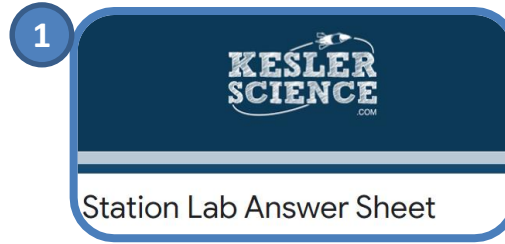


Kesler Science Station Lab

Online Answer Sheet Instructions

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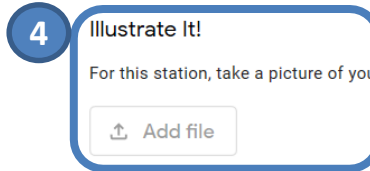
Use the link to the form your teacher provided for this station lab.

A screenshot of the form input fields. It shows three rows of input boxes. The first row is labeled 'Email address *' and contains the text 'chriskesler@keslerscience.com'. The second row is labeled 'First Name' and contains the text 'Chris'. The third row is labeled 'Last Name' and contains the text 'Kesler'.

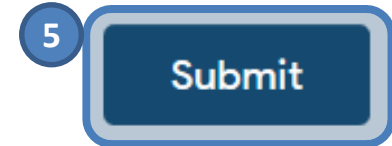
Enter your email address and name. Choose your class.



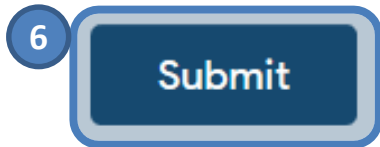
Look at this file for questions and answer them in the form. Make sure you are answering each station in the correct answer section of your form.



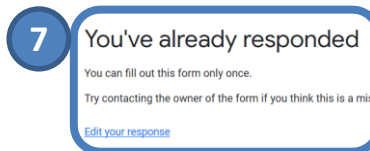
Sometimes you may need to upload a photo. You can take a picture with a phone, webcam, or scanner. Click Add File and browse to the picture you saved.



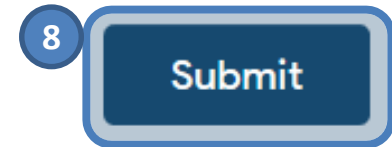
The Submit button is at the bottom of the form. You can submit without completing the form.



Make sure you hit submit anytime you stop working on the form so you do not lose your answers.



You can edit your answers or return later to complete the stations. Go back to the link your teacher gave you for the form, click it, then click Edit your response.



When you have completed all the stations, carefully check your answers and submit your form for the final time.

A white, jagged-edged callout bubble with a green and yellow border, containing the text "Watch It!".

Watch It!

Watch It! Station Directions

Each member of the group will go to the website listed on task card #1.

Complete the task cards in order.

Every student will answer the questions from the task cards on the lab sheet in the Watch It! section of the lab sheet.

Watch It!
#1

StudyJams: <http://goo.gl/jbSdps>
URL is case-sensitive

1. Click Play on the video.
2. Answer questions from cards #2-4 on your lab sheet.



Study Jams

Watch It!
#2

Describe what a front is.

Watch It!
#3

Describe what an air mass is.

Watch It!
#4

Explain how a cold front is formed.



Research It!

Research It! Station Directions

Each member of the group will go to the website listed on task card #1.

Complete the task cards in order.

Every student will answer the questions from the task cards on the lab sheet in the Research It! section.

Research It!
#1

1. Go to <https://climate.ncsu.edu/edu/Fronts>

2. Why should you care about weather fronts?
3. Fronts mark the boundary between _____.

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Research It!
#2

1. What are three factors that often change at a front?
 - a.
 - b.
 - c.

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Research It!
#3

1. What causes a warm air mass to move over a cold air mass instead of mixing with it?
2. What are conditions like after a warm air mass passes over a region? (Look at the three factors from your last question and tell how those changed.)

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Research It!
#4

1. As a cold air mass advances on a warm air mass, what usually comes before it?
2. When neither air mass is advancing, it is called a _____.
3. For which front is this a symbol?



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A starburst-shaped logo with a white center and a green and yellow border. The text "Explore It!" is written inside in blue.

Explore
It!

Explore It! Station Directions

One member of the group will read the task cards in order. The group will be responsible for completing each of the tasks that are being read.

Each member of the group will then write their conclusions down on the lab sheet in the Explore It! section.

Explore It!
#1


Use the map at the station for this activity.

1. On your lab sheet write what you already know about cold and warm fronts.

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Explore It!
#2

Locate the blue flags on the weather map.




This is called a **cold front** and travels in the direction the flags are pointing. The air behind it is cold, dense, and dry. When it overtakes a warm front it pushes the warm front up and can cause heavy thunderstorms or snow storms at the front boundary.

1. Summarize a cold front on your lab sheet.

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Explore It!
#3

Locate the red flags on the weather map.




This is called a **warm front** and travels in the direction the flags (half circles) are pointing. The air behind it is warmer and less dense than a cold air mass. When it overtakes a cold air mass, it slides above the cold air and can cause a light rain shower.

1. Summarize a warm front on your lab sheet.

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Explore It!
#4

Locate the red and blue flags on the same line on the weather map.



This is called a **stationary front**. Stationary fronts happen when a cold air mass and a warm air mass meet, but neither one has enough force to move the other. The mixture of cold and warm air causes rain that sometimes remains in the area for many days.

1. Summarize a stationary front on your lab sheet.

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Explore It!
#5

Locate the purple flags on the weather map.

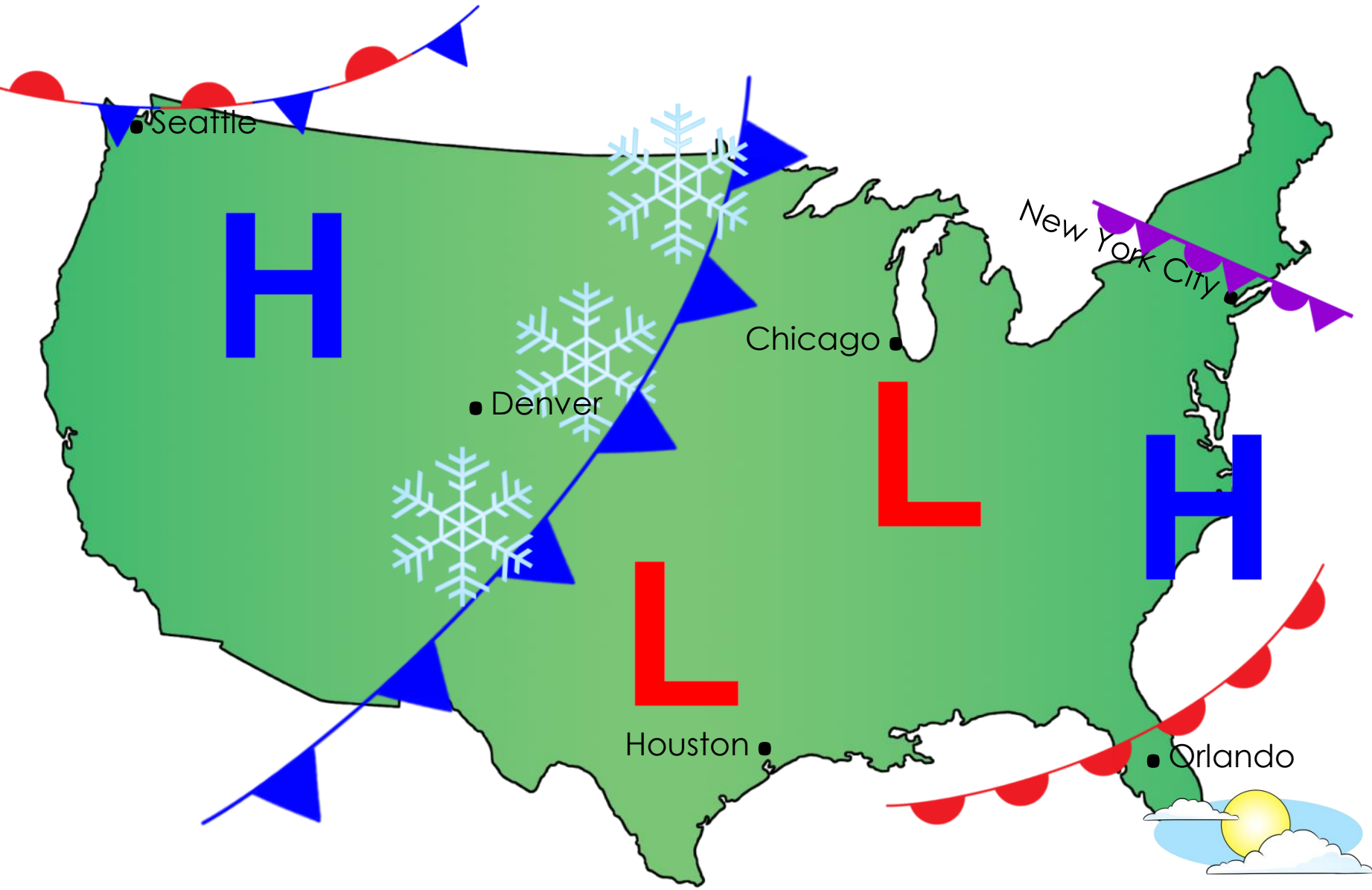
This is called an **occluded front**. This type of front happens when two cold fronts converge on a warm front and push it upwards. You can expect light rain on an occluded front.

1. Summarize an occluded front on your lab sheet.

Explore It!
#6

Use the information you learned to answer the following questions.

1. What kind of weather is Seattle likely having? How long will it stay that way?
2. What kind of weather is Denver experiencing?
3. What do you expect the weather to be like in NYC?
4. What is the expected weather in Houston in about 48 hours?



A white, starburst-shaped callout bubble with a green and yellow border, containing the text "Read It!".

Read It!

Read It! Station Directions

Each member of the group will read the passage and answer the questions from the task cards on the lab sheet in the Read It! section.

It is important to remember that the answers will come directly from the reading passage.

Read It!
(M)

Air Masses

A front is a boundary separating two air masses. The differences between the air masses are their temperature, humidity, and density.

A front is the leading edge of the air mass. Cold fronts are shown on a weather map by a blue line with triangles pointing in the direction the front is traveling.

Cold fronts are very much like air plows. They push away a warm, moist air mass and switch it with a cooler and drier air mass.

Cold fronts generally advance at average speeds between 20-25 mph toward the east, faster in the winter than the summer, and are usually oriented along a northeast to southwest line.





A good example of how a cold front moves is a like a hand plane. When a sharpened metal plate of a hand plane is pushed forward over a wood surface, it slices shavings of wood that curl up in front of the cutter. With the cold front, warm air is quickly forced upward (like the shavings) before of the actual cold air mass (the "cutter") arrives. High cumulus clouds form. Hard showers and some are gusty thunderstorms usually are present. Then comes the cooler and drier air.

A warm air mass can also overtake a cold air mass. This action happens much slower than the plowing effect of a cold air mass. On a weather map, a warm air mass is shown as a red line with red semi-circles. Warm air masses move slowly over cold air masses. They bring warmer and more long-lasting weather patterns.

Both warm and cold weather masses, and the fronts that fall on their leading edges, create a variety of weather over the earth.

Read It!
#1

What does the front symbol look like for a cold front?

- A.  C. 
- B.  D. 

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Read It!
#2

Which description best matches a cold front?

- A. Warm air is pushed up by cooler air and thunderstorms or ice storms are present
- B. Cold air is pushed up by cooler air and thunderstorms or ice storms are present
- C. Warm air is pushed up by cooler air and dry air is present along the front
- D. Cold air is replaced by warm air and thunderstorms are present.

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Read It!
#3

Which best describes the speed and appearance of most cold fronts?

- A. 5-15mph east, NW to SE line
- B. 5-15mph east, NE to SW line
- C. 20-25mph east, NE to SW line
- D. 20-25mph east, NW to SE line

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Read It!
#4

A cold air mass comes into a warm air mass like what kind of machine?

- A. Forklift
- B. Generator
- C. Wind turbine
- D. Plow

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A starburst graphic with a white center and a green and yellow border, containing the text "Illustrate It!".

Illustrate It!

Illustrate It! Station Directions

Each member of the group will draw a quick sketch on the lab sheet that shows they understand the concept being taught.

Use the colored pencils and markers that are provided.

The directions for the sketch are provided on the task card at the table.

A white starburst shape with a green and yellow border, containing the text "Illustrate It!".

Illustrate It!

Illustrate It! Station Directions

Use the colored pencils to draw each of the 4 types of fronts: **cold front**, **warm front**, **stationary front**, **occluded front**.

Label the fronts and describe the weather at each front boundary.

You may use <http://bit.ly/314lyOA> for reference.



Write It!

Write It! Station Directions

It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

Answer each of the task card questions on the lab sheet in **complete sentences**.

Write It!
#1

How does density relate to cold and warm air masses?

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Write It!
#2

Describe the expected weather in your town if a cold front is going to be moving in within the next 12 hours.

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Write It!
#3

How are cold fronts different from stationary fronts?

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A starburst graphic with a white center and a green and yellow border, containing the text 'Assess It!'.

Assess It!

Assess It! Station Directions

It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

Each member will answer the questions from the task cards on the lab sheet in the Assess It! section.

Assess It!
#1

What kind of front occurs when a cold air mass replaces a warm air mass?

- A. Cold front
- B. Warm front
- C. Stationary front
- D. Occluded front

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Assess It!
#2

What kind of weather would you expect in Denver, CO?



- A. Rainy weather with mild temperatures
- B. Icy storms with decreasing temperatures
- C. Icy storms with increasing temperatures
- D. Rainy weather with warm temperatures

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Assess It!
#3

Which is the best description for a stationary front?

- A. Colder weather that will last for a couple of hours
- B. Warmer weather that will last for a couple of hours
- C. Consistent rain that may last for several days
- D. Strong thunderstorms or ice storms

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Assess It!
#4

Chicago is _____ than it will be tomorrow.



- A. icier
- B. wetter
- C. colder
- D. warmer

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Organize It!

Organize It! Station Directions





It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

Each group will organize the cards. Each of the cards will be used. Have your teacher sign off on your Organize it section after it has been checked.

Please mix up the cards again before the next group arrives at this station.

Rearrange the characteristics so they match the type of front they describe.

Cold Front	Warm Front	Stationary Front	Occluded Front
<p>Warm air mass catches up to a cold air mass and moves over it</p>	<p>Two cold air masses converge on a warm air mass</p>	<p>Cold dense air replaces warm, less dense air</p>	
	<p>A cold and warm air mass meet but neither has the force to push the other one</p>		<p>Often associated with light rain</p>
<p>Often heavy thunderstorms or ice storms and decreasing temperatures</p>		<p>Light rain that remains in the area for days</p>	