STORM-E Weather simulation

Day 2 PDF Files

Air Pressure
- Air Pressure Team Map
- Air Pressure Team Graph Data (days 2 & 3)
- Air Pressure Team Graph

Humidity
- Humidity Team Dew Point Temperature Map
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- Humidity Team Graph
- Humidity Team Relative Humidity Map

Temperature
- Temperature Team Surface Temperature Map
- Temperature Team Upper Air Temperature Map
- Temperature Team Graph Data (days 2 & 3)
- Temperature Team Graph

Wind
- Wind Team Upper Air Wind Speed Map
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- Wind Team Graph

Air Pressure Team - Day 2

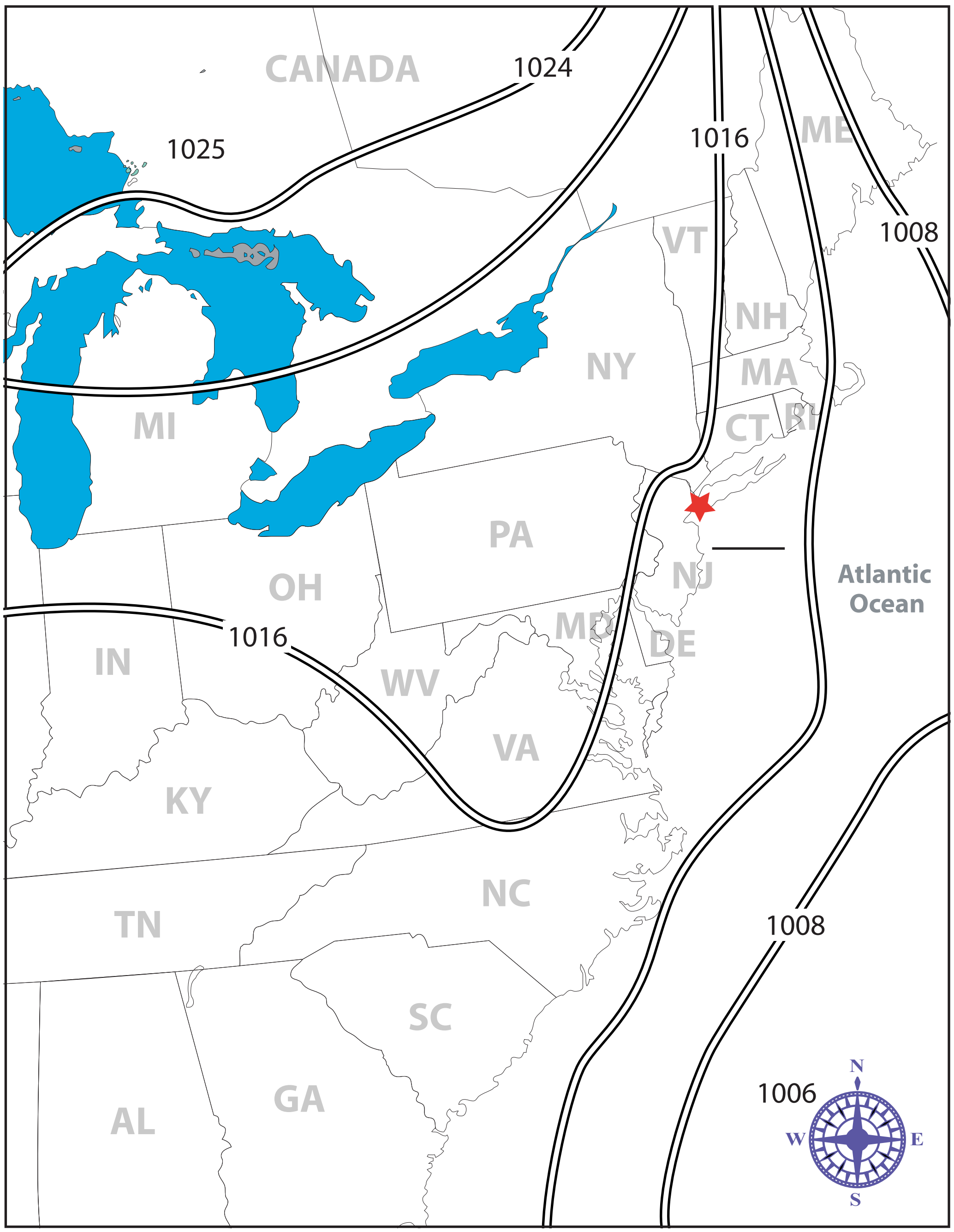
Isobars are lines connecting places of equal air pressure. They have a regular interval of four millibars. First, fill in the key with a pattern of numbers increasing or decreasing by four.

Some isobar lines might not be numbered. Next print the correct numbers next to those lines. Then using the color key, trace over all the isobar lines.

Draw circles around the highest and the lowest number on this map. Label the high with the letter "H" and the low with the letter "L."

The star on the map marks New York City. Estimate the air pressure reading for New York City and record it on the line. What air pressure reading do you expect for New York City in 24 hours? In 48 hours?

Sea Level Pressure (mb) Day 2 Analysis for 12Z 29 DEC 00



KEY	
Color	**Millibars**
Red	1024
Yellow	
Orange	
Green	
Blue	
Purple	
Brown	1000
Black	
Grey	

0	200 mi
0	322 km

Interval 4.0

Days 2 and 3 Air Pressure Team Graph Data for New York City

Day 2

AIR PRESSURE DATA

EST	Air Pressure (mb)
2 p.m.	1014
3 p.m.	1014
4 p.m.	1014
5 p.m.	1014
6 p.m.	1014
7 p.m.	1013
8 p.m.	1013
9 p.m.	1014
10 p.m.	1014
11 p.m.	1014
Midnight	1014

Day 3

AIR PRESSURE DATA

EST	Air Pressure (mb)
2 p.m.	996
3 p.m.	995
4 p.m.	996
5 p.m.	997
6 p.m.	997
7 p.m.	998
8 p.m.	998
9 p.m.	998
10 p.m.	998
11 p.m.	999
Midnight	999

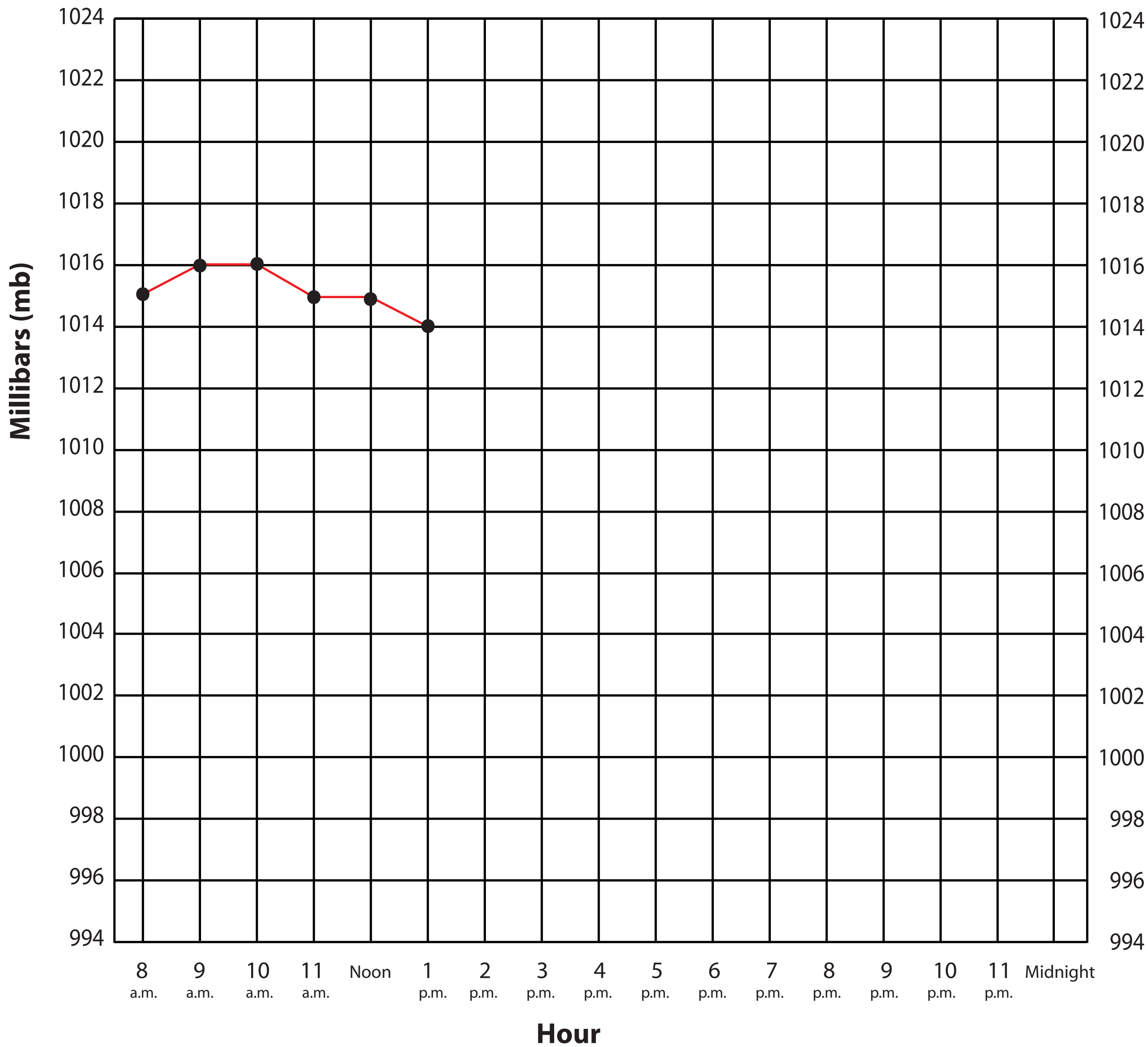
Air Pressure Team Graph Day 2 - New York City

The graph below displays air pressure data for New York City on day 2. The data is recorded every hour.

Complete the graph by marking a dot on each hour. Ask your teacher for the data. Next draw a line to connect the dots. This makes a line graph.

Is the air pressure rising, falling, or staying about the same?

What type of weather do you think New York City is having on day 2?



Humidity Team Dew Point Temperature - Day 2

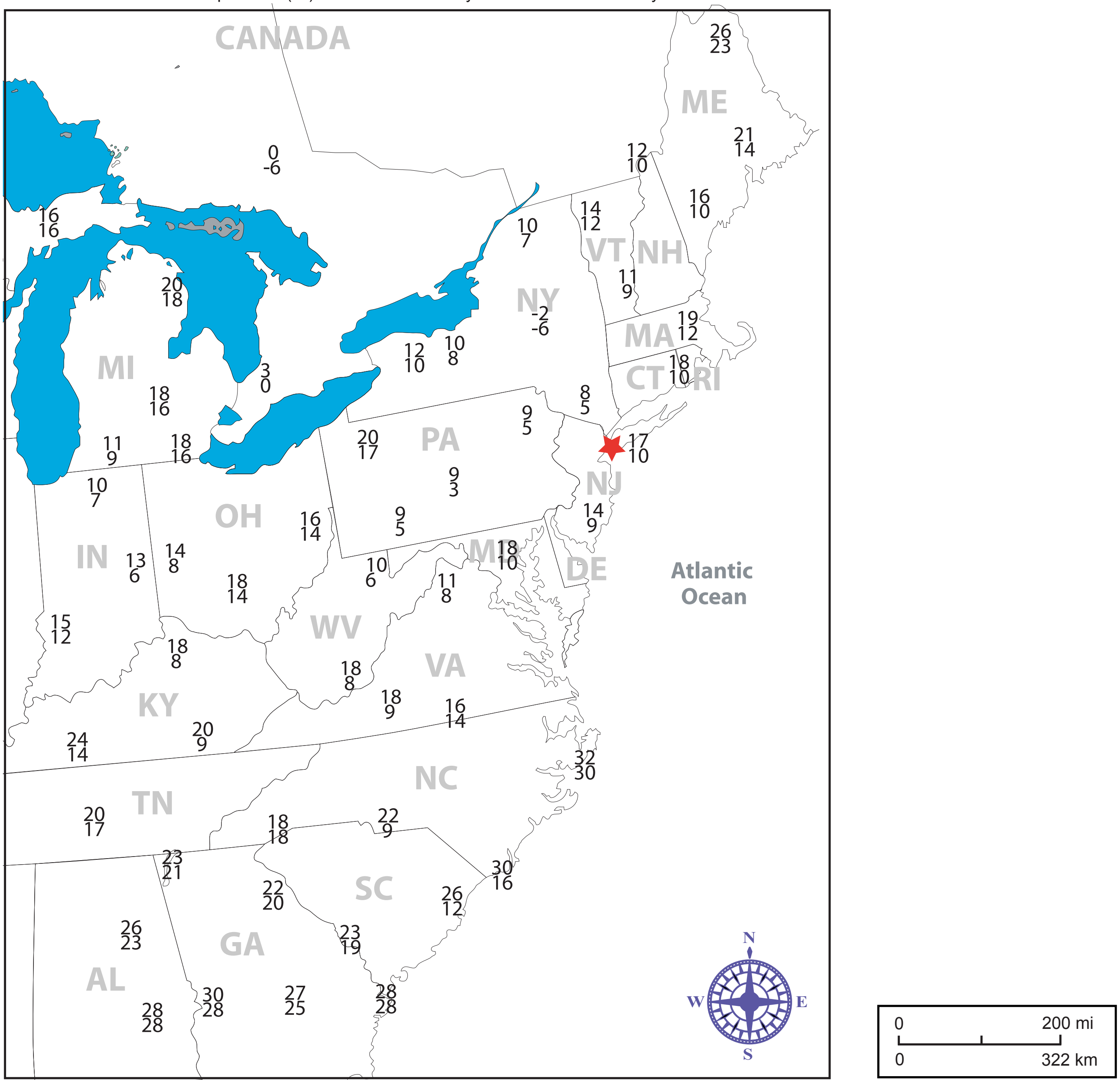
Dew point is the temperature to which air must be cooled to achieve saturation. The possibility of cloud formation increases as the air temperature drops closer to its dew point.

Important: Use the relative humidity map you have already completed to assist you. Find the places you circled and begin the following search in those areas.

Circle the places on the dew point temperature map where the difference between the surface air temperature (top number) and the dew point temperature (bottom number) is less than or equal to 2 (≤ 2) degrees. Now look at the areas you circled. Which have the highest *possibility* of precipitation?

What are your weather predictions for New York City in 24 hours? In 48 hours? Be ready to report to Weather Central.

Surface and Dew Point Temperature (ºF) Day 2 Analysis for 12Z 29 DEC 00



Days 2 and 3 Humidity Team Graph Data for New York City

Day 2

HUMIDITY DATA

EST	Temperature (degrees F)	Dew Point (degrees F)	Difference
2 p.m.	30	16	14
3 p.m.	31	17	
4 p.m.	29	17	
5 p.m.	28	18	
6 p.m.	28	18	
7 p.m.	28	18	
8 p.m.	28	19	
9 p.m.	27	19	
10 p.m.	26	20	
11 p.m.	27	19	
Midnight	26	19	

Day 3

HUMIDITY DATA

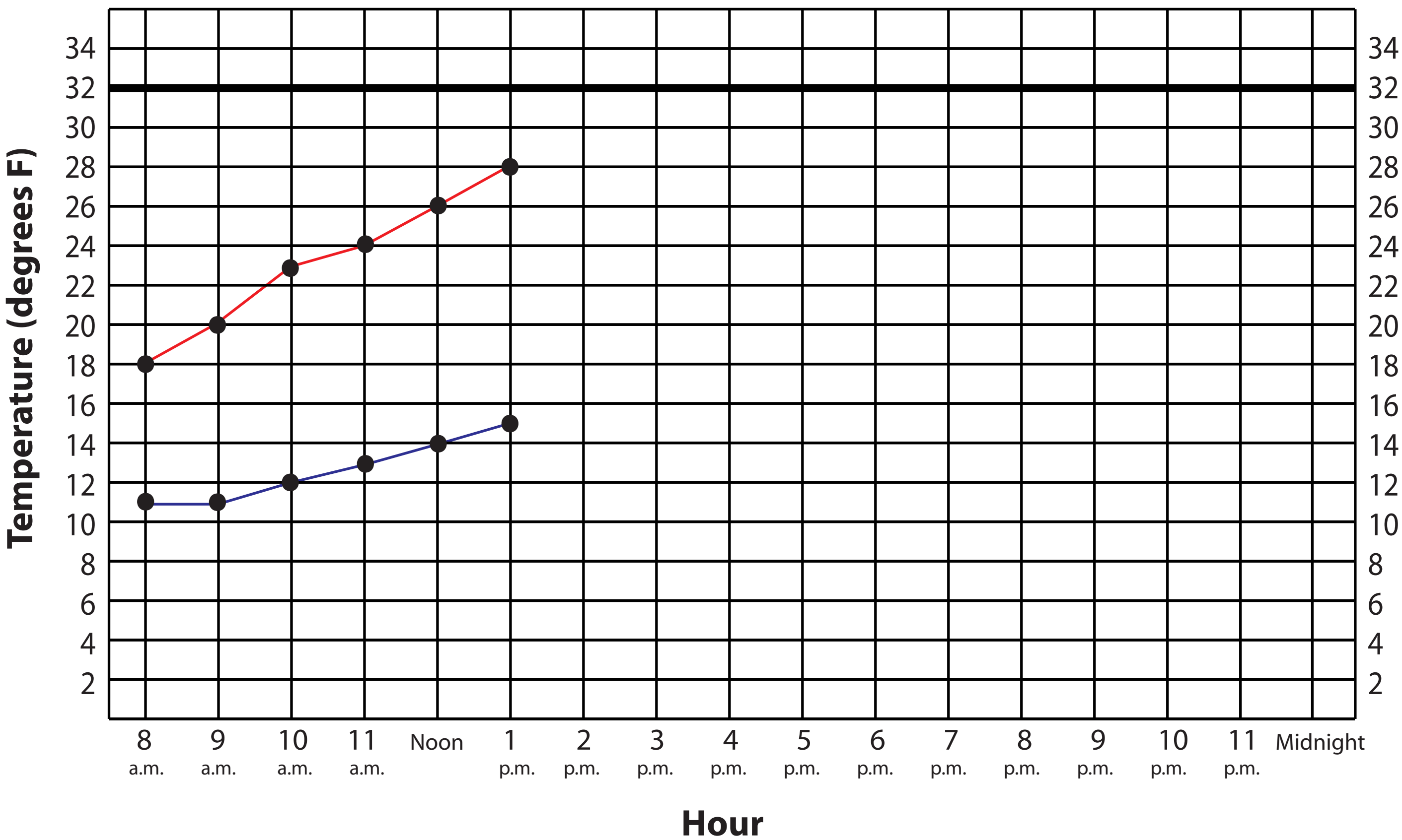
EST	Temperature (degrees F)	Dew Point (degrees F)	Difference
2 p.m.	28	28	0
3 p.m.	30	29	
4 p.m.	29	29	
5 p.m.	30	30	
6 p.m.	29	28	
7 p.m.	29	27	
8 p.m.	28	24	
9 p.m.	27	24	
10 p.m.	26	23	
11 p.m.	26	23	
Midnight	26	22	

Humidity Team Graph Day 2 - New York City

Finish the line graph of temperature readings for New York City on day 2. Ask your teacher for the data.

Graph the temperature in red. Graph the dew point in blue.

Is the temperature dropping toward the dew point? Is the possibility of precipitation increasing or decreasing? What type of weather do you think New York City is having on day 2?



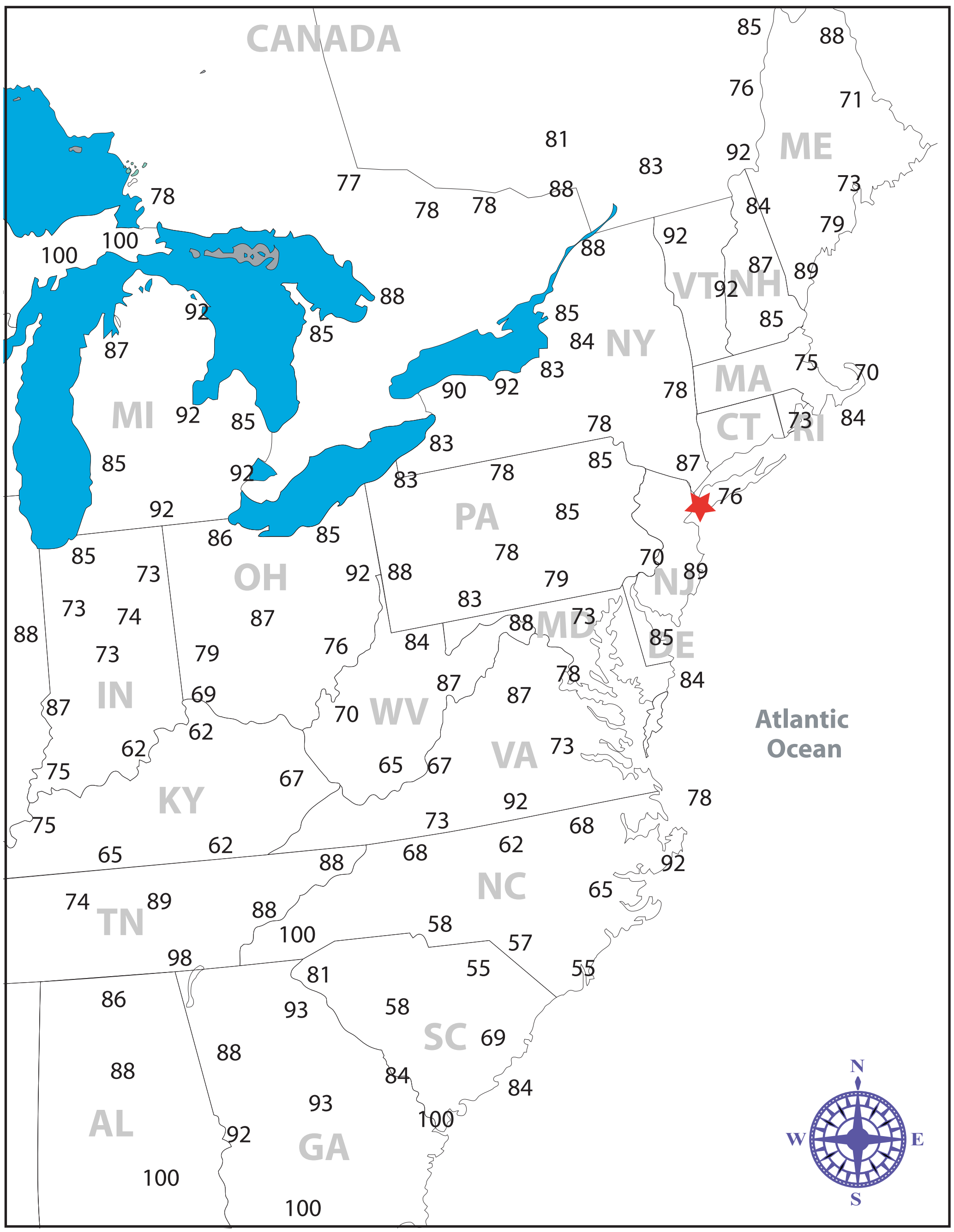
Humidity Team Relative Humidity - Day 2

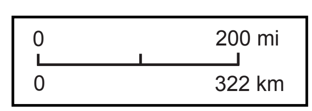
Important: Complete this map *before* starting the dew point temperature map.

Relative humidity measures how close air is to saturation. The possibility of precipitation *increases* as the relative humidity approaches 100 percent. Use a red pencil to circle numbers greater than or equal to 90 (≥ 90). DO NOT shade in the circle. Now look at the areas you circled. Which have the highest *possibility* of precipitation?

Compare the days 1 and 2 maps. The star marks New York City. Do you notice any weather patterns or trends that would affect the weather in New York City in 24 hours? In 48 hours?

Surface Relative Humidity (%) Day 2 Analysis for 12Z 29 DEC 00





Temperature Team Surface Temperature - Day 2

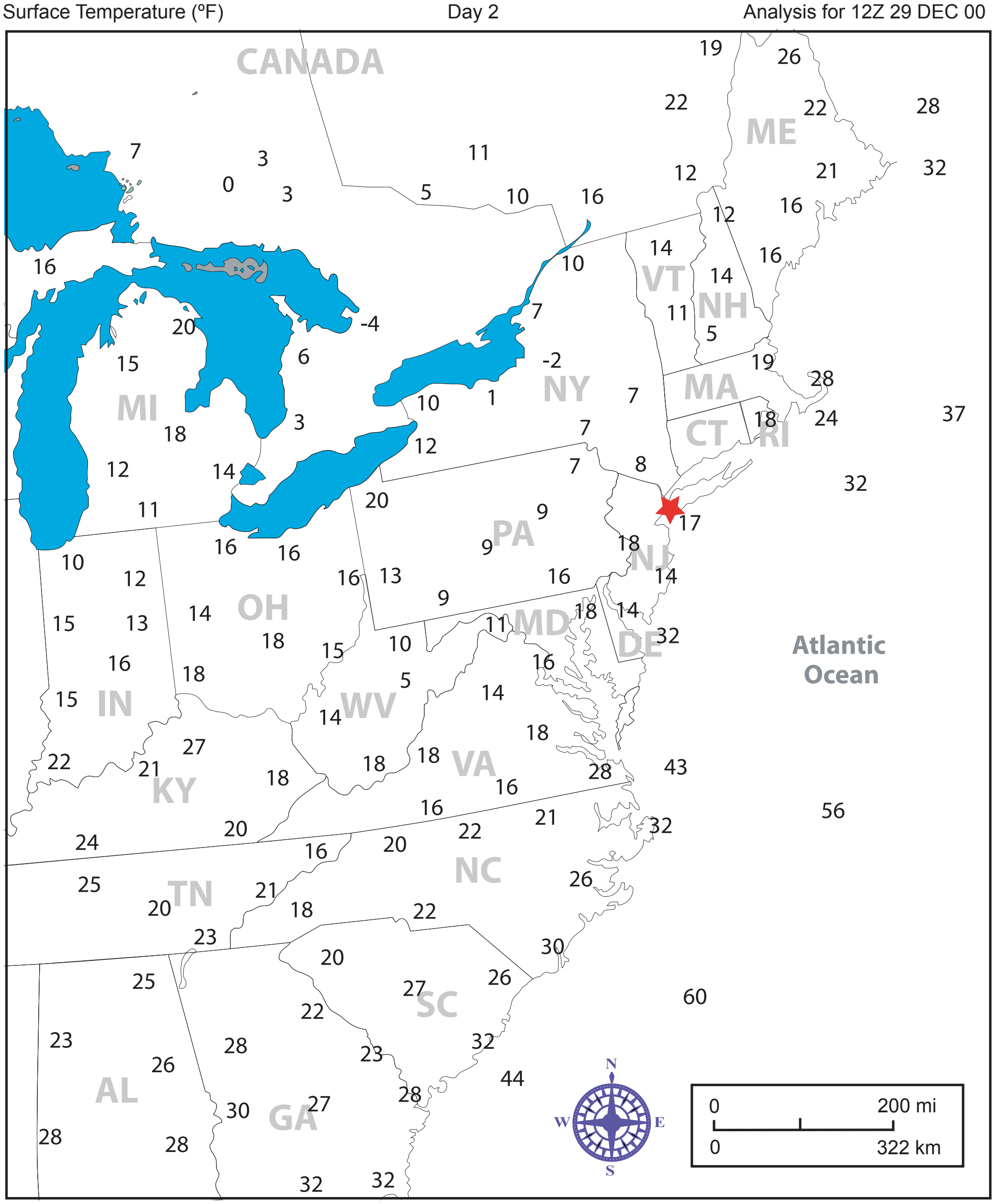
The surface temperature readings on this map are in degrees Fahrenheit. On the Fahrenheit scale freezing is 32 degrees.

Circle each number with the corresponding color in the key. DO NOT shade in the circle.

An isotherm is a line on a map joining areas of equal temperature. Use a black pencil to draw an isotherm connecting the 32-degree readings.

The star marks New York City. Looking at surface temperature alone, what type of precipitation is *possible* in New York City?

Surface Temperature (ºF) Day 2 Analysis for 12Z 29 DEC 00



KEY	
Color	ºF
Red	>32
Black	32
Blue	<32

Temperature Team Upper Air Temperature - Day 2

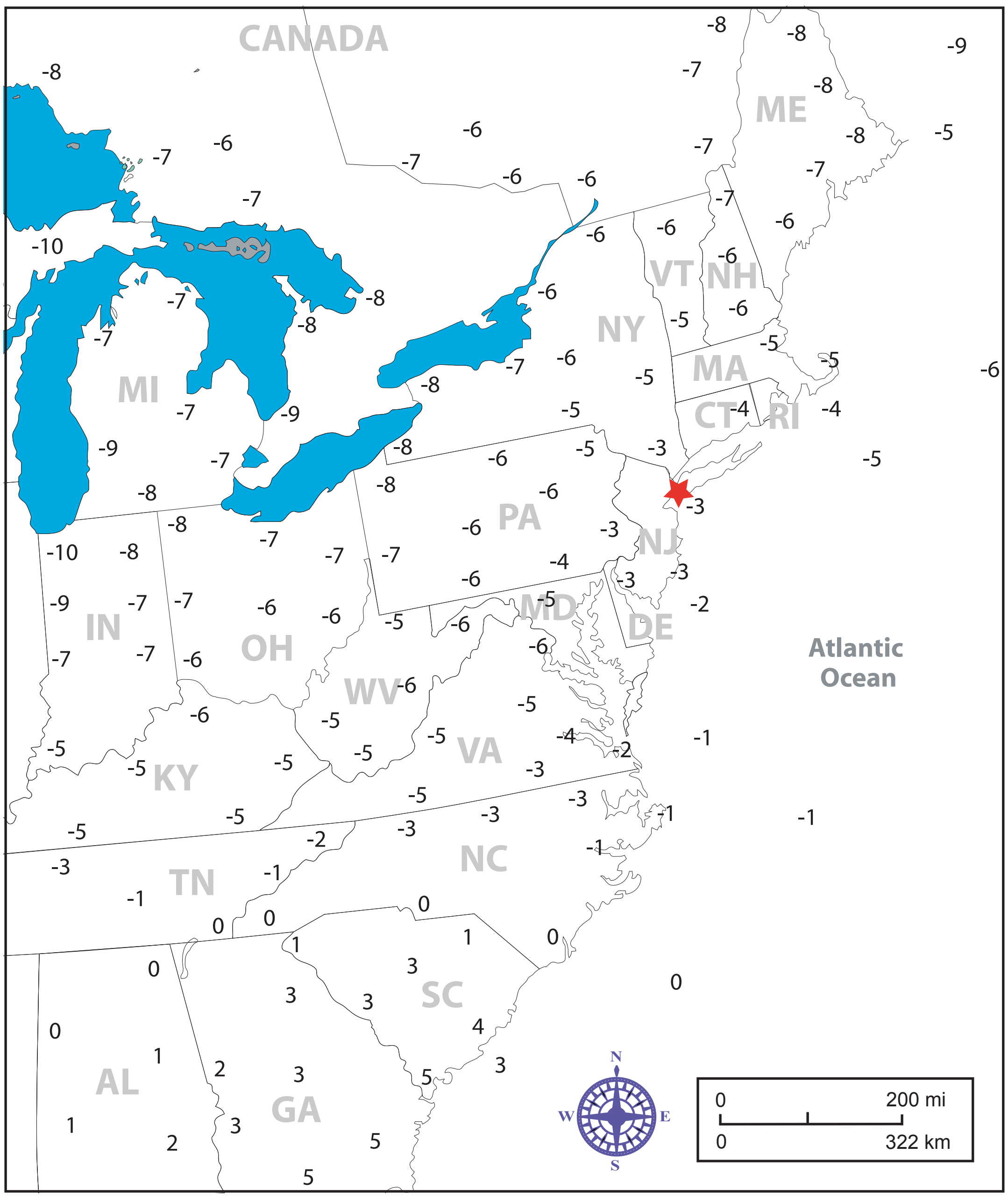
Most precipitation forms approximately 5,000 feet above sea level, where the air pressure is 850mb. Temperatures at this level affect the *type* of precipitation that forms. The 850mb temperature readings on this map are in degrees Celsius. On the Celsius scale freezing is 0 degrees.

Circle each number with the corresponding color in the key. DO NOT shade in the circle.

An isotherm is a line on a map joining areas of equal temperature. Use a black pencil to draw an isotherm connecting the 0-degree readings.

The star marks New York City. Looking at the 850mb temperature alone, *IF* precipitation develops, what type would form 5,000 feet above New York City?

850mb Temperature (ºC) Day 2 Analysis for 12Z 29 DEC 00



KEY	
Color	**ºC**
Orange	>0
Black	0
Green	<0

Days 2 and 3 Temperature Team Graph Data for New York City

Day 2

TEMPERATURE DATA

EST	Temperature (degrees F)
2 p.m.	30
3 p.m.	31
4 p.m.	29
5 p.m.	28
6 p.m.	28
7 p.m.	28
8 p.m.	28
9 p.m.	27
10 p.m.	26
11 p.m.	27
Midnight	26

WIND CHILL DATA

Wind Speed (knots)	Wind Chill (degrees F)
9	21
7	27
7	21
5	
5	
5	
5	
4	
4	
5	
6	

Day 3

TEMPERATURE DATA

EST	Temperature (degrees F)
2 p.m.	28
3 p.m.	30
4 p.m.	29
5 p.m.	30
6 p.m.	29
7 p.m.	29
8 p.m.	28
9 p.m.	27
10 p.m.	26
11 p.m.	26
Midnight	26

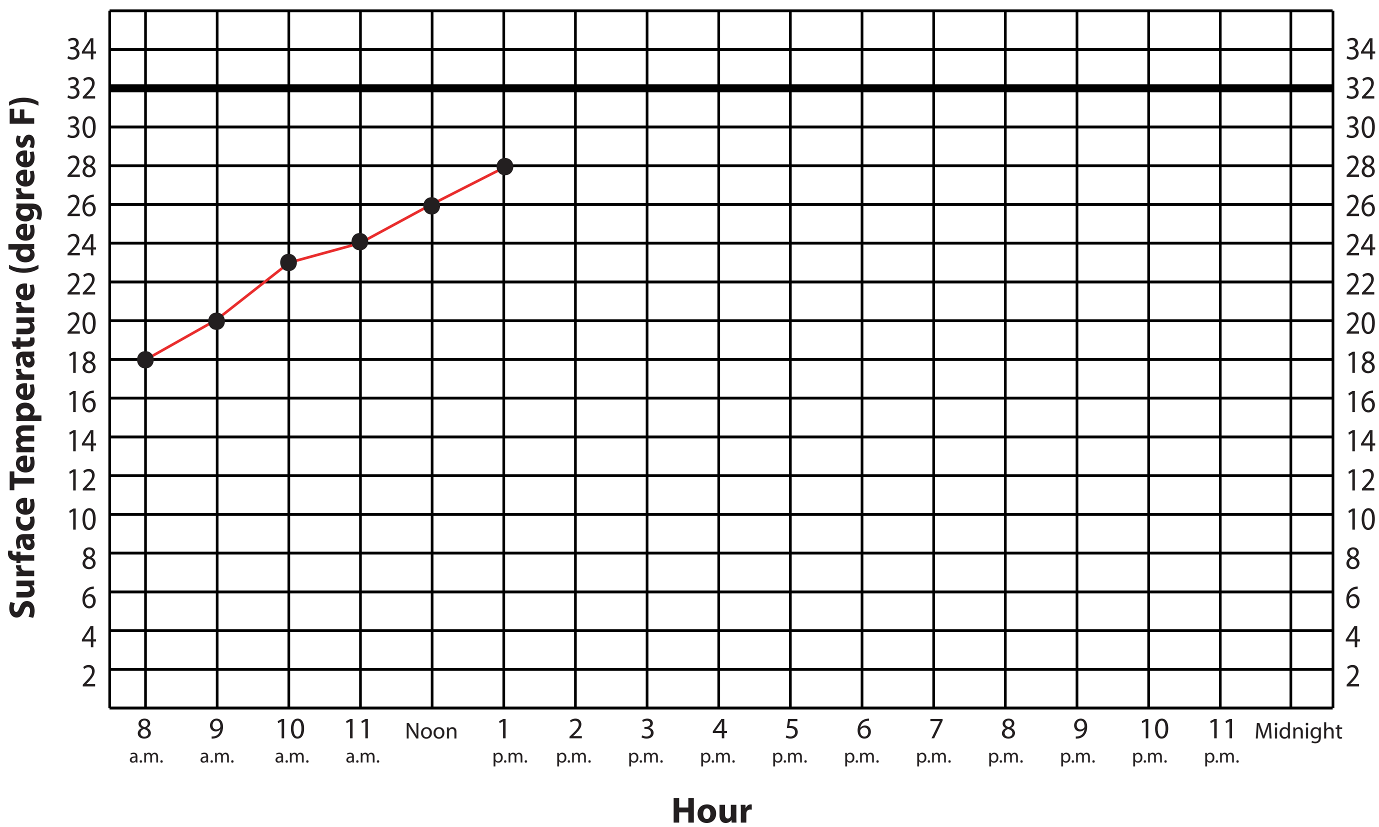
WIND CHILL DATA

Wind Speed (knots)	Wind Chill (degrees F)
23	16
20	17
18	17
17	
19	
18	
16	
18	
21	
18	
18	

Temperature Team Graph Day 2 - New York City

Finish the line graph of surface temperature readings for New York City on day 2. Ask your teacher for the data. Graph the temperature in red.

Are surface temperatures in New York City above freezing, below freezing, or both?



Next calculate wind chills. Use the Wind Chill Index Chart below and your graph data sheet. Are there dangerous wind chills in New York City on day 2? If so, when do they occur?

Wind Chill Index Chart

Surface Temperature (°F)

Wind Speed (knots)	40-36	35-31	30-26	25-21	20-16	15-11	10-6	5-1	0-¯4	¯5-¯9	¯10-¯14	¯15-¯19
1-5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28
6-10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35
11-15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39
16-20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42
21-25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44
26-30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46
31-35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48
36-39	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50

Wind Chill (°F)

Frostbite Occurs in 15 Minutes or Less

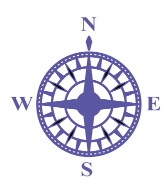
Wind Team Upper Air Wind Speed - Day 2

Jet streams are narrow corridors of very strong winds at altitudes from 30,000 to 50,000 feet. They blow in a wavy pattern from west to east across North America at speeds exceeding 90 knots.

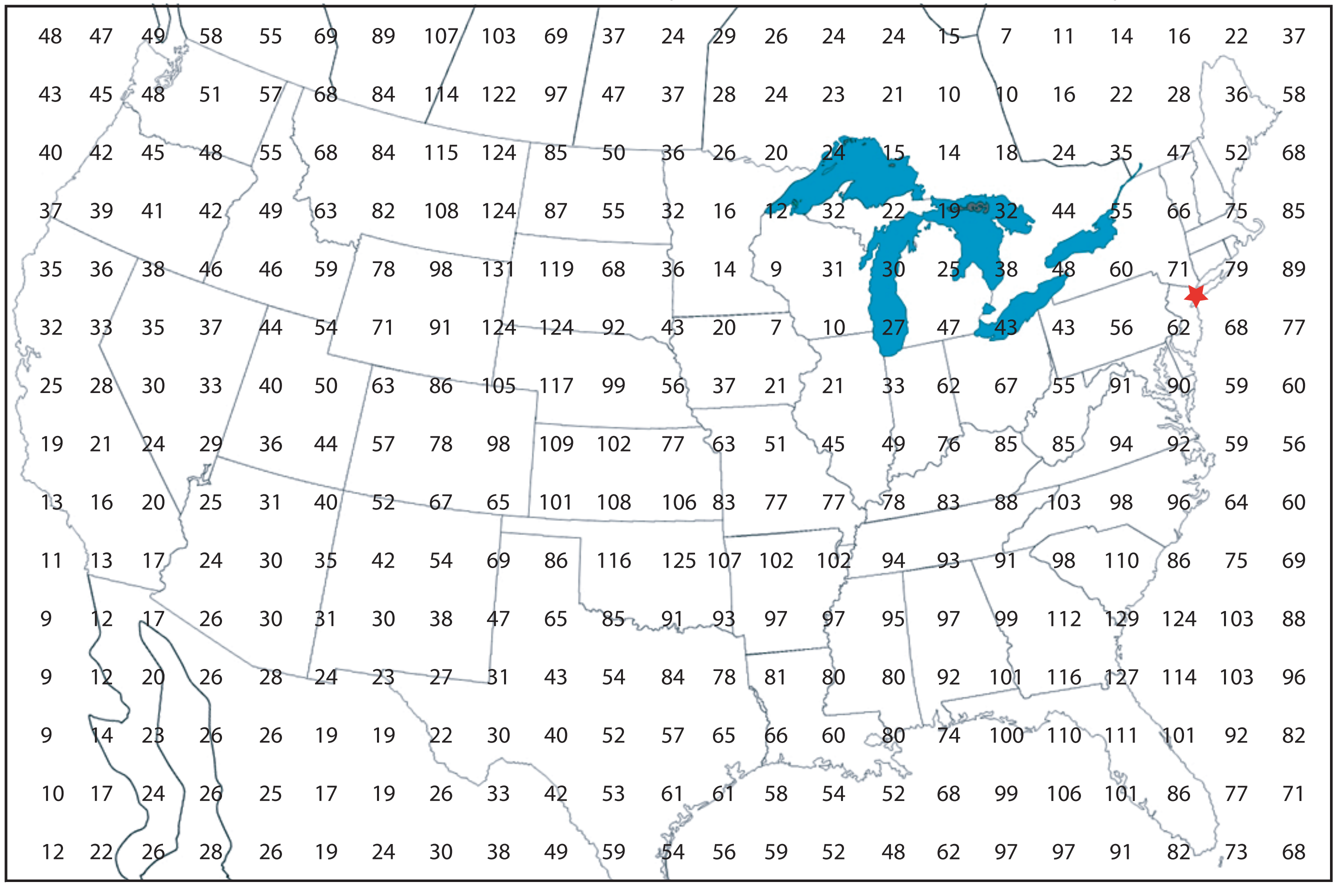
The shape of the jet stream is important in weather forecasting. Troughs (U) of low pressure air that dip south bring cold, cloudy weather. Ridges (∩) of high pressure air that rise north bring warm, clear weather.

Circle each number with the corresponding color in the key. DO NOT shade in the circle. Do you notice a trough or ridge? What is the position of the jet stream in relation to New York City (indicated by a star)? How might the shape of the jet stream affect the weather in New York City?

KEY	
Color	**Knots**
Red	≥150
Orange	130-149
Blue	110-129
Green	90-109
Don't Color	<90



Upper Air Wind Speed (knots) Day 2 Analysis for 12Z 29 DEC 00



Days 2 and 3 Wind Team Graph Data for New York City

Day 2

WIND DATA

EST	Wind Speed (knots)
2 p.m.	9
3 p.m.	7
4 p.m.	7
5 p.m.	5
6 p.m.	5
7 p.m.	5
8 p.m.	5
9 p.m.	4
10 p.m.	4
11 p.m.	5
Midnight	6

WIND CHILL DATA

Temperature (degrees F)	Wind Chill (degrees F)
30	21
31	27
29	21
28	
28	
28	
28	
27	
26	
27	
26	

Day 3

WIND DATA

EST	Wind Speed (knots)
2 p.m.	23
3 p.m.	20
4 p.m.	18
5 p.m.	17
6 p.m.	19
7 p.m.	18
8 p.m.	16
9 p.m.	18
10 p.m.	21
11 p.m.	18
Midnight	18

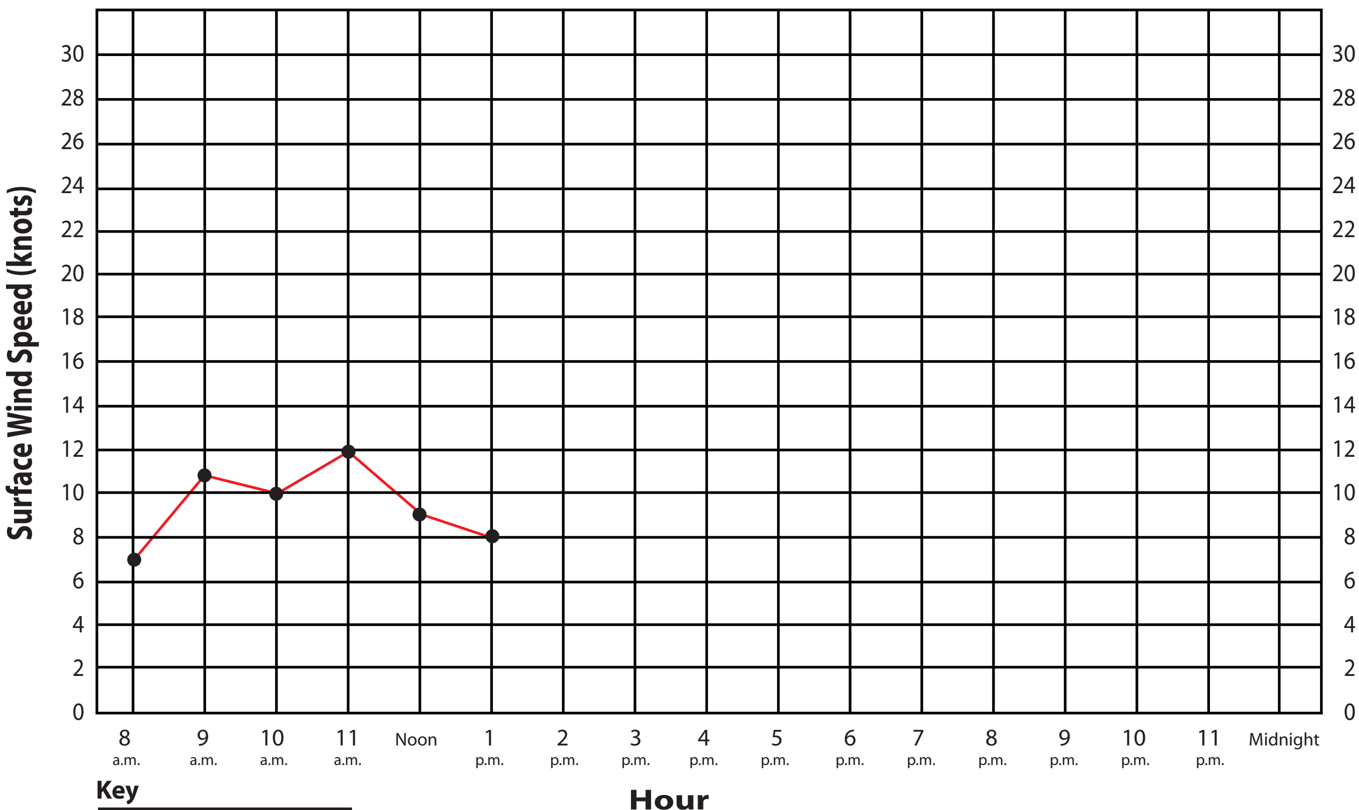
WIND CHILL DATA

Temperature (degrees F)	Wind Chill (degrees F)
28	16
30	17
29	17
30	
29	
29	
28	
27	
26	
26	
26	

Wind Team Graph Day 2 - New York City

Surface winds blow across the Earth at altitudes from 0 to approximately 3,000 feet.

First, finish the line graph of surface wind speeds for New York City on day 2. Ask your teacher for the data. Is the wind speed increasing or decreasing?



Key

G = Gust
1 Knot = 1.151 miles/hr.

Next, calculate wind chills. Use the Wind Chill Index chart below and your graph data sheet. Are there dangerous wind chills in New York City on day 2? If so, when do they occur?

Wind Chill Index Chart

Surface Temperature (°F) / **Wind Chill (°F)**

Wind Speed (knots)	40-36	35-31	30-26	25-21	20-16	15-11	10-6	5-1	0-ˉ4	ˉ5-ˉ9	ˉ10-ˉ14	ˉ15-ˉ19
1-5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28
6-10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35
11-15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39
16-20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42
21-25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44
26-30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46
31-35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48
36-39	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50

Frostbite Occurs in 15 Minutes or Less (shaded cells)