New Castle County Vocational Technical School District
St. Georges Technical High School
Integrated Science
Unified Summative Assessment with Accommodations – Educational Research Version, Winter 2009

Materials required:

- Whiteboard, whiteboard marker, whiteboard eraser
- Cards listing stages of a star's life cycle
- Models representing the Sun, Earth (with axis and Northern/Southern hemispheres marked), and Moon
- Elements of food web

Oral Free Response Portion

This portion of the test will be videotaped. For this portion of the test, the examiner will read each question to you. After the question is asked, you will be given the opportunity to either answer it orally or skip it. At the end of the oral portion of the exam, you will be allowed to return to any questions you chose to skip and answer them at that time.

1. Listed on these cards are some of the parts of a star's life cycle. Place the cards in order from the earliest stage of a star's life to the latest stage, explain what occurs during each stage, and describe why that stage of the life cycle is important.
   Stages: Nebula, Supernova, Main sequence, Star begins to shine

2. A) Using the models provided, show the relative positions of the Sun and the Earth when it is winter in the Northern hemisphere. Explain why this positioning causes winter in the Northern hemisphere.
   B) Using the models provided, show the relative positions of the Sun and the Earth when it is summer in the Northern hemisphere. Explain why this positioning causes summer in the Northern hemisphere.
   C) Using the models provided, show the relative positions of the Sun, Earth, and moon when the tides are highest. Explain why this positioning causes the tides to be at their highest.

3. A) Arrange the organisms provided into a food web. Use the arrows provided to indicate the flow of energy through the food web. You might not use all the arrows, and all of the organisms might not be connected to all of the other organisms.
   B) Which are the producer or producers in this food web?
   C) Which are the consumer or consumers in this food web? Are they first-level consumers, second-level consumers, or third-level consumers?
   D) How does the amount of available energy change between the trophic levels of the food web?
   E) A disease kills most of the insect population shown in this food web. How does this effect the rest of the organisms in the food web?

Written or Oral Free Response Portion

For this portion of the test, there are four questions. For each question, you may either give your answer orally to the examiner, or type your answer on a computer. If you choose to give your answer orally to the examiner, your response will be videotaped just like the rest of the oral questions, and you will be allowed to skip questions and return to them at the end. You may draw a picture on the provided whiteboard to help you explain if you would like. If you choose to type your answer, you will have access to a computer after the oral portion of the exam is complete.

1. Describe how the solar system formed.

2. Describe how the moon stays in orbit around the Earth.

3. Spectrometers and parallax are two examples of tools and techniques that astronomers use to study stars. Describe what astronomers learn about stars by using each of these.

4. Describe the difference between nuclear fission and nuclear fusion.