



Released Form

Student Name: \_\_\_\_\_

Spring 2013  
North Carolina  
Measures of Student Learning:  
NC's Common Exams  
**Earth/Environmental Science**



# Student Booklet



Public Schools of North Carolina  
State Board of Education  
Department of Public Instruction  
Raleigh, North Carolina 27699-6314



- 1 Which statement describes the motion of Earth around the sun?
- A The speed of Earth is constant regardless of its distance from the sun.
  - B The speed of Earth is constant because the distance remains the same between Earth and the sun.
  - C Speed increases the farther Earth is from the sun and decreases the closer it is to the sun.
  - D Speed increases the closer Earth is to the sun and decreases the farther it is from the sun.
- 2 If it is summer in the northern hemisphere, which statement is true?
- A Earth has changed the tilt of its axis by 20 degrees due to its revolution.
  - B It is winter in the southern hemisphere due to the tilt of Earth's axis.
  - C It is summer in the southern hemisphere due to the tilt of Earth's axis.
  - D Earth has reached its closest point to the sun due to its revolution.
- 3 How does a straight alignment between Earth, the sun, and the moon impact the tides on Earth?
- A It produces the greatest change in high and low tides.
  - B It produces the least change in high and low tides.
  - C It produces semidiurnal tides.
  - D It produces diurnal tides.



- 4 Which describes the difference between nuclear fission and nuclear fusion?
- A Nuclear fission is the process that produces the radiant energy of stars, and nuclear fusion splits a heavier nucleus into smaller nuclei.
  - B Nuclear fission splits a heavier nucleus into smaller nuclei, and nuclear fusion is the process that produces the radiant energy of stars.
  - C Nuclear fission produces the energy in the core of Earth, and nuclear fusion produces energy in nuclear power plants.
  - D Nuclear fission produces energy in nuclear power plants, and nuclear fusion produces the energy in the core of Earth.
- 5 How does heat from the sun get to Earth?
- A by radiation, using electromagnetic waves to transfer the heat
  - B by convection, using liquids and gases to transfer the heat
  - C by conduction, using solids to transfer the heat
  - D by absorption, using primary waves to transfer the heat
- 6 Why do green plants require solar energy?
- A to produce their own food
  - B to absorb nitrogen into their roots
  - C to release carbon dioxide into the atmosphere
  - D to decompose the dead or decaying remains of animals



- 7 Which structure can form as a result of a divergent plate boundary?
- A a continental volcanic arc, due to the collision of two plates
  - B a continental mountain, due to the collision of two plates
  - C a mid-ocean ridge, due to the separation of two plates
  - D an ocean trench, due to the separation of two plates
- 8 Which would produce the **most** severe earthquake damage along the surface of Earth?
- A an earthquake with a deep focus and a magnitude of 2.5
  - B an earthquake with a shallow focus and a magnitude of 2.5
  - C an earthquake with a deep focus and a magnitude of 4.5
  - D an earthquake with a shallow focus and a magnitude of 4.5
- 9 Scientists are studying a graph showing the time differences between the seismic P-waves and the seismic S-waves as they travel through Earth. Which information can they learn from the graph?
- A the magnitude of an earthquake
  - B the duration of an earthquake
  - C the epicenter of an earthquake
  - D the intensity of an earthquake



- 10 Which agent of erosion leads to the formation of sand dunes?
- A ice
  - B wind
  - C water
  - D gravity
- 11 How can water be an agent for physical weathering?
- A by absorbing gases from the atmosphere and ground to chemically react with minerals
  - B by seeping into the soil and dissolving the minerals in rocks
  - C by absorbing sulfur oxides and creating acid precipitation
  - D by seeping into the cracks of rocks and freezing
- 12 Which is **most likely** a prevention strategy for flooding?
- A building artificial levees
  - B reducing water consumption
  - C recycling bottled-water containers
  - D building waste landfills for metals and other contaminants



- 13 How could the removal of trees and other vegetation impact an environment?
- A by increasing oxygen production
  - B by increasing soil formation
  - C by increasing transpiration
  - D by increasing erosion
- 14 Large quantities of sand can be added to the beach to stabilize the shoreline. Which describes a disadvantage of this process?
- A It causes inland erosion.
  - B It is a short-term solution.
  - C It creates a barrier that prevents the tides from occurring along the coastline.
  - D It creates a wall that disrupts the vegetation along the coastline.
- 15 Which is an advantage of safely using uranium as an energy source rather than using coal?
- A Uranium produces energy without polluting the atmosphere, while burning coal can increase the CO<sub>2</sub> in the atmosphere.
  - B Uranium reduces the amount of thermal pollution, while burning coal can increase the amount of thermal pollution.
  - C Uranium is the most cost-efficient energy resource, while coal is the most expensive energy resource.
  - D Uranium can be easily mined from deep within Earth, while coal is a hard resource to mine from deep within Earth.



- 16 Which results from the unequal heating of the ocean water of Earth?
- A a constant sea level
  - B changes in tidal patterns
  - C unchanging climate for all regions on Earth
  - D changes in ocean current patterns
- 17 Why are ocean currents important to coastal regions?
- A They produce high and low tides along coastal regions.
  - B They can warm or cool the air temperatures along coastal regions.
  - C They move vertically pushing warm water and nutrients to the surface along coastal regions.
  - D They increase the rate of precipitation as cold water moves along coastal regions.
- 18 Which is formed when a section of impermeable rock forces groundwater to move laterally and emerge onto the surface of Earth?
- A a spring
  - B an aquifer
  - C a geyser
  - D a well



- 19 How could a long-term decrease in precipitation impact an area?
- A It could increase the average water level of lakes in the area.
  - B It could increase the amount of flooding in the area.
  - C It could decrease the amount of possible infiltration in the area.
  - D It could decrease the possible amount of damage to crops in the area.
- 20 Which consequence could an exponentially growing human population have on drinkable water?
- A It could cause a decrease in the amount of waste and pollutants in the water supply.
  - B It could cause an increase in the amount of water available for the population.
  - C It could cause an increase in cases of waterborne diseases.
  - D It could cause a decrease in needing water for survival.
- 21 A local government is considering whether to build a dam. Which is an advantage of building this structure?
- A It can decrease the accumulation of sediment in the water.
  - B It can improve the natural habitat of plants and animals.
  - C It is an inexpensive process.
  - D It can create a storage place for water.





- 22 The drilling for freshwater increases along a coastal area. What is a likely consequence of this action?
- A an intrusion of salt water into aquifers
  - B the loss of water resources in estuaries
  - C the destruction of estuaries because of an increase in sea levels
  - D a decrease in salt concentration in inlet waterways
- 23 In which atmospheric layer of Earth do thunderstorms occur?
- A thermosphere
  - B mesosphere
  - C stratosphere
  - D troposphere
- 24 Which gas makes up the largest component of the Earth's atmosphere?
- A argon (Ar)
  - B oxygen (O<sub>2</sub>)
  - C nitrogen (N<sub>2</sub>)
  - D carbon dioxide (CO<sub>2</sub>)



- 25 Which statement describes the general movement of air masses?
- A They move from areas of high pressure to areas of low pressure.
  - B They move from areas of high altitude to areas of low altitude.
  - C They move from areas of low humidity to areas of high humidity.
  - D They move from areas of low temperature to areas of high temperature.
- 26 Which **most likely** occurs when a fast-moving cold air mass moves into a region of warmer, moist air?
- A It causes light precipitation for a long period of time.
  - B It causes light precipitation for a short period of time.
  - C It causes heavy precipitation for a long period of time.
  - D It causes heavy precipitation for a short period of time.
- 27 Which contributes to the formation of hurricanes during the late summer?
- A the interaction between ocean water salinity and warm air masses
  - B the interaction between ocean water currents and polar air masses
  - C the interaction between ocean water temperatures and warm air masses
  - D the interaction between ocean water salinity and ocean water density



- 28 Which is a major source of air pollution created by humans?
- A hydroelectric plants
  - B industrial factories
  - C reforestation
  - D nuclear power
- 29 Which can lead to the depletion of the ozone layer of Earth?
- A coal-fired power plants
  - B vehicle exhaust
  - C burning compost
  - D aerosols
- 30 How is climate different from weather?
- A Climate is constantly changing, whereas weather changes slowly over time.
  - B Climate influences people's daily activities, whereas weather influences people's seasonal activities.
  - C Climate refers to the atmospheric conditions on a given date, whereas weather refers to the atmospheric conditions during a given season.
  - D Climate is based on observations made for a region over several years, whereas weather is based on day-to-day observations made for a region.



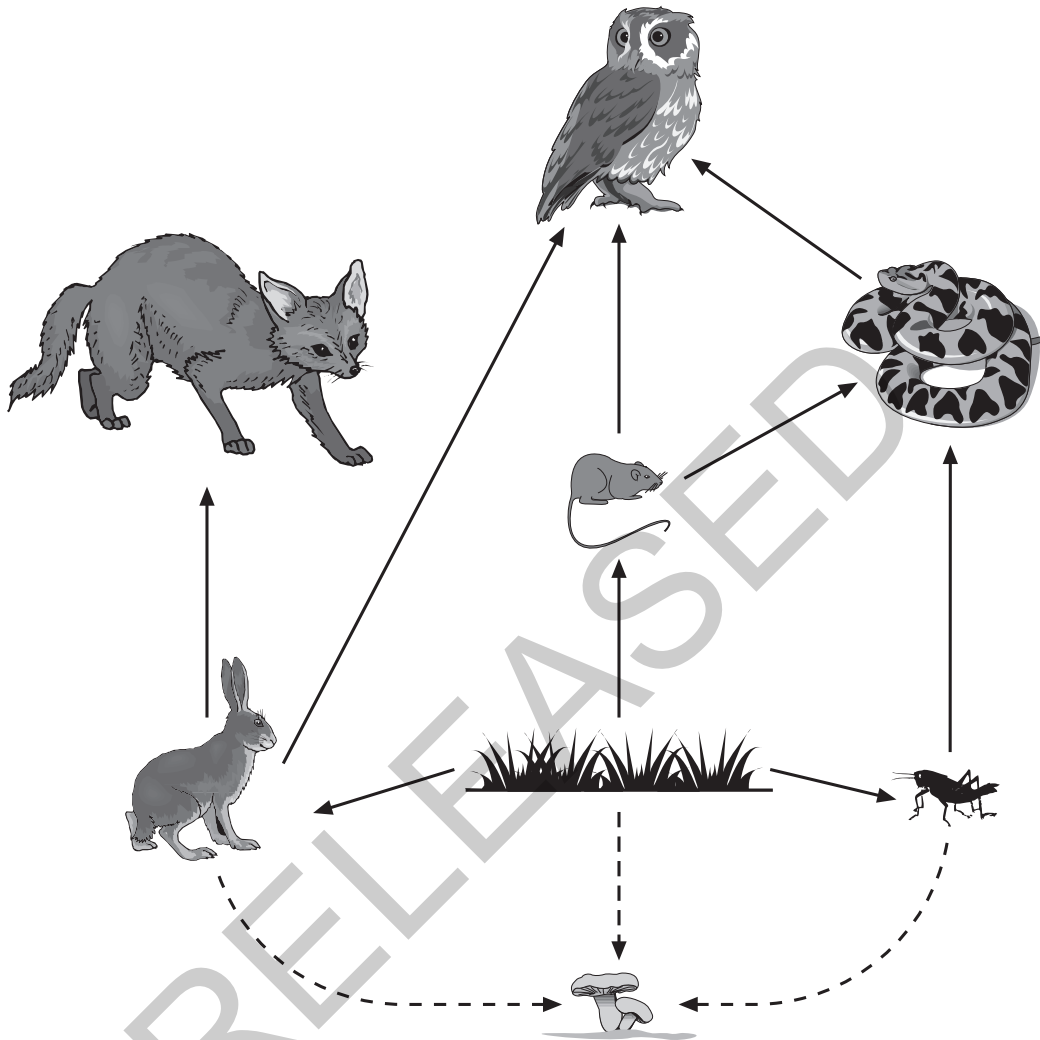
- 31 A local government voted against the large-scale development of buildings and roads in the area. What could have been the motive behind their decision?
- A It could lead to a decrease in the average annual temperature in the area.
  - B It could lead to the formation of heat islands, which may impact the microclimate in the area.
  - C It could lead to the introduction of invasive species, which may impact the area.
  - D It could lead to a decrease in acid rain production in the area.
- 32 A company has several factories around the world and has decided to transition from burning fossil fuels to using alternative energy resources. How could a decrease in burning fossil fuels impact the atmosphere?
- A It could decrease the oxygen levels of the atmosphere.
  - B It could increase the nitrogen levels of the atmosphere.
  - C It could decrease the carbon dioxide levels of the atmosphere.
  - D It could increase the sulfur dioxide levels of the atmosphere.
- 33 Some factories can increase the amount of thermal pollution by dumping heated water into lakes and rivers. How can this type of pollution affect aquatic environments?
- A It can reduce the number of aquatic species in the environment.
  - B It can increase the amount of dissolved oxygen in the environment.
  - C It can reduce the decomposition rate of organisms in the environment.
  - D It can increase the life expectancy of animals in the aquatic environment.



- 34 Since 1901, global surface temperatures have risen at an average rate of  $0.13^{\circ}\text{F}$  every ten years. In which way could the average increase in global temperatures influence Earth?
- A by decreasing erosion within coastal ecosystems
  - B by decreasing periods of drought in all water systems
  - C by increasing the amount of flooding because of rising sea levels
  - D by increasing the formation of sea ice within polar regions
- 35 Which example describes an abiotic factor that could impact the diversity of an ecosystem?
- A An increase in prey can impact the number of predators in an ecosystem.
  - B The introduction of an invasive species can change the amount of available resources in an ecosystem.
  - C An increase in the amount of acid rain can change the pH of the soil in an ecosystem.
  - D The competition for food can impact the survival rate between members of the same species in an ecosystem.



36 This diagram represents a food web for a community of organisms.



A disease causes the rabbit population to decline drastically. How would this decline in the rabbit population impact the community?

- A The mouse population would decrease.
- B The grasshopper population would decrease.
- C The fox population would decrease.
- D The snake population would decrease.



- 37 Kudzu, a vine covering many acres of North Carolina, was introduced to the United States in 1876 to control erosion. Over the years, scientists found that kudzu creates problems by growing rapidly and preventing other plants from getting sunlight. Which **best** describes kudzu?
- A a noncompetitive species
  - B an invasive, nonnative species
  - C an agent of erosion
  - D an abiotic factor
- 38 Which could **most likely** have a lasting negative impact on the biodiversity of an area?
- A clear-cutting
  - B selective cutting
  - C an increase in plant populations
  - D a reduction in the use of fertilizers
- 39 How could the exponential growth of the human population impact regions throughout the world?
- A It could lead to a decrease in the amount of pollution in the regions.
  - B It could lead to an increase in the biodiversity of the regions.
  - C It could lead to an increase in the demand for food in the regions.
  - D It could lead to a decrease in the demand for land within the regions.



- 40 Which **best** describes the relationship between carrying capacity and Earth's resources?
- A A population that is below the carrying capacity will have an increase in contagious diseases.
  - B A population that is above the carrying capacity will have a decrease in natural resources.
  - C A population that is below the carrying capacity will experience a decrease in freshwater resources.
  - D A population that is above the carrying capacity will experience an increase in plant production.

**This is the end of the multiple-choice portion of the test.**

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The questions you read next will require you to answer in writing.

1. Write your answers on separate paper.
2. Be sure to write your name on each page.

1 Consider this weather symbol:



- What does this weather symbol represent?
- If this symbol is over a particular area on a weather map, which type of weather conditions are **most likely** occurring in the area?

2 El Niño can lead to complex weather patterns.

- Describe the cause and characteristics of El Niño.
- Describe how El Niño affects weather conditions in other parts of the world.



- 3 Many scientists are studying the “ecological footprint” created by every country.
- Describe the concept of an “ecological footprint.”
  - Why do countries such as the United States and Germany potentially have a greater ecological impact on the world than many other countries?

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**This is the end of the Earth/Environmental Science test.**

- 1. Look back over your answers.**
- 2. Put all of your papers inside your test book and close the test book.**
- 3. Place your calculator on top of the test book.**
- 4. Stay quietly in your seat until your teacher tells you that testing is finished.**

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**Earth/Environmental Science**  
**RELEASED Form**  
**Spring 2013**  
**Answer Key**

Item number	Type	Key	Unifying Concept
1	MC	D	Earth in the Universe
2	MC	B	Earth in the Universe
3	MC	A	Earth in the Universe
4	MC	B	Earth in the Universe
5	MC	A	Earth in the Universe
6	MC	A	Earth in the Universe
7	MC	C	Earth Systems, Structures and Processes
8	MC	D	Earth Systems, Structures and Processes
9	MC	C	Earth Systems, Structures and Processes
10	MC	B	Earth Systems, Structures and Processes
11	MC	D	Earth Systems, Structures and Processes
12	MC	A	Earth Systems, Structures and Processes
13	MC	D	Earth Systems, Structures and Processes
14	MC	B	Earth Systems, Structures and Processes
15	MC	A	Earth Systems, Structures and Processes
16	MC	D	Earth Systems, Structures and Processes
17	MC	B	Earth Systems, Structures and Processes
18	MC	A	Earth Systems, Structures and Processes
19	MC	C	Earth Systems, Structures and Processes
20	MC	C	Earth Systems, Structures and Processes
21	MC	D	Earth Systems, Structures and Processes
22	MC	A	Earth Systems, Structures and Processes
23	MC	D	Earth Systems, Structures and Processes



Item number	Type	Key	Unifying Concept
24	MC	C	Earth Systems, Structures and Processes
25	MC	A	Earth Systems, Structures and Processes
26	MC	D	Earth Systems, Structures and Processes
27	MC	C	Earth Systems, Structures and Processes
28	MC	B	Earth Systems, Structures and Processes
29	MC	D	Earth Systems, Structures and Processes
30	MC	D	Earth Systems, Structures and Processes
31	MC	B	Earth Systems, Structures and Processes
32	MC	C	Earth Systems, Structures and Processes
33	MC	A	Earth Systems, Structures and Processes
34	MC	C	Earth Systems, Structures and Processes
35	MC	C	Earth Systems, Structures and Processes
36	MC	C	Earth Systems, Structures and Processes
37	MC	B	Earth Systems, Structures and Processes
38	MC	A	Earth Systems, Structures and Processes
39	MC	C	Earth Systems, Structures and Processes
40	MC	B	Earth Systems, Structures and Processes
41	CR	Rubric	Earth Systems, Structures and Processes
42	CR	Rubric	Earth Systems, Structures and Processes
43	CR	Rubric	Earth Systems, Structures and Processes

**Item Types:**

MC = multiple choice

CR = constructed response