North Carolina Science Olympiad

School Name: _____

Student Names:

(Print Legibly)

_____ , _____

Circle One:

Varsity

Or

Junior Varsity

(If your school has more than one Junior Varsity, circle the number that corresponds with your team, if you don't know look at your wristband.)

1 2 3 4

Division B
(Middle School)

Raleigh Regional Tournament

Event Name: Ecology

Student Response Sheet

Put all answers on this sheet in the spaces provided.

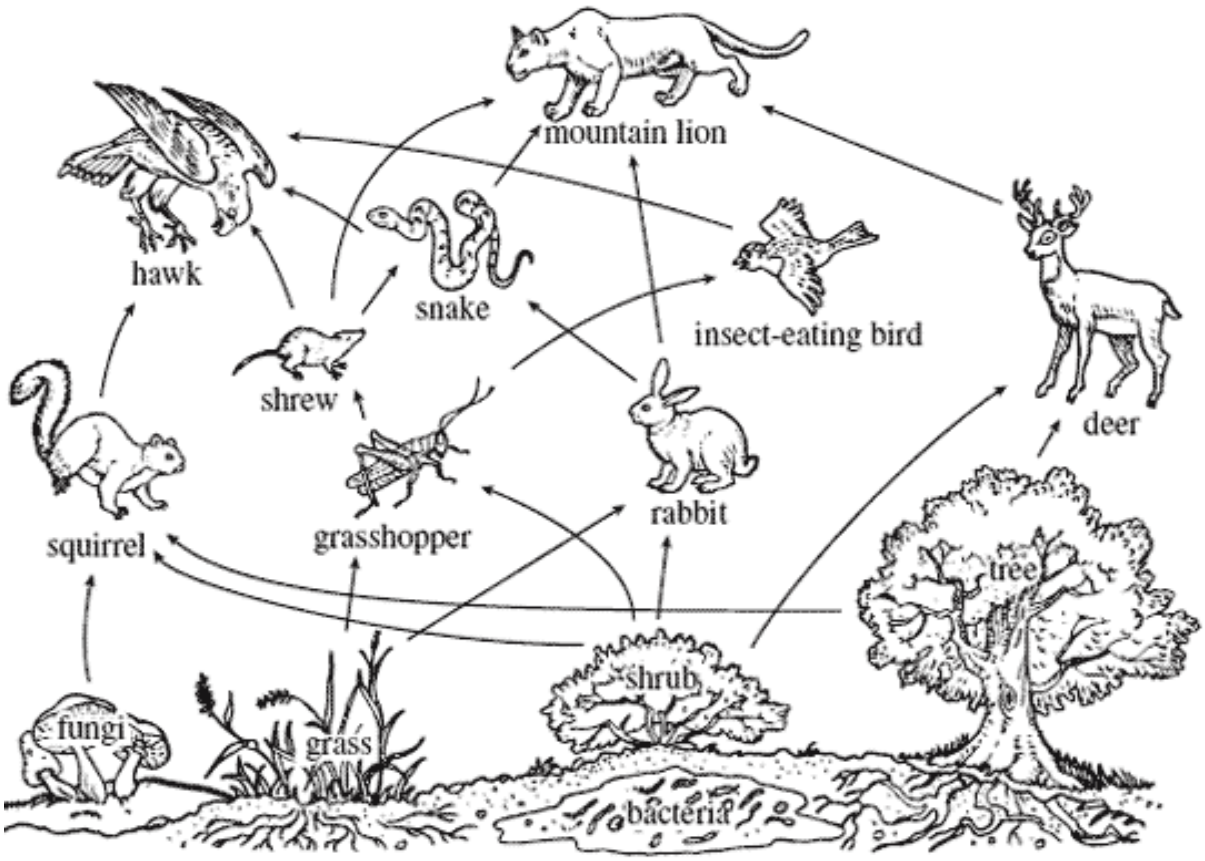
Multiple Choice and True or False

1. _____	11. _____	21. _____	31. _____
2. _____	12. _____	22. _____	32. _____
3. _____	13. _____	23. _____	33. ____
4. _____	14. _____	24. _____	34. _____
5. _____	15. _____	25. _____	35. _____
6. _____	16. _____	26. _____	36. _____
7. _____	17. _____	27. _____	37. _____
8. _____	18. _____	28. _____	38. _____
9. _____	19. _____	29. _____	39. _____
10. _____	20. _____	30. _____	40. _____

41.

42.

43.



Use the figure above to choose the ONE BEST answer to answer questions 1 – 7. Write the answer on the answer sheet. Members of this forest community get materials they need to survive from the ecosystem. These materials are constantly being recycled.

1. The role of grass in this food web is best described as
   a) decomposer
   b) consumer
   c) primary producer
   d) secondary producer

2. What is the role of the grasshopper in this food web?
   a) decomposer
   b) primary consumer
   c) producer
   d) secondary consumer

3. What would happen to the population of snakes if the rabbits were suddenly removed from this ecosystem?
   a) The snake population would decrease
   b) The snake population would increase
   c) The snake population would be unchanged
   d) The snakes would completely die out

4. Explain what would happen to the grasshopper population if the insect-eating birds were suddenly removed from this ecosystem.
   a) The grasshopper population would decrease
   b) The grasshopper population would increase
   c) The grasshopper population would be unchanged
   d) The grasshoppers would completely die out

5. Which of the organisms in the food web would be classified as secondary consumers?
   a) squirrel b) deer c) tree d) hawk

6. Which organism represents the largest portion of available energy in the web?
   a) mountain lion b) deer c) tree d) insect eating bird

7. A food web illustrates the:
   a) relationship between all the producers
   b) relationship between producers and consumers only
   c) relationship between all members of an ecological community
   d) relationship between all the consumers

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8. Ecology is best defined as the study of
   a) populations.
   b) the rate of populations changes.
   c) population increases and decreases.
   d) organisms as they interact with other organisms and with their physical environment.

9. The physical location where an organism lives is best described as the organism's
   a) life zone b) niche c) habitat d) community

10. The number of individuals per unit area or volume is known as the
   a) population density
   b) population distribution
   c) carrying capacity
   d) limiting factors

11. Everything else being equal, when the number of births exceeds the number of deaths, this results in
   a) population growth
   b) biotic potential
   c) environmental resistance
   d) carrying capacity

12. What do competition, predation and food availability have in common?
   a) They are all abiotic factors b) They are all biotic factors
   c) They are all limiting factors d) Nothing

13. Everything else being equal, when emigration rate is greater than immigration rate
    a) the population number decreases
    b) the population number increases
    c) the population number stays the same
    d) the population number fluctuates over time

True/False : write the word TRUE or FALSE on the answer sheet

14) The temperature never drops below freezing in any desert biome.

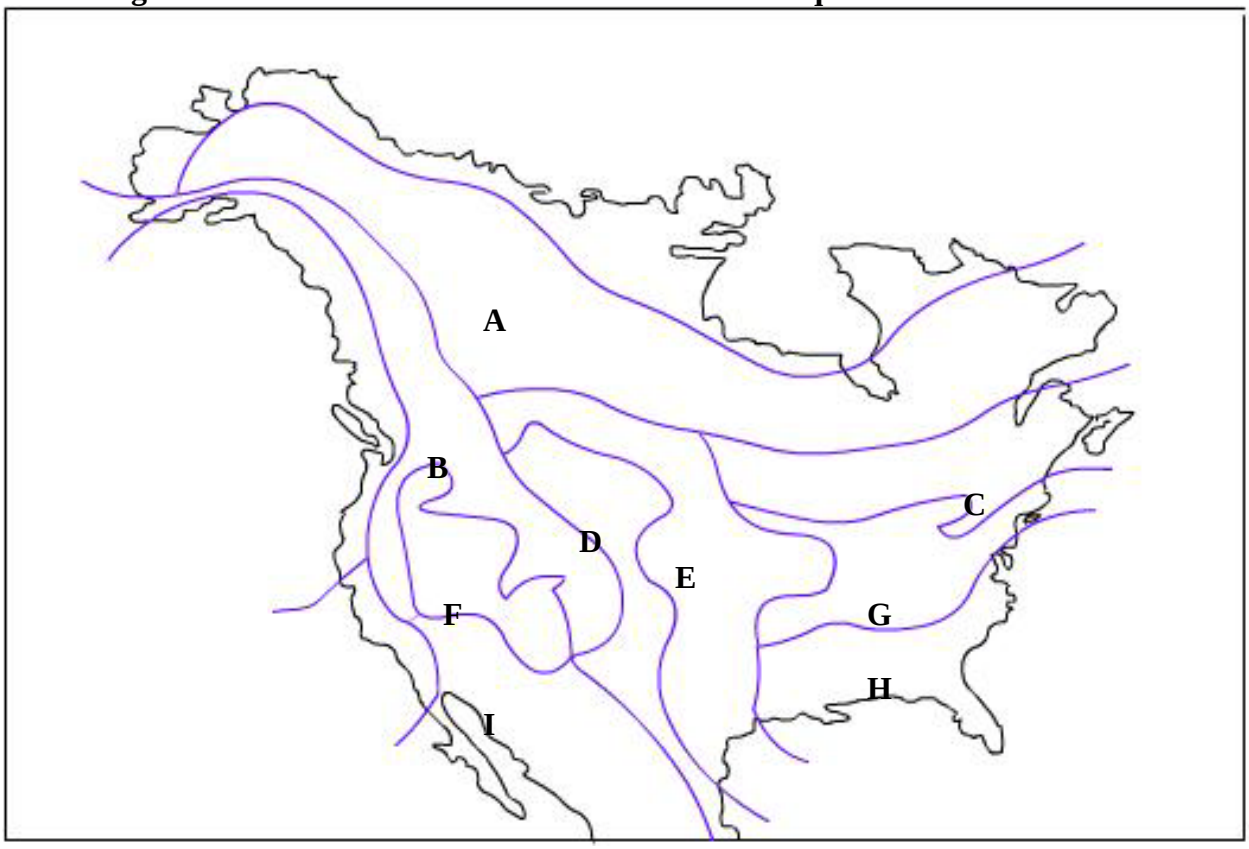
15) In an ecosystem, energy is lost in the form of heat.

16) Immigration is the movement *into* a community.

17) The leaves on a saguaro cactus are its spines.

18) An example of an abiotic factor is a dead organism.

Use the figure below and choose the ONE BEST answer to questions 19 and 20



19. Which location(s) represents a forest biome?
    a) A b) B c) C d) all three of those e) A and C only

20. Which location represents desert?
    a) B b) F c) E d) H

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21. Which of the following contribute to the production of atmospheric carbon dioxide?
    a) oceanic sediments b) burning fossil fuels
    c) photosynthesis by plants d) soils

22. Two species of *Anolis* lizard share the same niche and therefore compete for the same food sources (insects). However, *A. distichus* perches on fence posts and other sunny surfaces while *A. insolitus* usually perches on shady branches. This type of competition is called:
    a) commensalisms
    b) intraspecific competition
    c) competitive exclusion
    d) resource partitioning

23. Which statement best explains why there are so few large carnivores on earth?
    a) Primary producers are scarce.
    b) 90% of the available energy in one tropic level is not converted to the next level.
    c) Large carnivores prey on each other.
    d) Biological magnification increases mortality rates in large carnivores.

24. Forests cover approximately:
    a) one-half of earth's land area
    b) one-third of earth's land area
    c) one-fourth of earth's land area
    d) one-eighth of earth's land area

25. The most diverse biotic communities in the world are largely ___ biomes.
    a) marine
    b) desert
    c) forest
    d) grassland

26. Which of the following is NOT a result of a forest's ability to act as a natural sponge?
    a) slow runoff of rainfall
    b) increase the amount of sediment washing into springs
    c) recharge springs and streams by holding water
    d) regulate the flow of water from mountan highlands to croplands

27. Which of the following is NOT an important ecological role of forests?
    a) Providing fuel wood to burn.
    b) Providing numerous habitats for wildlife.
    c) Influencing local climte.
    d) Purifying the air.

28. Which of the following is the principle way in which people use wood harvested from forests?
    a) production of lumber
    b) production of paper
    c) manufacture of medicines
    d) provision of fuel wood

29. Old-growth forests have large numbers of standing dead trees referred to as
    a) snags b) dead trees c) debris d) understory

30. Which of the following is NOT one of the leading deadly tree diseases in the U.S.?
    a) white pine blisters
    b) Dutch elm disease
    c) Chestnut blight
    d) Hemlock rot

31. Which of the following does not directly influence a regions climate?
    a) weather b) solar radiation
    c) earth's rotation around the sun d) earth's rotaion around its axis

32. Where would you locate humans on a tropic pyramid?
    a) on the top because humans are omnivores
    b) on the bottom because there are more humans than any other species on earth
    c) second from the bottom because humans evolved to eat plants
    d) second from the top because humans were sometimes prey to large carnivores

33. During the winter months, most invertebrate species of the coniferous forest:
    a) hibernate b) breed
    c) migrate d) remain active

Use the table below to answer questions 34 and 35

Biome	*Soil*	*Vegetation*
1	Dry; nutrient poor	Succulent plants, scattered grasses
2	Thin; moist; low in nutrients	Broad-leafed evergreen shrubs and trees
3	Thin, moist topsoil; nutrient-poor; slightly acidic	Mosses, lichens
4	Moist; nutrient-rich; highly acidic	Giant needle-leafed evergreen trees
5	Low in nutrients; highly acidic	Needle-leafed evergreen trees

34. Which biome is represented by 1 in the table?
    a) polar b) grassland c) desert d) forest

35. Which biome is represented by 5 in the table?
    a) tundra b) forest c) grassland d) tropical rain forest

36. Plants in the coniferous forest have all of the following adaptations EXCEPT:
    a) needles have waxy coating b) leaves have recessed stoma
    c) adaptations for drought d) flowers develop in mid-summer

37. Which of the following animals would most likely NOT be found in a coniferous forest?
    a) moose b) bear c) lynx d) monkey

38. Deserts are characterized by rainfall amounts of
    a) under 25 cm b) over 200 cm
    c) about 100 cm d) under 5 cm

39. Which are usually the last type of plants to appear in the ecological succession of a forest?
    a) mosses b) oaks c) grasses d) shrubs

40. Which of the following is often used to represent the history of population growth in a stable environment?
    a) exponential phase b) a J-shaped curve
    c) lag phase d) an S-shaped curve

Short Answer Questions: write your answer on the answer sheet.

41. List two adaptations of the saguaro cactus for water conservation and protection from predators. (2 points)

42. List two ways in which animals of the coniferous forest are adapted to the cold months. (2 points)

43. Compare the trees in a coniferous forest and the trees in a deciduous forest. List three tree types (or species) for each. (10 points)

ANSWER KEY to Student Response Sheet **DO NOT COPY WITH EVENT!!!!!!!!!!!**
Put all answers on this sheet in the spaces provided.

5 Tie Breaker Questions are marked by an asterisk *
Multiple Choice and True or False

1. ___c__	11. __a___	21. __b___	31. __a___
2. ___b__	12. __c___	22. __d___	32. __a___
3. ___a__	13. __a__	23. __b___	33. _a___
4. __b___	14. false	24. __b___	34. __c___
5. __d___	15. true	25. ___c__	35. __b___
6. __c___	16. true	26. __b___	36. __d___
7. ___c__	17. true	27. ___a__	37. ___d__
8. __d___	18. false	28. __d___	38. __a___
***9. __c___**	***19. ___d__**	***29. __a___**	***39. __b___**
10. ___a__	20. __b___	30. __d___	40. ___b__

41. (2 points for any two of the following or other reasonable answers): thickened stems and branches for water storage (and photosynthesis); thick waxy cuticle to prevent water loss; leaves are spines with reduced surface area (to prevent water loss) and for protection; leaves have recessed stomata (openings for gas exchange); photosynthesize at night to prevent water loss.

42. (two points for any of these or other reasonable answers): Mammals have stored fat for insulation; some animals migrate south; invertebrates hibernate.

***43**. (10 points total): Coniferous forests are *dominated by cone bearing, evergreen trees (2 pts)* like spruce, fir, hemlock and pine. Deciduous forests are dominated by *broad-leaf trees that lose their leaves in the autumn (2 points).* Examples include oaks, maples, birches, beeches, ashes, poplars, et cetera.