Air Masses and Fronts

Activity Guide Component → 8.3.3, 8.3.4, & 8.3.5

Guiding Questions (be able to answer these questions at the end of packet)

1. How are air masses formed?
2. What are the differences between each of the four air masses? ( Mention name, characteristics, and location)
3. What are the three air fronts and what are characteristics of each?
4. What data can be used to identify when a front occurred?

Agenda (fill in the squares and circles as you complete everything on the agenda)

- [ ] Air Masses Notes → 7 Minutes → Page 2
  - Watch the air masses video. Make sure you follow along.

- [ ] Air Masses Notes Review Cut and Paste → 5 Minutes → Page 3
  - Cut out the air masses and paste them onto the map. Clean up after yourself!

- [ ] Air Masses Labeling Worksheet → 7 Minutes → Page 4
  - Fill out the chart using the notes as a reference
  - Check your packet with your teacher

- [ ] Air Front Lab → 10 Minutes → Page 5
  - Complete the air front lab and analysis questions. Clean up after yourself!

- [ ] Air Front Computer Interactive → 20 Minutes → Page 6
  - Complete the Air Front Computer Interactive

- [ ] Air Front Notes → 10 Minutes → Page 7
  - Watch the air front notes. Make sure you follow along.

- [ ] Air Front Worksheet → 5 Minutes → Page 8
  - Complete the air front worksheet

- [ ] Air Masses and Fronts Review Worksheet → 7 Minutes → Page 9
  - Complete the air masses and fronts review. Check in packet with the teacher

- [ ] Guiding Questions → 6 Minutes → Page 10
  - Answer the guiding questions

- [ ] Air Masses and Fronts Quiz → 10 Minutes → ________________
  - Give your teacher your packet and take the quiz.

<table>
<thead>
<tr>
<th>70% or Above</th>
<th>69% or Under</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Move on to the Study Guide</td>
<td>● Ask any questions you might have</td>
</tr>
<tr>
<td></td>
<td>● Retake the quiz TOMORROW</td>
</tr>
</tbody>
</table>

Unit Test will cover 4 activities: Water Cycle, Air Pressure / Winds, Air Masses / Fronts and Weather Data

FILL IN THE FOLLOWING DATES:

Unit study guide due: ________________________________

Unit test over 4 packets is on: ________________________________
**AIR MASS NOTES**

**What are air masses?**
- Large Bodies of air
- Form when the air over a large region sits in one place for many days
- The air gradually takes on the characteristics of the land or water below it

**How do air masses affect our weather?**
- As an air mass moves, it brings its characteristics with it
- Changes weather

**What are the two characteristics that describe air masses?**
- Two words each
  - One for moisture
  - One for temperature

**When describing moisture what words can we use?**
- The first word of an air mass tells one where the mass was formed (over water or land)
  - **Continental**
    - Air masses formed over land
    - DRY
  - **Maritime**
    - Air masses formed over water
    - WET

**When describing temperature what words can we use?**
- The second word of an air mass tells whether an air mass was formed close to the equator or pole
  - **Tropical**
    - Air masses formed near the **equator**
    - WARM AIR
  - **Polar**
    - Air masses formed closer to the **poles**
    - COLD AIR

**What are the 4 Major Air Masses?**
- The four major air masses are:
  - Maritime Tropical (moist warm air)
  - Continental Tropical (dry warm air)
  - Maritime Polar (moist cold air)
  - Continental Polar (dry cold air)

**What moves air masses?**
- Winds
- Air masses can travel away from the regions where they form
  - Can move with global winds and jet streams
- As the air mass moves it changes

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**CODE WORD:**

**You MUST watch and listen to the entire video to get the code word**
See your teacher for the air masses to cut out and paste onto your paper
## Air Mass Worksheet

<table>
<thead>
<tr>
<th>Letter</th>
<th>Temperature (Hot or Cold)</th>
<th>Moisture (Dry or Moist)</th>
<th>Air Mass Name (Maritime Tropical, Maritime Polar, Continental Tropical, Continental Polar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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</tbody>
</table>
Air Fronts Lab

Procedure:
1. Fill the rectangle plastic container ¼ way full of water
2. Fill a small beaker of blue COLD water → ¾ Full (ask the teacher if you need an ice cube)
3. Fill a small beaker of red WARM water
4. On the LEFT SIDE stand the blue beaker of water in the container of water you filled in step 1
5. On the RIGHT SIDE Stand the red beaker of water in the container of water you filled in step 1
6. Slowly tip both beakers over (at the same time) so the warm and cold water spills out
7. Draw what happens at the beginning and at the end
   - Look at the container at eye level
   - Color your drawing
8. Clean up your lab station by pouring the plastic container of water into the sink
9. Rinse out the container and the beakers
10. Answer the analysis questions below

Drawings

<table>
<thead>
<tr>
<th>Beginning</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>(First 5 seconds)</td>
<td>(After 30 seconds)</td>
</tr>
</tbody>
</table>

Analysis Questions
1. Describe the density and the temperature of the blue ice cube

2. Describe the density and the temperature of the red water

3. Explain what happened in this lab. Why did the waters behave like they did? MENTION DENSITY

4. Air fronts occur when two air masses meet. Which air mass would go on top of the other? Tropical or Polar? Why?
**Air Front Computer Interactive**

**Procedure:** Go to [http://www.phschool.com/atschool/phsciexp/active_art/weather_fronts/](http://www.phschool.com/atschool/phsciexp/active_art/weather_fronts/) (also found on the website) and complete the following chart.

★ **MAKE SURE YOU READ THE TEXT AT THE TOP OF THE PAGE AND WATCH THE MOVEMENT ON THE INTERACTIVE**

**Introduction**

1. What is an air front?

2. What does an air front often cause? (2 things)
   - 
   - 

<table>
<thead>
<tr>
<th>Front</th>
<th>What Type of Air Mass Is Moving In?</th>
<th>Which Air Mass Goes On Top and Why</th>
<th>Type of Cloud</th>
<th>Weather Caused</th>
<th>Picture At the End (Include labels, clouds, and precipitation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Front</td>
<td></td>
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<tr>
<td>Warm Front</td>
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<tr>
<td>Stationary Front</td>
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</tr>
</tbody>
</table>
**AIR FRONT NOTES**

What is it called when 2 air masses meet?
- Front

What happens at a front?
- Weather Changes
- Clouds and precipitation are often formed

What are the three different types of fronts?
- Cold Front
- Warm Front
- Stationary Front

<table>
<thead>
<tr>
<th>Description</th>
<th>Cold Front</th>
<th>Warm Front</th>
<th>Stationary Front</th>
</tr>
</thead>
</table>
| (State what type of air mass meets the other type of air mass) | • Mass of cold, dense air moves in  
• Warmer air ahead of it is pushed upward (it’s less dense) and condenses forming precipitation | • Mass of warm air moves in  
• Warm air moves above/on top the cold air (it’s less dense)  
• Moisture in the warm air condenses, producing cloud-covered skies. | • Occurs when air masses meet and stop moving.  
• The air can still move sideways  
• Whatever front advances first decides which it will be |

<table>
<thead>
<tr>
<th>Weather that occurs at the boundary</th>
<th>Heavy Storms</th>
<th>Hours of rain or snow</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of cloud do you find at the front?</td>
<td>Cumulonimbus</td>
<td>Cirrus and Stratus</td>
</tr>
<tr>
<td>Weather you will find after</td>
<td>Cool and Clear Skies</td>
<td>Warmer Weather</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ways to identify that the front is occurring</th>
<th>Cold Front</th>
<th>Warm Front</th>
</tr>
</thead>
</table>
| • Heavy Storms Occur  
• Temperature Drops  
• Barometric Pressure Drops | • Steady Rain Occurs  
• Temperature Increases  
• Barometric Pressure Drops |  

| Picture | Cold air | Warm air | Cold air | Warm air | Stationary front |
1. Examine the following diagram and answer the following questions.

What type of front is illustrated?

2. Explain why warm air is pushed up by the cold front.

3. Where are clouds formed when there is a cold front?

4. Examine the following diagram and answer the following questions.

What type of front is illustrated?

5. What happens to the warm air when it overtakes the cold air?

6. Where do clouds form when there is a warm front?
Air Masses and Front Review Worksheet

Circle the correct answer in the table below

<table>
<thead>
<tr>
<th>Type</th>
<th>Where it Forms (Circle over ocean or land)</th>
<th>Temperature (Circle warm or cold)</th>
<th>Humidity (Circle moist or dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental Polar (CP)</td>
<td>over ocean over land</td>
<td>warm cold</td>
<td>moist dry</td>
</tr>
<tr>
<td>Continental Tropical (CT)</td>
<td>over ocean over land</td>
<td>warm cold</td>
<td>moist dry</td>
</tr>
<tr>
<td>Maritime Polar (MP)</td>
<td>over ocean over land</td>
<td>warm cold</td>
<td>moist dry</td>
</tr>
<tr>
<td>Maritime Tropical (MT)</td>
<td>over ocean over land</td>
<td>warm cold</td>
<td>moist dry</td>
</tr>
</tbody>
</table>

Complete the table below with image on the right

<table>
<thead>
<tr>
<th>Letter</th>
<th>Temperature (Cold, Warm)</th>
<th>Humidity (Dry, Moist)</th>
<th>Name of Air Mass (CT, CP, MT, MP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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</tbody>
</table>

Select C, W, or S to identify the type of front the statement describes.

- C = Cold Front
- W = Warm Front
- S = Stationary

1. Barometric pressure drops significantly.
2. Cool air mass is in place - warm air mass moves in.
3. Warm air mass is in place - cool air mass moves in.
4. Brings gentle rain that may last for hours or days.
5. Neither air mass moves.
6. Strong winds are formed followed by heavy rain, crashing thunder, and flashing lightning.
7. When the front passes, the temperature warms up and it becomes humid.
8. When the front passes, the weather turns cooler.
9. Air masses move sideways.

**GUIDING QUESTIONS**

1. How are air masses formed?

2. What are the differences between each of the four air masses? (Mention name, characteristics, and location)

<table>
<thead>
<tr>
<th>Air Mass</th>
<th>Location Formed</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

3. What are the three air fronts and what are characteristics of each?

<table>
<thead>
<tr>
<th>Air Front</th>
<th>Air Mass Movement</th>
<th>Ways to Identify Front is Occurring</th>
<th>New Weather Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Front</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warm Front</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stationary Front</td>
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<td>X</td>
<td></td>
</tr>
</tbody>
</table>

4. What data can be used to identify when a front occurred?
   -
   -