Weather Permitting 2016 – Event Leader Instructions

Event Set up

This is a station event. There are 20 stations. If you have more than 20 teams you can print two sets of stations. Spread the stations around the room. Put one team at each station, they will rotate through all 20 stations in order. Teams can't go back to a station after their 2 minutes is up.

Materials

If you have any of these specimens, please set them out with the questions, otherwise the pictures are fine. If you asked for this from the State Office we are sending all the samples and supplies to you.

Station 1: Nothing
Station 2: #6 = barometer, #7=weather vane, #8 = hygrometer, #9 = weather balloon, #10 = anemometer, #11 = thermometer
Station 3: nothing
Station 4: 3d water cycle model. url included on station page
Station 5: sling psychrometer
Station 6: nothing
Station 7: set up container as shown. Add 1 drop of food coloring to water in bottom so that it looks like the ocean. You will need some ice cubes to place in the top half. If you are running a split schedule, dump this station out and set up a fresh one for the second session.
Station 8: nothing
Station 9: nothing
Station 10: ~~nothing~~ red + blue colored pencils
Station 11: nothing
Station 12: nothing
Station 13: nothing
Station 14: weather map – adjust answers if using your own
Station 15: ~~nothing~~ red + blue colored pencils
Station 16: nothing
Station 17: nothing
Station 18: nothing
Station 19: nothing
Station 20: nothing

Each team is allowed to bring:
Something to write with, If they have anything else, take it away until the end of the event.
Running the Event:

Teams have 2 minutes per station. Teams should leave station pages with the question side down until instructed to flip them over and begin. When each team is done at a station, they should flip the station page back over. Be sure to instruct teams which way to move and allow adequate time for transition between stations. Elementary kids get easily confused about which way to rotate, putting arrows on the table might be helpful, especially when going from Station 20 back to Station 1.

A copy of the official rules is on the back of this page in case you or the students have a question about the event that wasn't answered here.

Weather Permitting – Student Response Sheet

School: _____ V JV1 JV2 JV3 JV4

Student Names: _____

For each answer, fill in the blank or circle the correct response.

Station 1

1. _____
2. _____
3. _____
4. _____
5. _____

Station 2

6. _____
7. _____
8. _____
9. _____
10. _____
11. _____

Station 3

12. _____
13. WATER or SOIL
14. _____
    _____
    _____

Station 4

15. _____
16. _____
17. _____
18. _____
19. _____

Station 5

20. A B C D
21. A B C D
22. A B C D
23. A B C D

Station 6

24. _____
25. _____
26. _____
27. A B C D
28. A B C D

Station 7

29. _____
30. _____
31. _____
32. A B C D
33. TRUE or FALSE

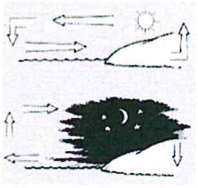
Station 8

34. A B C D
35. A B C D
36. A B C D
37. A B C D
38. A B C D

Station 9

39. A B C D
40. A B C D
41. A _____
    B _____
    C _____
    D _____

Station 10

42. 

43. A B C D

44. DAY or NIGHT

45. A B C D

Station 11

46. A B C D

47. A B C D

48. A B C D

Station 12

49. _____

50. A B C D

51. A B C D

52. A B C D

Station 13

53. _____

54. _____

55. A B C D

56. A B C D

Station 14

57. _____

58. _____

59. A B C D

60. _____

61. _____

62. _____

Station 15

63. 

64. cP = WARM or COLD
    mT = WARM or COLD

65. Draw arrow on line above

66. A B C D

67. _____

Station 16

68. 1 2 3 4

69. A B C D

70. A B C D

71. A B C D

Station 17

72. _____

73. A B C D

74. A B C D

Station 18

75. _____

76. _____

77. YES or NO

78. A B C D

79. A B C D

Station 19

80. _____

_____

81. _____

82. _____

Station 20

83. _____

84. A B C D

85. MILES or FEET

86. NORTHERN or SOUTHERN

Weather Permitting – Student Response Sheet

ANSWER KEY__EACH ANSWER WORTH 1 POINT UNLESS NOTED. TOTAL POINTS: 94 pts

TIEBREAKERS - FIRST TO GET THE FOLLOWING QUESTION RIGHT: _14,75,83,53,44,10__

For each answer, fill in the blank or circle the correct response.

Station 1

1. __CUMULUS__
2. __NIMBOSTRATUS___
3. __HIGH__
4. __ICE OR ICE CRYSTALS__
5. _#1 & #4__ Both for point

Station 2

6. _F__
7. _I__
8. _D__
9. _C__
10. _A___
11. _B__

Station 3

12. __COAST___
13. WATER or SOIL
14. ___ONCE THE WATER AT THE OCEAN WARMS UP, IT STAYS WARM LONGER THAN THE LAND +2

Station 4

15. __UNDERGROUND STORAGE___
16. __SNOWPACK_
17. __EVAPORATION__
18. __TRANSPIRATION___
19. __EVAPORATION__

Station 5

20. A B C D
21. A B C D
22. A B C D
23. A B C D

Station 6

24. __COLD FRONT__
25. _WARM FRONT___
26. __STATIONARY FRONT__
27. A B C D
28. A B C D

Station 7

29. _CONDENSATION_
30. _PRECIPITATION_
31. _THE SUN_
32. A B C D
33. TRUE or FALSE

Station 8

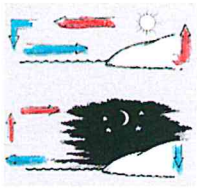
34. A B C D
35. A B C D
36. A B C D
37. A B C D
38. A B C D

Station 9

39. A B C D
40. A B C D
41. A _RAIN__
    B__FREEZING RAIN__
    C__SLEET___
    D___SNOW___

Station 10

+2 pts if arrow colors are correct

42. 
43. A B C D
44. DAY or NIGHT
45. A B C D

Station 11

46. A B C D
47. A B C D
48. A B C D

Station 12

49. _RAIN OR PRECIPITATION__
50. A B C D
51. A B C D
52. A B C D

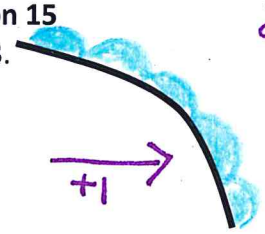
Station 13

53. _RAIN GUAGE_
54. _6.4CM_____
55. A B C D
56. A B C D

Station 14

57. 32°F
58. Billings or Denver
59. A (B) C D
60. Below
61. Wednesday
62. 8°

Station 15

63. 

2pts - 1 blue semicircles
+1 on correct side of line

64. cP = WARM or COLD
mT = WARM or COLD
>1 pt each

65. Draw arrow on line above
66. A B C D
67. _LIGHTNING__

Station 16

68. 1 2 3 4
69. A B C D
70. A B C D
71. A B C D

Station 17

72. 1018 mb (+1 bonus pt if units included)
73. A B C D
74. A B C D

Station 18

75. THE GULF STREAM__
76. _TEMPERATURE_
77. YES or NO
78. A B C D
79. A B C D

Station 19

80. _APRIL & OCTOBER_(1 PT EACH)
_EITHER ORDER IS FINE__
81. __SUMMER___
82. __WINTER____

Station 20

83. __JET STREAMS___
84. A B C D
85. MILES or FEET
86. NORTHERN or SOUTHERN

STATION 1

1. I recently took a plane trip and snapped this photo out of the window. What type of cloud is it?

2. This cloud was seen at the National Science Olympiad tournament in Nebraska. What type of cloud is it?

3. Are these clouds considered low, medium or high level clouds?

4. What are this type of cloud made of?

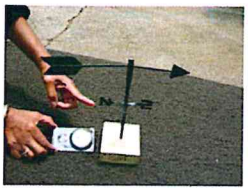
5. Which of the clouds above indicate fair weather? List all the numbers that apply.

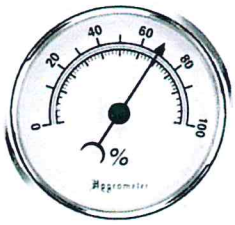
Types of clouds:					
Altostratus	Cirrus	Cumulonimbus	Cumulus	Nimbostratus	Stratus

STATION 2

Match the instrument to its job. You will not use all the letters.

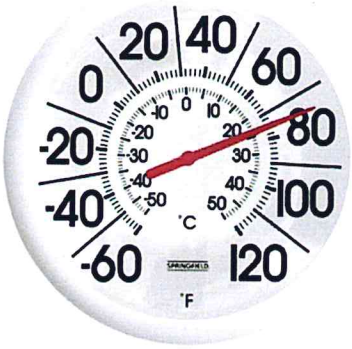
6. 

7. 

8. 

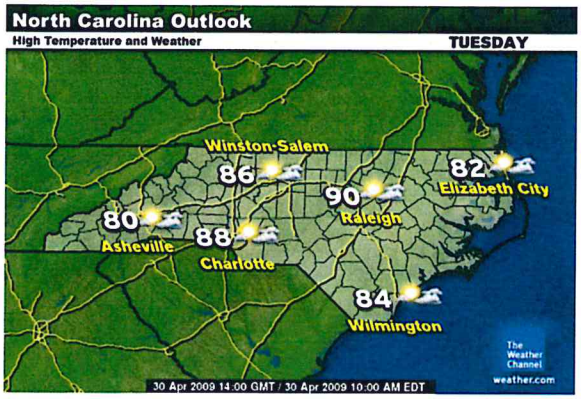
9. 

10. 

11. 

a. Measures wind speed
b. Measures temperature
c. Measures temperature, atmospheric pressure; used when forecasting weather and determining altitude
d. Measures the amount of water vapor in the air
e. Measures the amount and motion of precipitation
f. Measures atmospheric pressure
g. Measures atmospheric moisture
h. Measures amount of rainfall
i. Measures wind direction
j. Measures Earth's climate

STATION 3

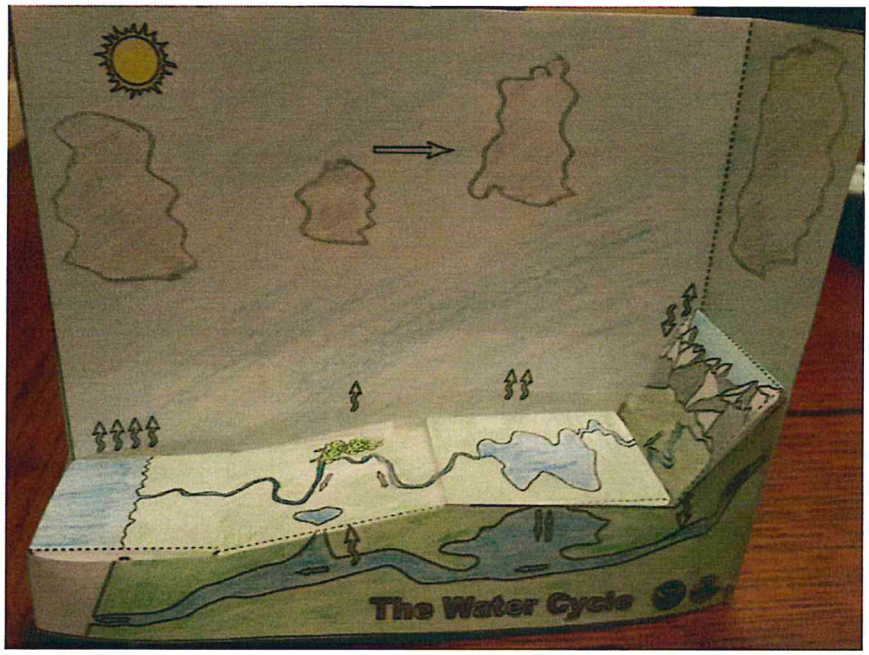


12. Look at the map above for April in NC; is it going to be warmer along the coastal areas of North Carolina (Wilmington & Elizabeth City), or in the central/piedmont areas of North Carolina (Raleigh, Charlotte, & Winston Salem)?

13. Look at the picture above; if you put 2 cups; one with soil and one with water; under a lamp for 1 hour and then turned the light off, which would cool down slower– the one with water or the one with soil?

14. Use your answer from #13 to explain the temperature difference from the coastal area to the central piedmont on the map at the top.

STATION 4



http://www.srh.noaa.gov/jetstream/atmos/images/hydro_papercraft_bw_nolabels.pdf

Label the lettered pieces of the water cycle on the model at this station.

15. L

16. M

17. N

18. O

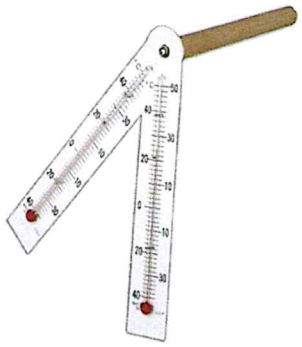
19. P

Water Cycle Word Bank

accumulation	fog	surface water
cloud	precipitation	transpiration
condensation	runoff	underground storage
evaporation	snowpack	

STATION 5

20. Does warm air or cool air hold more humidity?
    a. warm air because air molecules in warm air move fast
    b. cool air because air molecules in cool air move slowly
    c. warm air because air molecules in warm air move slowly
    d. cool air because air molecules in cool air move fast



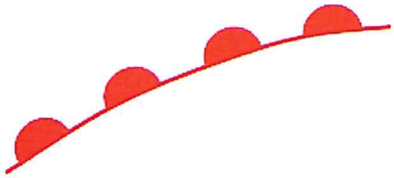
21. What does this instrument measure?
    a. Air pressure
    b. Humidity
    c. Temperature
    d. Relative Humidity

22. Which concept best describes the actual amount of water vapor in the air?
    a. Relative humidity
    b. Specific humidity
    c. Saturation
    d. Meteorology

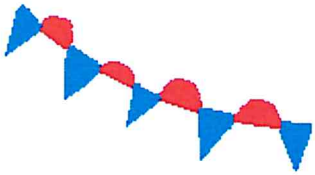
23. When a body of air can hold no more water vapor, it is referred to as being what?
    a. Dry
    b. Empty
    c. Saturated
    d. Humid

STATION 6

A



B



C

24. What type of front is A?

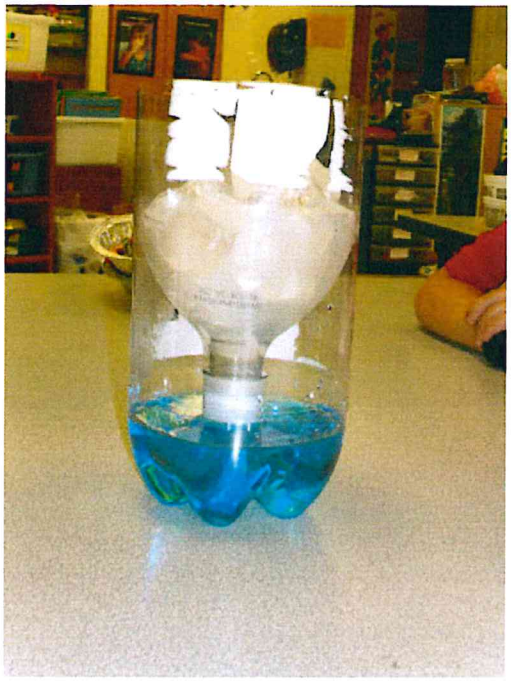
25. What type of front is B?

26. What type of front is C?

27. The term stationary front describes a front _____.
    a. that continues forward
    b. that is present for a brief amount of time
    c. that changes
    d. that stops advancing

28. What kind of weather does a cold front usually bring?
    a. Warm
    b. Sunny
    c. Stormy
    d. Windy

STATION 7



Imagine that the blue water at the bottom is the ocean and the top of the bottle is the atmosphere.

29. You should see some 'clouds' inside the container. Through what process are clouds formed in the sky?

30. After a few minutes, you may see water dripping down off of the inside bottle. What is it called in the water cycle when water comes back down to the ground?

31. What gives the earth's water cycle its energy?

32. When you hang clothes outside to dry, what process are you hoping for?
    A. evaporation
    B. precipitation
    C. condensation
    D. accumulation

33. TRUE or FALSE: All water in the water cycle ends up in the same place it started.

STATION 8

34. The layer of the atmosphere where most weather happens is called the:
    a. Exosphere
    b. Mesosphere
    c. Stratosphere
    d. Troposphere

35. Which two terms are used to describe weather?
    a. wind direction and amount of erosion
    b. gravity and amount of rain
    c. air temperature and wind speed
    d. groundwater and cloud cover

36. In what ways does the Sun influence weather?
    a. The Sun heats air in the atmosphere.
    b. The Sun evaporates water in the atmosphere to create clouds.
    c. The Sun heats water on Earth.
    d. all answers are correct

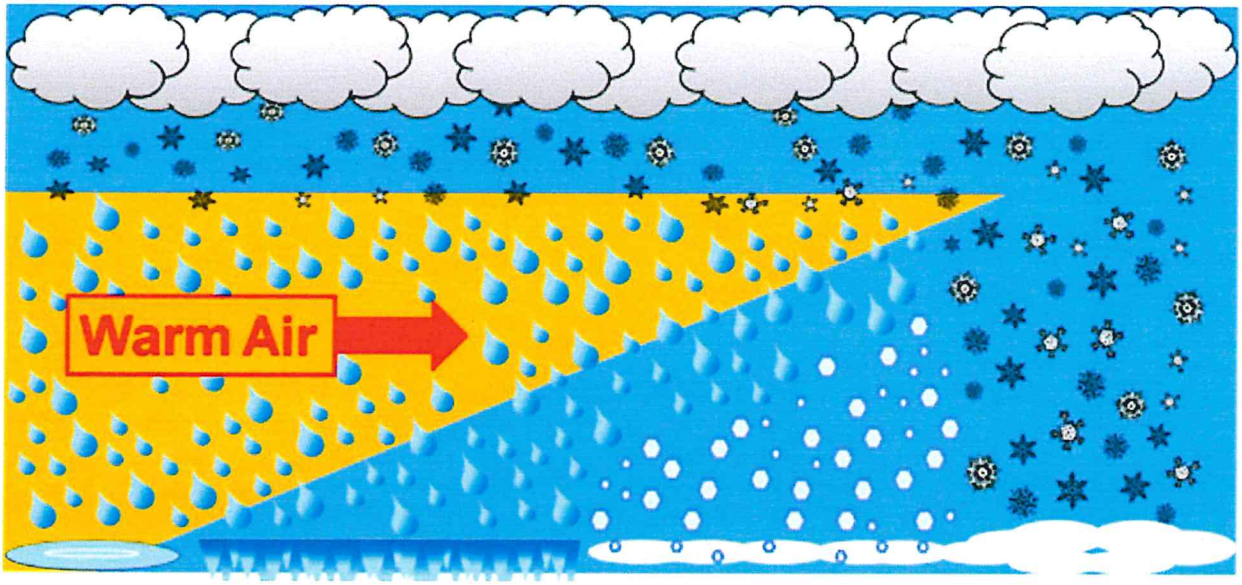
37. What is the weight of air called?
    a. Air pressure
    b. Air Mass
    c. Humidity
    d. Precipitation

38. What is the average of weather conditions through all the seasons over a period of time?
    a. Weather
    b. Climate
    c. Microclimate
    d. Local winds

STATION 9

39. When the temperature reaches its ____ , snow, rain, or hail is likely to form.
    a. evaporation point
    b. dew point
    c. saturation point
    d. relative humidity

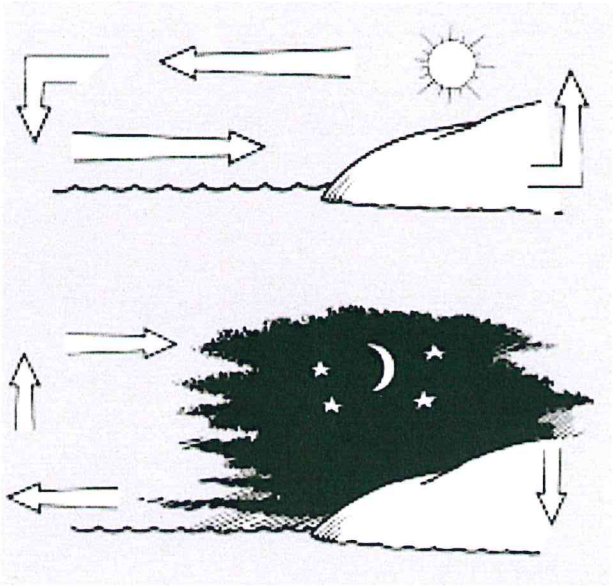
40. Which statement about hail is correct?
    a. It is rain that falls through a layer of freezing air
    b. It may be sent up into the clouds many times
    c. It forms in winter in low stratus clouds
    d. It is a liquid form of precipitation



41. Look at the graphic above. It shows 4 different scenarios of what can happen as snow falls to the ground through different amount of warm air. Label each letter above as:

Freezing Rain, Rain, Sleet or Snow

STATION 10



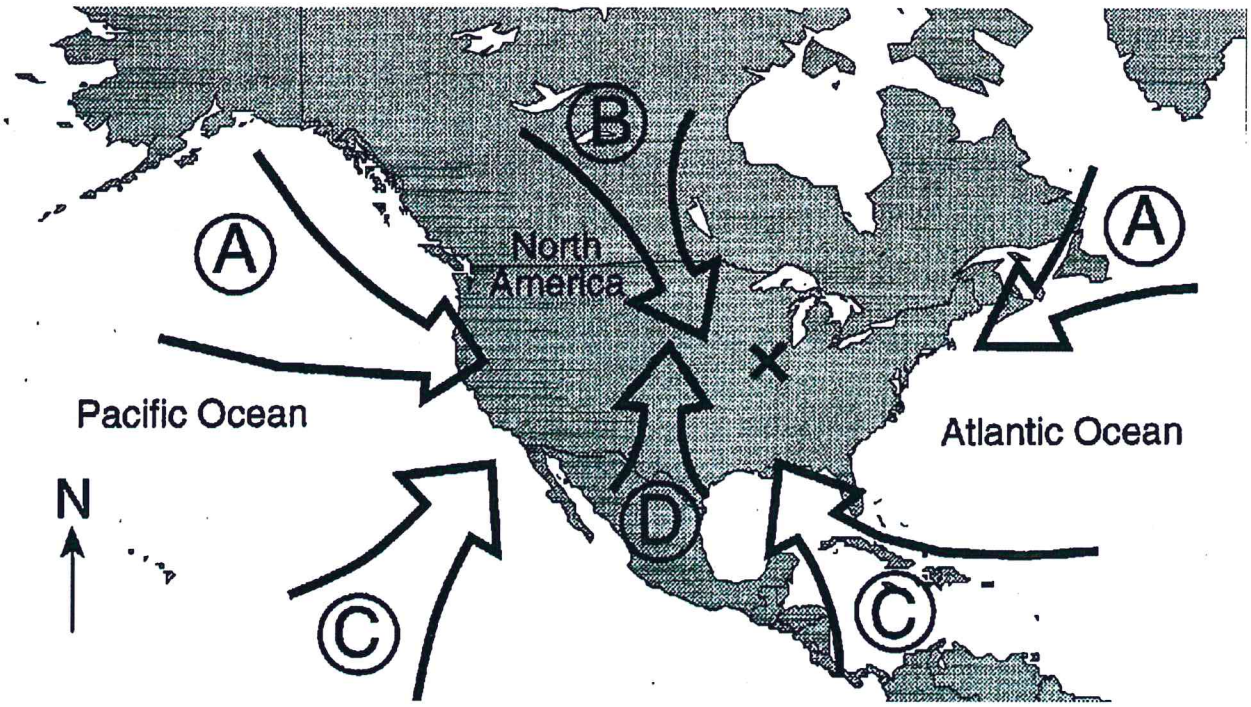
42. Use the colored pencils at this station to color the arrows on your answer to show the temperature of the air masses for these land and sea breezes. Use BLUE for cool air and RED for warm air.

43. Cooler air _____.
    a. sinks
    b. does none of these
    c. is lighter than warm air
    d. rises

44. Does a sea breeze typically happen during the day or at night?

45. What causes wind?
    a. high pressure
    b. low pressure
    c. weather patterns
    d. Air moves from regions of high pressure to regions of low pressure

STATION 11



46. Which source region letter above will produce a warm, moist air mass?

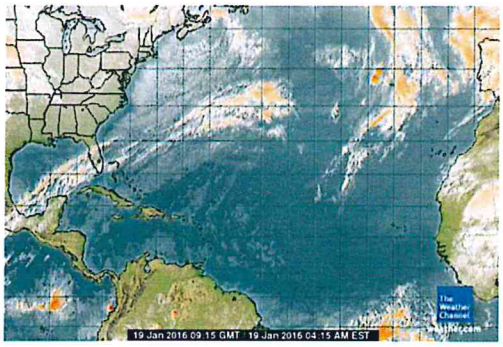
47. On the weather map above, which symbol would be used to represent an air mass that formed in region B?
    a. cT
    b. mP
    c. cP
    d. mT

48. When two air masses of different densities collide, it's called_____.
    a. a high pressure zone
    b. a front
    c. a hurricane
    d. a storm

STATION 12

49. It looks like both coasts of the country are getting the same type of weather today. What does the color represent?

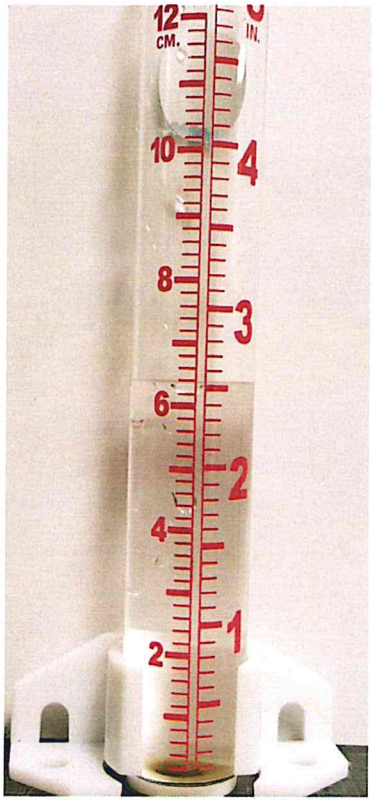
50. What do meteorologists use to create this type of map?
    A. Radar
    B. Weather Balloons
    C. Satellite
    D. They create this by using a computer model to predict upcoming weather events



51. This map shows the same time, but focused a bit more over the Atlantic Ocean. What do meteorologists use to create this type of map?
    A. Radar
    B. Weather Balloons
    C. Satellite
    D. They create this by using a computer model to predict upcoming weather events

52. Which of these instruments allows us to collect data about the upper atmosphere to help predict the weather?
    A. Radar
    B. Weather Balloons
    C. Satellites
    D. Hygrometers

STATION 13



53. What is this weather instrument called?

54. According to the instrument, how much rain did we get (measured in metric of course!)?

55. It snowed, and filled the instrument to the 12" mark. When the snow melts, what will the liquid water reading be?

    a. 24"
    b. 15"
    c. 12"
    d. 1"

56. Where should you place this instrument to get accurate weather readings?
    a. Near the side of your house
    b. In the woods
    c. In a field
    d. Near the edge of a lake

STATION 14

Use the weather map from the Raleigh newspaper at this station to answer the following questions.

57. What was the high temperature for Washington, DC?

58. Name a city where it was snowing today.

59. Which city is experiencing dry clear conditions?

    A. Billings
    B. Raleigh
    C. Seattle
    D. Denver

60. Is Raleigh's forecasted temperature for Sunday above, below, or normal for this day of the year?

61. What day is it most likely to rain in Raleigh this week?

62. What was the record low recorded on this date in Raleigh?

Station 14

Today in the Triangle

MORNING 6 a.m. **23**
Chance precip: 10%
Relative humidity: 67%
Dew point: 14°
Wind: N.W. at 7 mph

AFTERNOON High **34**
Chance precip: 10%
Relative humidity: 49%
Dew point: 17°
Wind: N.W. at 5 mph

OVERNIGHT Low **20**
Chance precip: 0%
Relative humidity: 84%
Dew point: 19°
Wind: S.W. at 2 mph

Forecast Afternoon highs and overnight lows.

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
47/33	54/37	44/29	43/29
Chance precip: 0%	Chance precip: 10%	Chance precip: 40%	Chance precip: 30%

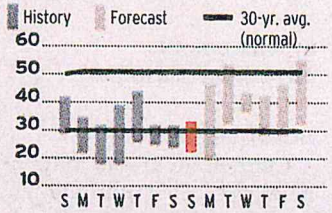
Almanac

7:30 p.m. Fri. through 7:30 p.m. Sat. at RDU

TEMPERATURE (RDU)

Yesterday:	low 24, high 32
Average Temp.:	low 31, high 51
Year-ago:	low 35, high 41
Record high:	77 - 1999
Record low:	8 - 1977

Temperature trend



PRECIPITATION (RDU)

Yesterday:	0.01"
Past seven days:	0.96"
Month to date:	1.73"
Normal month to date:	2.61"
Difference:	-0.88"
Season to date:	7.80"
Normal season to date:	5.68"
Difference:	2.12"
Year to date:	1.73"
Normal year to date:	2.61"
Difference:	-0.88"

LAKES (feet above mean sea level)

Falls: 251.80, week ago: 253.26
Jordan: 219.45, week ago: 224.63
Kerr: 300.00, week ago: 302.08

SUN AND MOON (RDU)

7:20 a.m. 5:32 p.m.

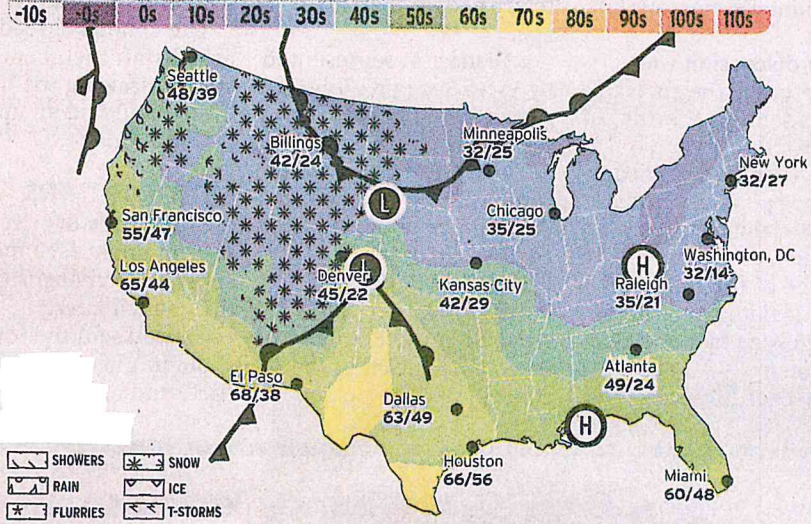
State

	Yesterday	Today	Tomorrow
Asheboro	32/23/.15	36/21/pc	49/34/pc
Asheville	28/21/.17	42/20/pc	46/32/pc
Boone	22/15/.00	37/18/pc	43/28/pc
Charlotte	38/25/.16	44/24/pc	48/34/pc
Elizabeth City	56/30/1.42	35/23/pc	46/33/pc
Fayetteville	34/27/.13	39/22/pc	51/35/pc
Goldsboro	33/26/.00	38/21/pc	50/36/pc
Greensboro	31/22/.34	34/22/pc	46/33/pc
Greenville	35/28/.00	39/24/pc	48/37/pc
Hickory	32/25/.05	43/22/pc	46/32/pc
Jacksonville	35/28/.00	42/22/pc	54/37/pc
Lumberton	36/28/.09	41/25/pc	52/36/pc
Morehead City	45/29/1.18	43/25/s	52/41/s
Mount Airy	30/24/.00	40/19/pc	45/30/pc
Murphy	32/23/.00	46/24/pc	48/36/pc
Nags Head	56/33/1.86	34/23/s	45/33/s
New Bern	43/28/1.68	42/24/pc	53/38/pc
Oxford	30/23/.00	34/20/pc	44/32/pc
Plymouth	43/29/.00	39/23/s	49/34/s
Rocky Mount	32/25/.01	37/20/pc	46/33/pc
Sanford	32/24/.00	38/21/pc	48/32/pc
Southern Pines	32/24/.21	38/21/pc	50/34/pc
Wilmington	39/30/1.28	44/26/pc	54/42/pc
Winston-Salem	28/23/.00	35/23/pc	46/31/pc

World

	Yesterday	Today	Tomorrow
Athens	46/37/pc	48/40/pc	54/42/pc
Baghdad	66/44/s	58/37/s	53/32/pc

Nation



	Yesterday	Today	Tomorrow
Albany	26/19/.00	28/17/pc	35/24/pc
Albuquerque	53/26/.00	52/27/pc	45/24/pc
Anchorage	25/22/.00	37/27/sf	31/31/sf
Atlanta	34/27/.05	49/24/s	56/32/pc
Austin	57/31/.00	66/53/pc	69/43/pc
Baltimore	28/22/1.75	32/14/pc	36/28/pc
Billings	44/33/.00	42/24/sf	35/22/pc
Birmingham	37/29/.00	48/31/s	56/51/pc
Miami	67/60/.03	60/48/s	70/65/pc
Milwaukee	31/27/.00	33/25/c	36/30/i
Minneapolis	22/18/.00	32/25/c	31/20/i
Myrtle Beach	37/30/.00	45/32/s	55/45/pc
Nashville	30/25/.00	37/29/pc	49/40/pc
New Orleans	51/37/.00	52/45/pc	67/55/pc
New York	27/24/1.89	32/27/pc	38/32/pc
Norfolk	48/30/2.80	34/22/pc	43/35/pc

Ocean and tides

Atlantic Beach
Seas 5-8', 45°; wind N.W. winds 25-35
Low tides: 12:52 a.m., 1:36 p.m.
High tides: 7:16 a.m., 7:34 p.m.

Bogue Inlet
Seas 5-8', NA ; wind N.W. winds 25-35
Low tides: 1:18 a.m., 2:02 p.m.
High tides: 7:44 a.m., 8:02 p.m.

Masonboro Inlet
Seas 5-8', 52°; wind N.W. winds 25-35
Low tides: 1:51 a.m., 2:27 p.m.
High tides: 8:02 a.m., 8:23 p.m.

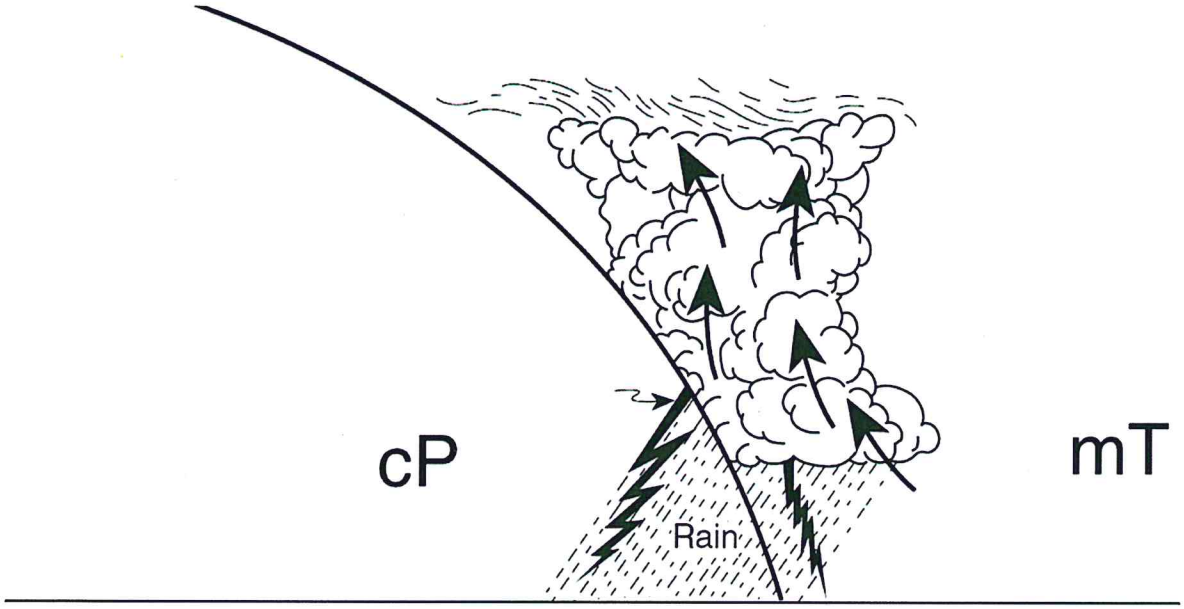
New River Inlet
Seas 5-8', NA ; wind N.W. winds 25-35
Low tides: 1:20 a.m., 2:04 p.m.
High tides: 7:47 a.m., 8:05 p.m.

Oregon Inlet
Seas 10-13', 44°; wind N.W. winds 25-30
Low tides: 1:48 a.m., 2:32 p.m.
High tides: 8:05 a.m., 8:23 p.m.

Southport
Seas 3-6', 52°; wind N.W. winds 20-25
Low tides: 1:57 a.m., 2:33 p.m.
High tides: 8:16 a.m., 8:37 p.m.

Solunar tables

STATION 15



63. On your answer sheet, draw the correct weather symbol for the curved line shown above.

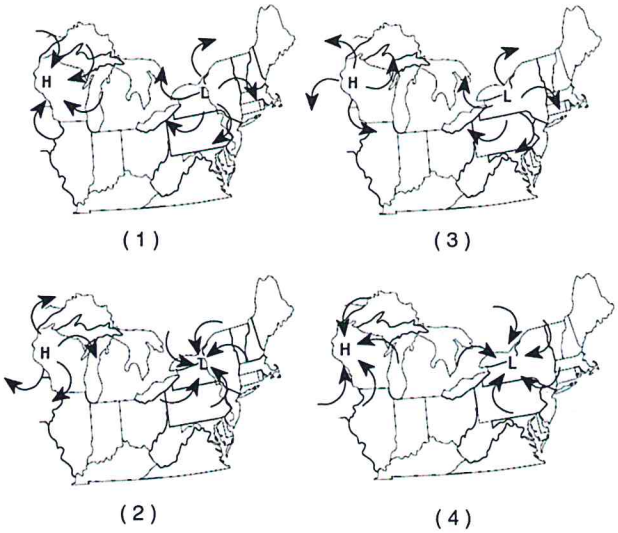
64. Label the two air masses on your answer sheet as warm or cold.

65. Draw an arrow showing which direction the air mass is moving.

66. What type of cloud has formed?
    a. Cumulus
    b. Cirrus
    c. Stratus
    d. Cumulonimbus

67. What does the jagged line on either side represent?

STATION 16



68. The arrows on which map best represent the direction of the surface winds associated with low and high pressure systems?

69. What causes low-pressure winds to swirl in a counter-clockwise direction?

    a. the natural tendency of winds to blow from low to high pressure
    b. precipitation
    c. Earth's rotation
    d. Earth's revolution around the Sun

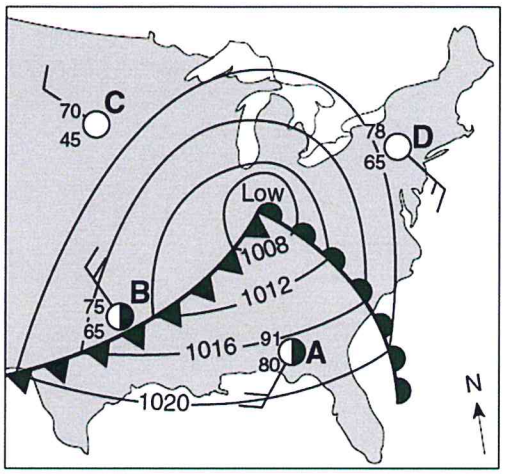
70. The push of air against its surroundings is called _____.

    a. humidity
    b. precipitation
    c. atmosphere
    d. air pressure

71. Which of the following is the cause of the change of seasons?

    a. the distance of a place from the Equator
    b. prevailing winds blowing across land or water
    c. the tilt of the Earth's axis
    d. the rotation of the Earth

STATION 17

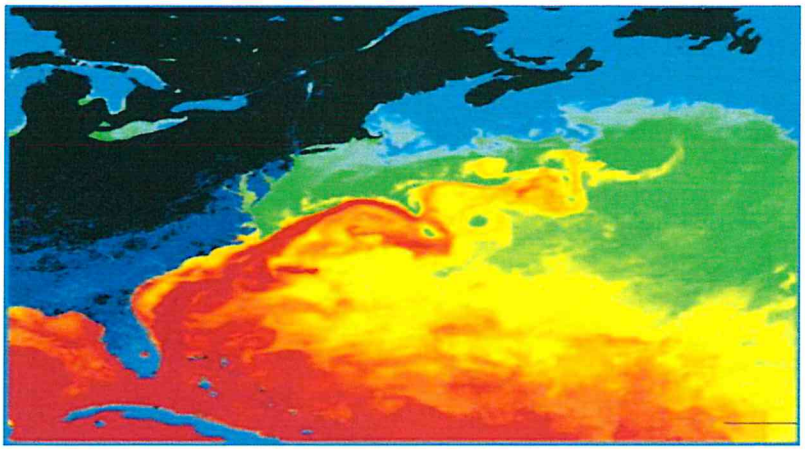


72. What is the barometric pressure at Station A?

73. Surface winds within this system are likely flowing:
    a. towards the center in a clockwise pattern
    b. toward the center in a counterclockwise pattern
    c. away from the center in a clockwise pattern
    d. away from the center in a counterclockwise pattern

74. The wind at station D is coming from:
    a. The NW
    b. The SW
    c. The NE
    d. The SE

STATION 18



75. The image above shows which current system?

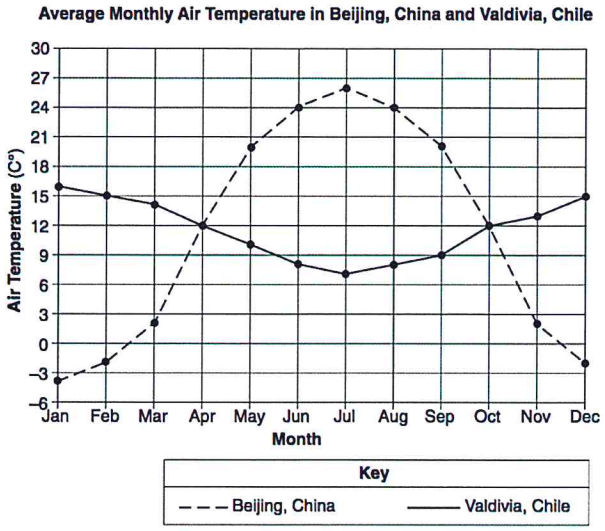
76. What do the different colors on the current systems map indicate?

77. Does the current follow the same route all year long?

78. Prevailing winds that travel to a region across a large body of water would probably make the region's climate
    a. warmer
    b. cooler
    c. wetter
    d. drier

79. Which carries warmth from the tropics toward the polar regions?
    a. urban heat islands
    b. warm-water currents
    c. cold-water currents
    d. trade winds

STATION 19



The graph above shows the average monthly air temperatures in a one-year period for two cities: Beijing, China and Valdivia, Chile.

80. What 2 months do the two cities have the same average temperature?

81. What season is it in July in Beijing?

82. What season is it in Valdivia in July?

STATION 20

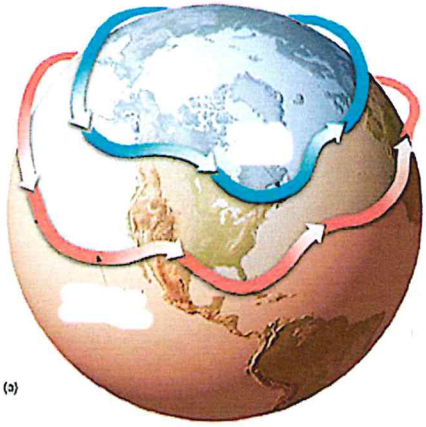
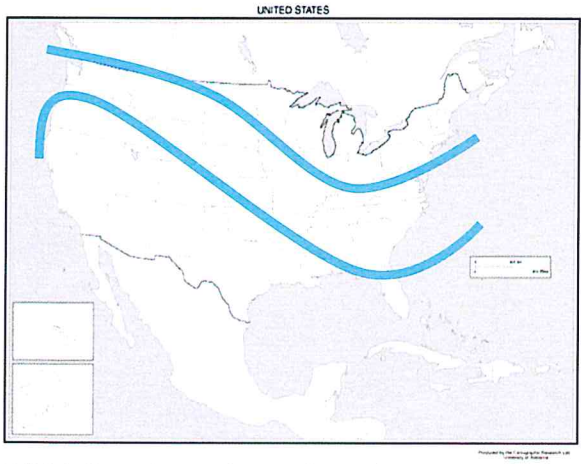


image from NASA

83. The picture above shows bands of air that affect the weather around the world. What are these called?

84. How fast is the air moving in these streams?
    a. 1-10 mph
    b. 10 – 100 mph
    c. 100 – 200 mph
    d. 1000 – 2000 mph

85. These streams are usually (MILES or FEET) thick.



86. Which line above shows the polar stream in the SUMMER? (Northern line or southern line)