

National Science Olympiad Answer Sheet

Meteorology

2005

Names _____ Answer Key _____

School Name _____

School Number _____

1. Severe Weather Myth or Fact (10 points)

- a) MYTH _____
- b) FACT _____
- c) FACT _____
- d) FACT _____
- e) FACT _____
- f) FACT _____
- g) FACT _____
- h) FACT _____
- i) MYTH _____
- j) MYTH _____

2. Storm Properties Table (16 points)

(Write "Yes" or "No" for each box in the table below.)

	Airmass	Squall line	MCC	Supercell
Is composed of a single cell	Yes	No	No	Yes
Requires wind shear	No	Yes	Yes	Yes
May produce a tornado	No	Yes	Yes	Yes
May produce hail	Yes	Yes	Yes	Yes

3. Floating a Car (6 points)

- a) 80 ft² _____
- b) ¼ foot? 1250 pounds
- ½ foot? 2500 pounds
- ¾ foot? 3750 pounds
- 1 foot? 5000 pounds
- c) B _____

4. Toasted Lightning (2 points)

- a) 4.5 billion
- b) 45 million

5. Storm Reports (8 points)

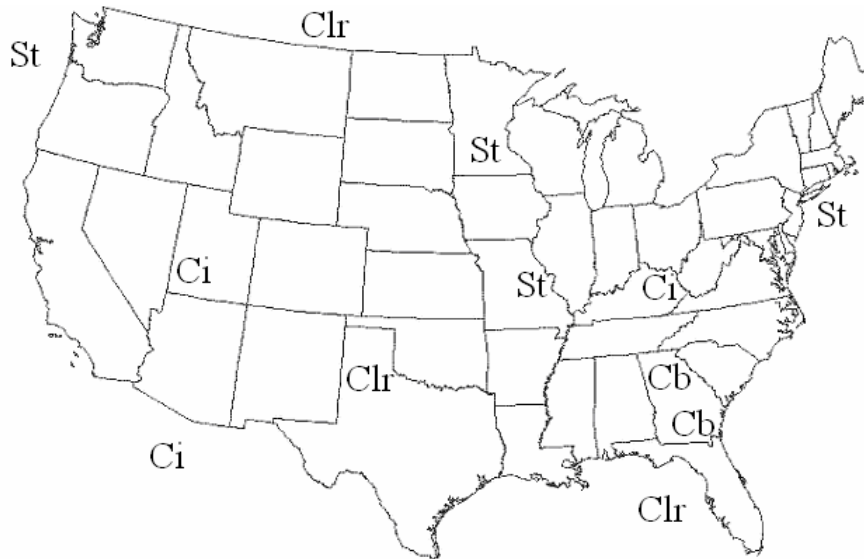
- a) Wind
- b) Indiana, Kentucky, Tennessee, North Carolina, Alabama, Georgia

- c) ii

6. Soaking Soils (9 points)

- a) Farmtown 6 inches Forestville 3 inches Sandstone City 2 inches
- b) Farmtown 12 hours Forestville 6 hours Sandstone City 4 hours
- c) Farmtown Never Forestville 3 PM Sandstone City 1 PM

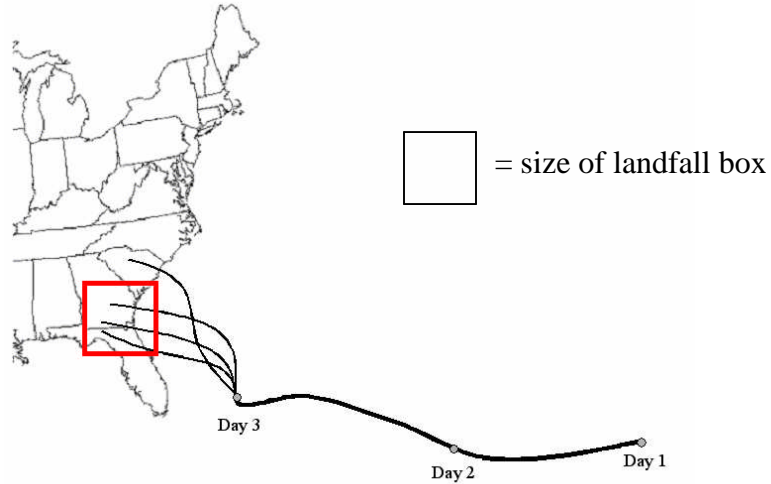
7. Satellite Interpretation (4 points)



Cb
(in eastern Cuba)

8. Tracking Hurricanes and Botched Forecasts (6 points)

a)



b)



9. Modifying a Sounding to Get Severe Weather (7 points)

- a) 7 – 8 °C
- b) 4 – 5 °C
- c) ~15 °C
- d) 10 – 11 °C
- e) (write A, B, C, or D for the next three answers)

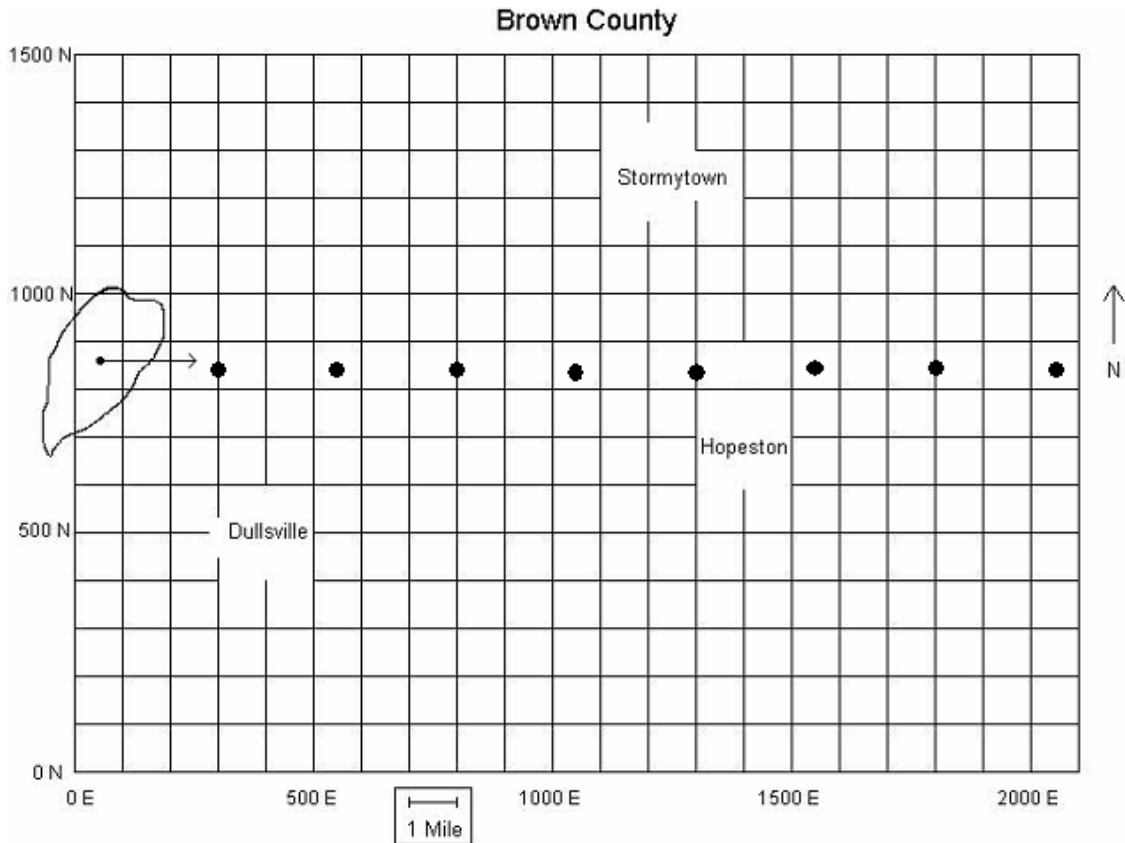
Step 1: D

Step 2: C

Step 3: A

10. Storm Spotting (23 points)

a) Plot the location of the storm center at 5-minute intervals:



b) Dullsville Spotter: 3:05 PM – 3:10 PM

Stormytown Spotter: 3:20 PM – 3:25 PM

Hopeston Spotter: 3:25 PM – 3:30 PM

c) Hopeston

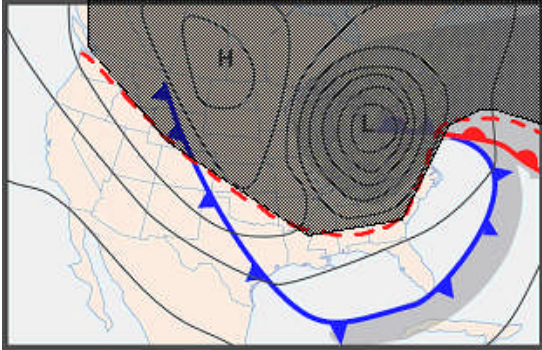
d) Dullsville Spotter: Severe winds, Tornado, Lightning, Wall cloud, Hail in distance

Stormytown Spotter: Severe winds, Lightning, Cirrus clouds

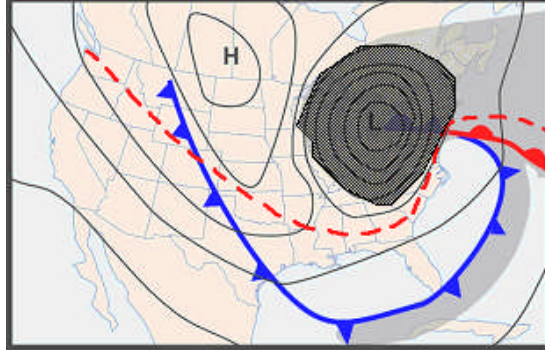
Hopeston Spotter: Hail at their location, Severe winds, Tornado, Lightning, Heavy rain at their location, Wall cloud, Cirrus clouds

11. Golden Opportunities (15 points)

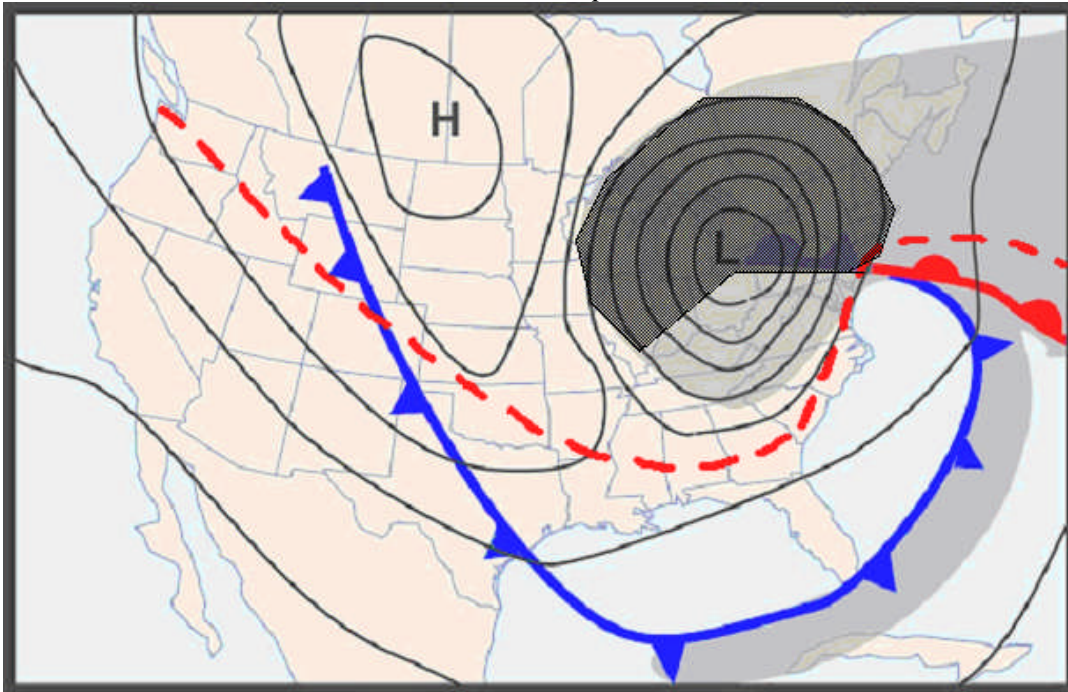
a) Shade in area with below-freezing temperatures on this map:



b) Shade in area with below-freezing temperatures and high winds on this map:



c) Shade in area with below-freezing temperatures, high winds, and warm, moist air on this map:



Should these cities have a blizzard warning? (write "yes" or "no")

- No St. Louis, MO
- Yes Sault Ste. Marie, MI
- No Minneapolis, MN
- Yes Albany, NY
- No Charleston, WV
- No Bangor, ME

Tie Breaker 1

Moisture, instability, lifting mechanism, wind shear (speed or directional), warm near surface, cooler dry air aloft, capping inversion in morning, “goal post” sounding, forms in warm sector of mid-latitude cyclone, CAPE, Lifted Index < -4, sunshine through afternoon to heat air, ahead of cold front/dryline/upper level front, tilted updraft, rotation

Tie Breaker 2

Pressure	_____
Temperature	_____
Relative Humidity	_____
Wind Speed	_____
Storm Speed	_____
Cloud Top Temperature	_____
Occurrence of Hail	_____
Occurrence of Tornadoes	_____

(Answers considered individually)

Credits:

1. “Severe and Hazardous Weather” by Rauber, Walsh, and Charlevoix were used in creating the Myth/Fact questions, question number 2, and the imagery for question 11
2. Storm Prediction Center for outline maps
3. UIUC for radar and satellite images
4. Mike Wilson, Joe Brewer, Redina Herman, and Mike Spinar for writing and submitting the exam.