

**CULMINATING TASK: Challenge 2**

## As the storm moved east, why did it snow in some areas but not others?

Over a few days, the cold front and the low pressure center moved. From February 20 to 22, the storm moved gradually from California to Nevada. Then, on February 23, the storm moved more quickly to the east and south. In the middle of the country, temperatures were cold enough for snow.



## As the storm moved east, why did it snow in some areas but not others?

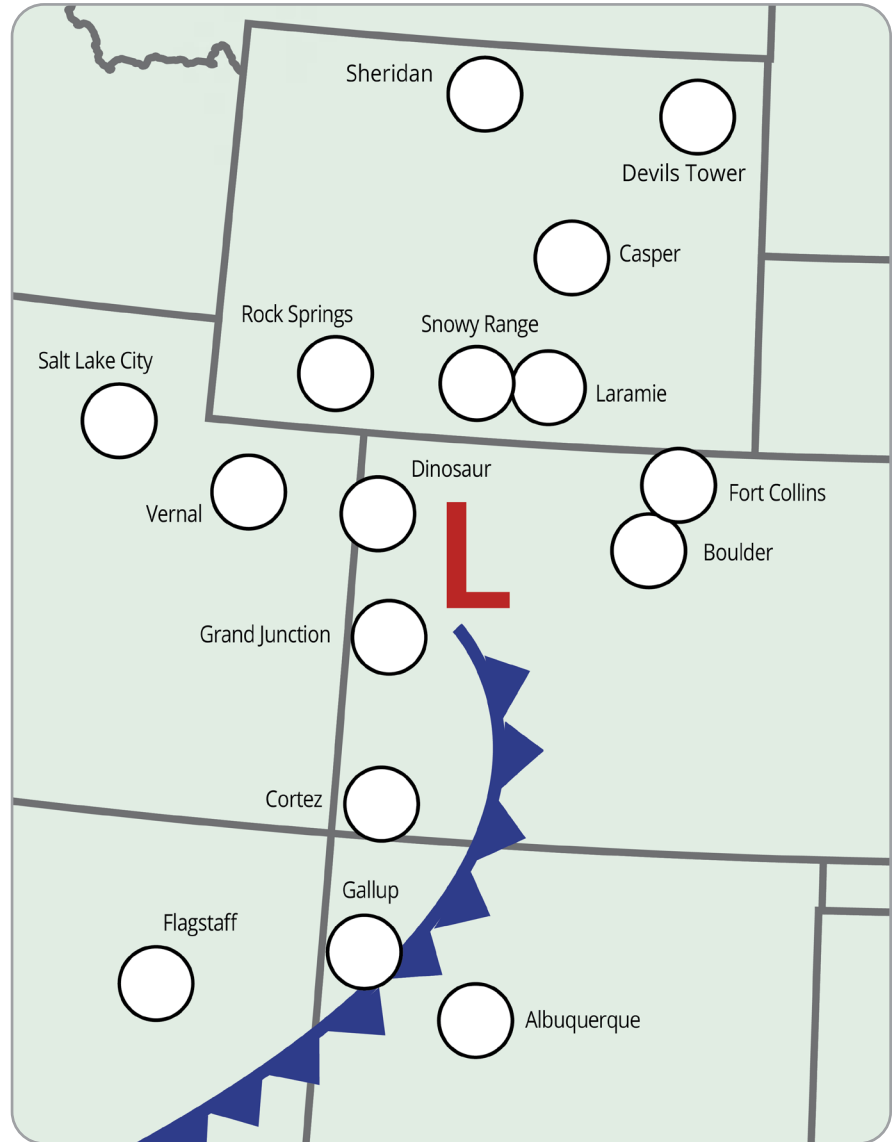
### STEP 1: Map the snowfall data.

Below is the snowfall report for the communities shown on the map.

1. Locate the communities on the map and **write the snowfall** in the circles.

### SNOWFALL: FEBRUARY 23, 2017

LOCATION	SNOW (cm)
Rock Springs, WY	45.7
Laramie, WY	7.6
Snowy Range, WY	61.0
Sheridan, WY	1.3
Devils Tower, WY	0
Casper, WY	13.7
Dinosaur, CO	19.1
Grand Junction, CO	0
Fort Collins, CO	3.8
Boulder, CO	1.3
Cortez, CO	0
Flagstaff, AZ	0
Salt Lake City, UT	8.6
Vernal, UT	17.8
Gallup, NM	0
Albuquerque, NM	0



 the center of an area of low pressure    
  cold front    
  snow

### STEP 2: Where might schools close?

Schools may close if there is heavy snowfall.

Locate where you think schools closed because of snow. **Color these locations with a bright color** on the map so you can easily see where the most snow occurred.



## As the storm moved east, why did it snow in some areas but not others?

### STEP 3: Look for a trend in the snowfall.

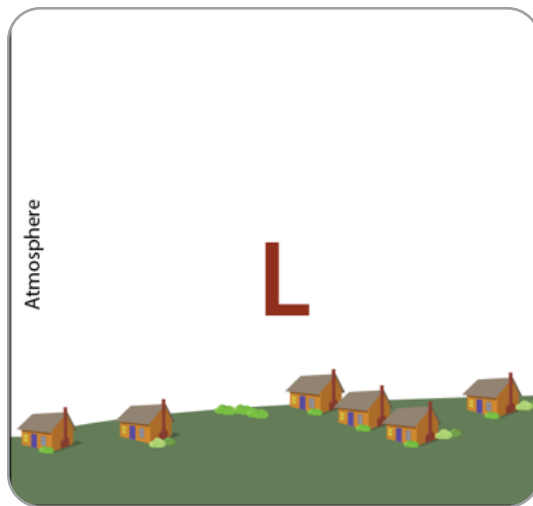
Refer to the map of snowfall on the previous page to answer the questions below.

1. What do you notice about the location of communities with the most snowfall? Where did the most snow fall with respect to the front and area of low pressure?
2. Why do you think this area received more snow?

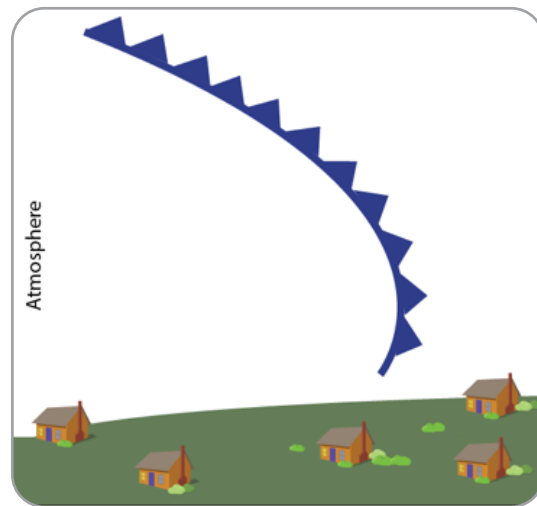
### STEP 4: Why didn't it snow everywhere?

There are two things that a storm needs to cause precipitation:

1. Air that is rising and cooling and
  2. Enough moisture in the air to create clouds and precipitation.
1. **Draw a cross section** that shows how air is moving and where clouds are forming at an area of low pressure and at a cold front using models you developed as a class.



How air is moving and where clouds are forming **at an area of low pressure**



How air is moving and where clouds are forming **at a cold front**

2. Notice where there is low pressure and where the front is on the snowfall map. Remember that the storm came from the west, so it moved over the areas on the west side of the map before it got to this location.
  - **Circle locations on the snowfall map** where there was little or no snow.
  - Why do you think these locations didn't get much/any snow?
3. **Name the locations** that you think are too far from the storm to get much snow.

**Moisture:** When it was on the West Coast, this storm was full of moisture, which is what caused so much rain and snow. Is it still full of moisture? The amount of moisture in the air is measured as humidity. On the following page is the average humidity data for the communities shown on the map.

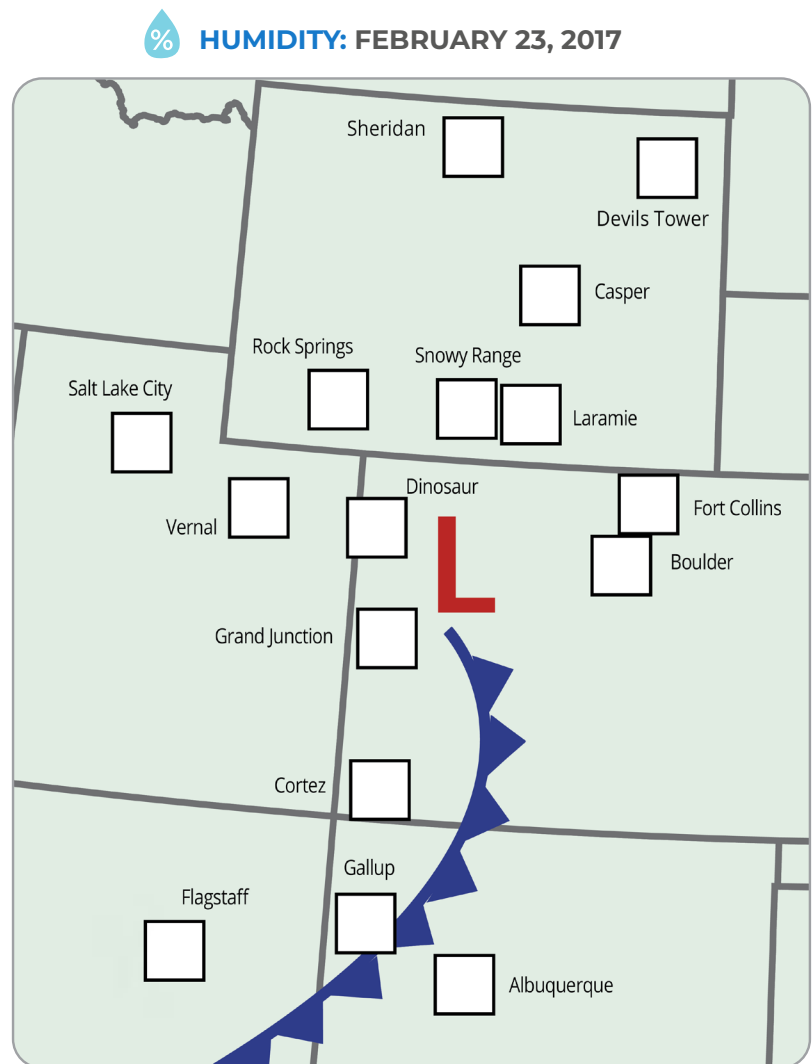


## As the storm moved east, why did it snow in some areas but not others?

Use these directions below to create the humidity map.

1. The humidity measurements in the table are from near the ground, not up in the clouds, but they can help us estimate how much moisture is in the air. Locate the communities on the map and **write the humidity** in the squares using a different color than the snowfall measurements.
2. **Color code** the locations that had an average humidity under 70%. These locations are less likely to get precipitation. **Choose another color** for the locations with humidity over 70%. These locations are more likely to get precipitation.
3. Name the locations that you think didn't get much precipitation because the air didn't have enough moisture.

LOCATION	AVERAGE HUMIDITY (%)
Rock Springs, WY	81
Laramie, WY	77
Snowy Range, WY	77
Sheridan, WY	84
Devils Tower, WY	88
Casper, WY	92
Dinosaur, CO	90
Grand Junction, CO	62
Fort Collins, CO	85
Boulder, CO	85
Cortez, CO	58
Flagstaff, AZ	56
Salt Lake City, UT	81
Vernal, UT	90
Gallup, NM	43
Albuquerque, NM	33



**KEY:**

- the center of an area of low pressure
- cold front
- humidity
- humidity under 70% (choose a color)
- humidity over 70% (choose a color)



**Discuss with your class.**

How does the humidity data help you understand why it snowed in some places and not others?