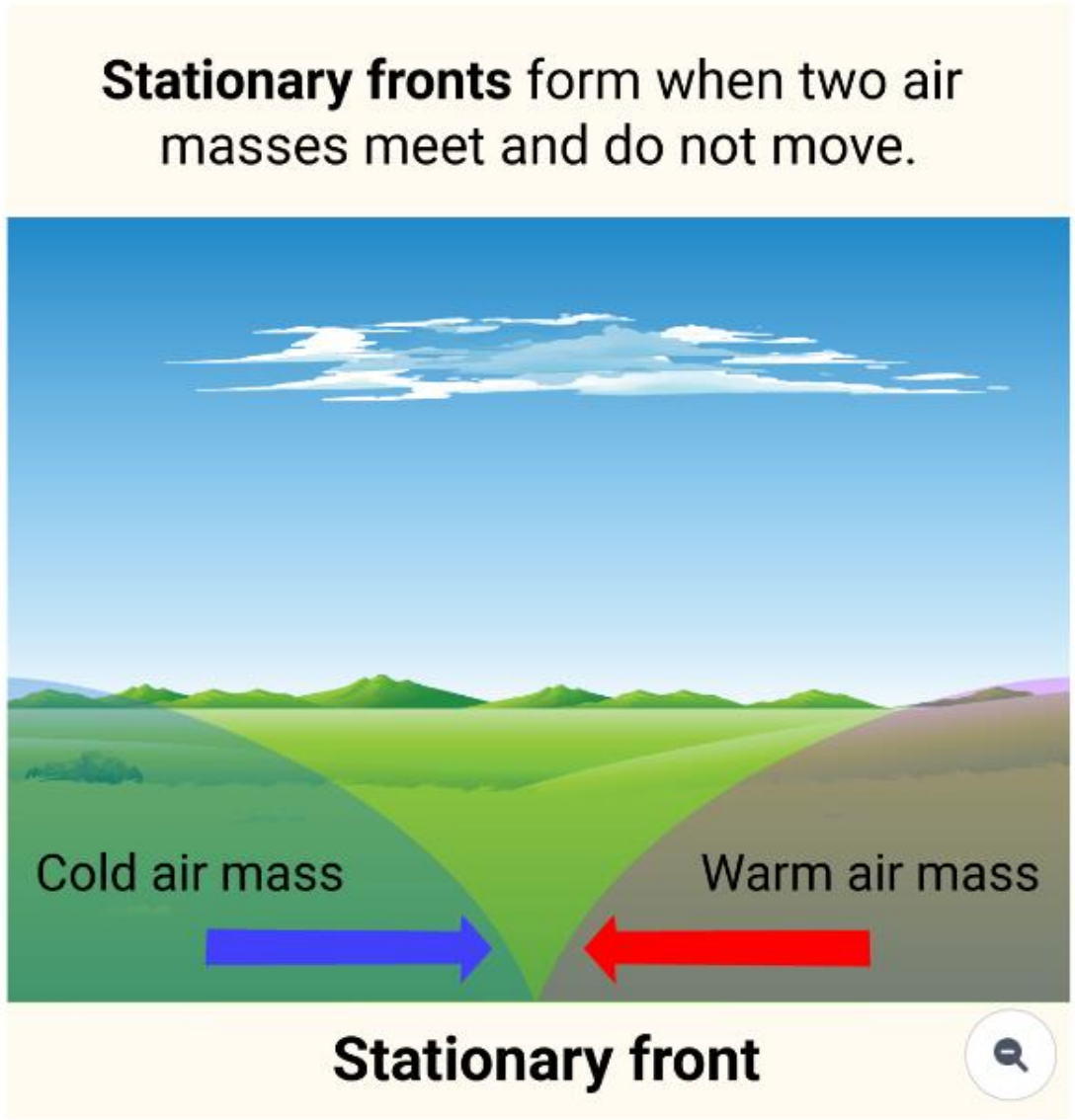
Vocabulary

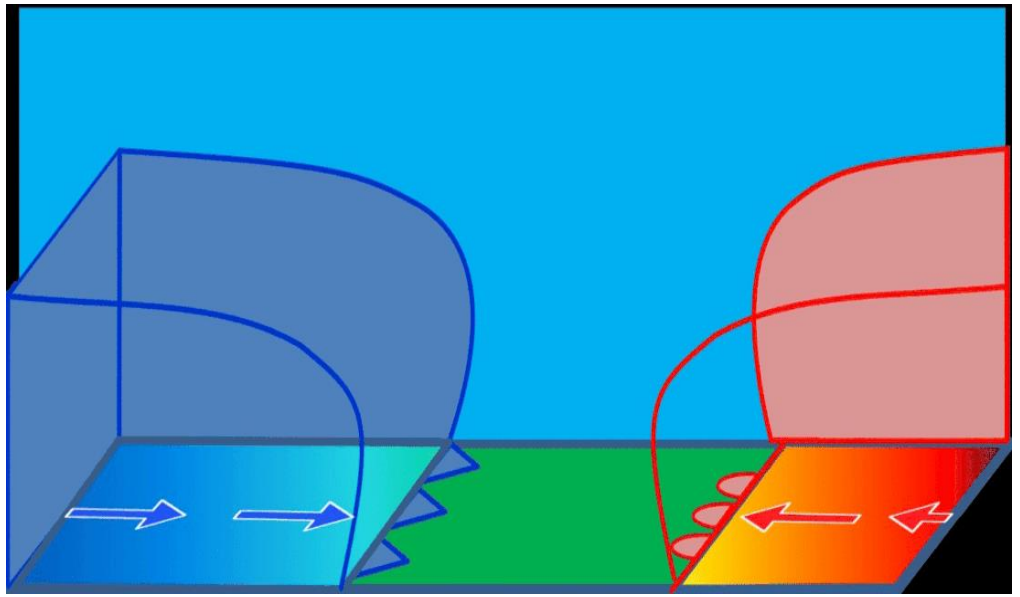
Explanation

Exit card

# Earth's Atmosphere

Textbook Page - 89



| ( Stationary front |
| --- |
| The - Boundary -- does not move |
| Rain -- lasts for days - |

Outcome!

- Identify air mass
- Identify front
- Differentiate between fronts types

A Select... front occurs when two air massess meet and they do not move.

- rain
- warm
- cold
- stationary

It is 10 am and the sun is shining in your city. By 2 pm in the afternoon, the weather is cloudy with light rain. Which of the following **most likely** caused the change in weather?

- A cold front formed in the area.
- A warm front formed in the area.
- A humid front formed in the area.
- A stationary front formed in the area.

Class itinerary

Starter

Outcomes

Vocabulary

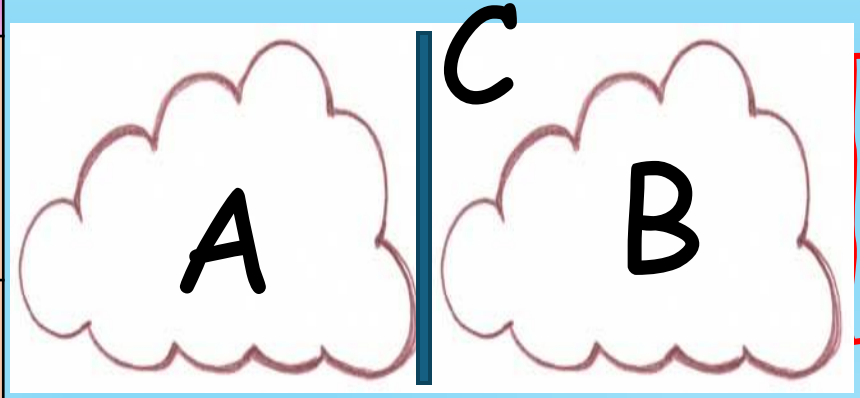
Explanation

Exit card

Plenary

# Air mass & Front

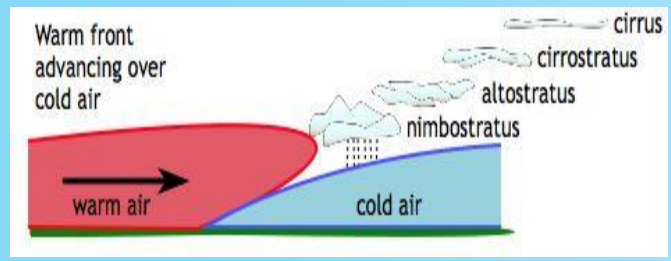
Textbook Page -89

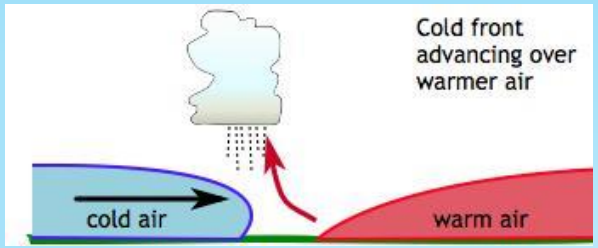


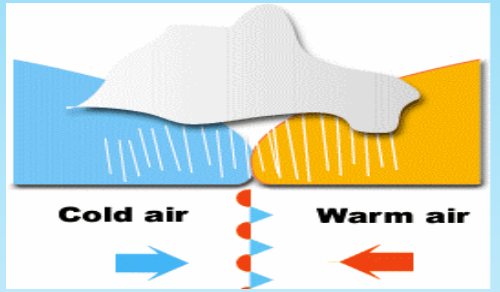

**A, B** are ( Air masses )

**C** is ( Front )

ONLY the ( Hot ) airmass will be **rising** up




| ( Warm ) front | ( Cold ) front | ( Stationary ) front |
|---|---|---|
| Warm air -- Pushed into / moves over -- cold air mass | ( Cold ) air Pushed under warm air mass | The -Boundary-- does not move |
| Light, steady-- Rain -- | --Stormy.--weather | Rain lasts for days--- |

Outcome!

Explore air-masses types
Explore air- masses characteristics

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

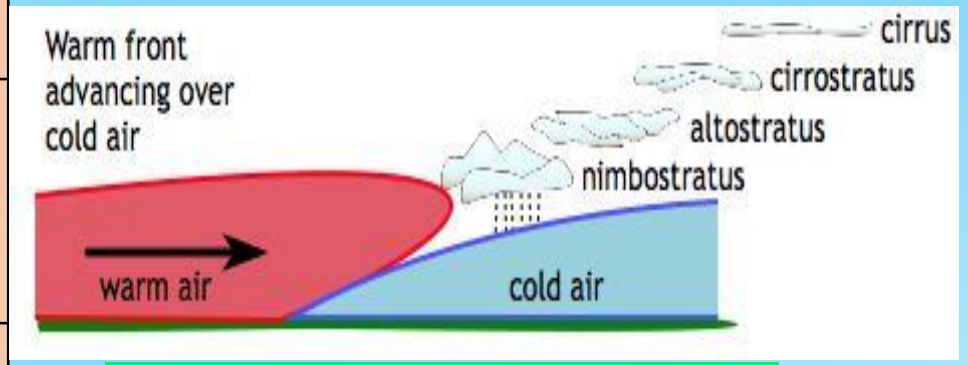
Exit card

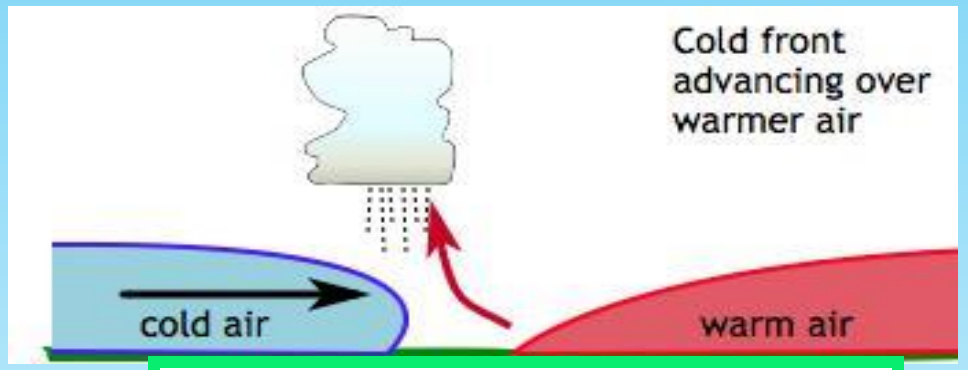
Plenary

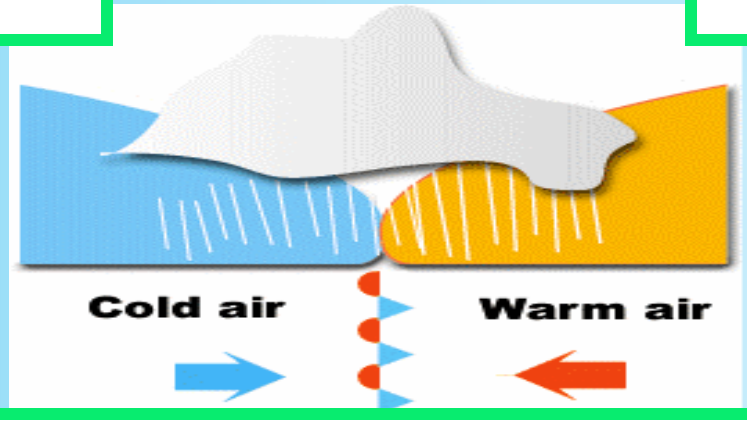
# Air mass & Front

Textbook Page -89

## Answer box: Cold front- warm front- stationary front




Outcome!

Explore air-masses types
Explore air- masses characteristics