Sample 2004 KCCT Science Released Items

(with DOK annotation)

Coding: Content Area-Grade-Item #-DOK Level-CCA v.4 Code-annotation

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1. Which is MOST likely to make a rock break open?
   - dew evaporating on the rock
   - tree leaves decaying on the rock
   - snow melting in a crack in the rock
   - water freezing in a crack in the rock

Science-4-1-DOK 1-SC-P-1.1.3 - This item requires that students recall a basic property of water—that water expands when it freezes**. (Big Idea: Structure and Transformation of Matter)**

Use the illustration below to answer question 3.

3. Look at the two magnets above. If you push the two magnets toward each other as shown, the magnets will
   - break into many pieces.
   - turn in opposite directions.
   - be pushed away from each other.
   - be pulled toward each other.

Science-4-3-DOK 2-SC-P-1.2.1-This item requires that students interpret a simple diagram and apply a property of magnets—that opposite poles attract. **(Big Idea: Motion and Forces)**

Paper Cup Telephone

4. Beth has made a telephone using two paper cups and a string. When she talks into one paper cup, her friend Joe can clearly hear her words through the other paper cup.

a. Explain how the paper cup telephone works.

b. Name TWO other examples in which sound can travel through solids.

Science-4-4-<u>DOK 2</u>-SC-P-1.2.5- While part B of this item is a level 1 (basic recall/identification of examples), part A requires students to produce a simple description of the concept of sound—vibrations are produced in the vocal cords and those vibrations are transferred to the cup and string, where they are transferred from one end to the other. **(Big Idea: Motion and Forces)**

Meat-Eaters

6. Many meat-eaters catch and eat other animals. Meat-eaters have different skills and physical features to help them do this.

a. Name ONE meat-eater, other than a human, that catches and kills its prey.

b. Describe THREE skills and physical features the meat-eater you chose uses.

Science-4-6-<u>DOK 2</u>-SC-04-3.4.1 – This item requires that students understand the relationship between skills or physical features and the function of those skills or features that enable the meat-eater to obtain food. **(Big Idea: Unity and Diversity)**

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2. An earthquake occurs when the tectonic plates below Earth's surface suddenly shift. These shifts of the tectonic plates are caused by

- ○ movements in Earth's core.
- ○ movements in Earth's mantle.
- ○ deposition of sediments.
- ○ eruption of volcanoes.

Science-7-2-<u>DOK 1</u>-SC-07-2.3.2--This requires recall of why movements occur in the Earth's plates. **(Big Idea: The Earth and the Universe)**

3. We get energy from the food we eat. The energy in the food first comes from the
   - O soil.
   - O fertilizers used by farmers.
   - O sun.
   - O vitamins added by food manufacturers.

Science-7-3-DOK 1-SC-07-4.6.1–This item requires recall of the energy transfer in a common food chain. It is considered foundational knowledge for a 7th grade student. **(Big Idea: Energy Transformations)**

Changes in Landforms

5. Scientists have evidence that the landforms we see on Earth, such as mountains, islands, and canyons, as well as the shapes of continents, are the result of constructive and destructive forces at work over a long period of time.
   Describe in detail **two** pieces of evidence that show that landforms on Earth are constantly changing. Provide a specific example for each piece of evidence.

Science-7-5-DOK 3-SC-07-2.3.1 -This item requires students to produce evidence via explanations about continuous constructive and destructive forces that produce changes to the Earth. The examples given in the item stem represent continuous change, and not merely discreet events. **(Big Idea: The Earth and the Universe)**

Extinction

6. A species may become extinct if environmental changes occur and the species does not adapt quickly enough to the changes.
   a. Identify an environmental change that might cause a species to become extinct **and** identify a species that would likely be affected by such a change.
   b. Describe how extinction of one species can affect other organisms in the ecosystem.

Science-7-6-DOK 3-SC-07-3.5.1 - This item requires students to apply the concept of cause & effect to an environmental change that may result in a particular species' extinction. The student must produce a justification for their response. **(Big Idea: Biological Change)**

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1. Acids such as HCl (hydrochloric acid) and H_2SO_4 (sulfuric acid) dissociate (separate into ions in water) completely in solution. The ion that acids have in common and that accounts for their properties is
   - ● H^+.
   - O SO_4^{-2}.
   - O Cl^-.
   - O H_2O.

Science-11-1-DOK 1-SC-HS-1.1.5 - This is recall of a basic chemistry concept. **(Big Idea: Structure and Transformation of Matter)**

2. Evidence suggests that 3.5 billion years ago the atmosphere of Earth had almost no oxygen gas. Approximately 1.8 billion years ago, the oxygen concentration is thought to have increased to 15%. Today the oxygen concentration is 20%. What most likely happened between 3.5 and 1.8 billion years ago to increase the amount of oxygen?

- ● The number of photosynthetic plant species increased.
- ○ The number of animal species increased.
- ○ The amount of water on Earth increased.
- ○ The amount of solar radiation reaching Earth increased.

Science-11-2-DOK 2-SC-HS-4.6.1 - This question goes beyond simple recall. Students make the connection that a greater plant population (implied) will result in an increase in oxygen production. **(Big Idea: Energy Transformations)**

Mid-Ocean Ridges

5. The theory of plate tectonics explains how mid-ocean ridges are formed.
   a. Draw and label a diagram that shows **how** a mid-ocean ridge forms.
   b. Describe **two** possible consequences that the formation of mid-ocean ridges has on other locations on Earth.

Science-11-5-DOK 2-SC-HS-2.3.10 -This item requires that students graphically represent a scientific phenomena (formation of mid ocean ridges) and to describe a cause/effect relationship resulting from the phenomena. **(Big Idea: Energy Transformations)**

Chemical Reactions and Carbon Dioxide (CO_2) Gas

6. Different kinds of chemical reactions result in the formation of carbon dioxide (CO_2) gas that is released into the atmosphere. These chemical reactions may take place within living organisms or nonliving sources.
   a. Identify a chemical reaction that takes place within living organisms that releases CO_2 into the atmosphere.
   b. Identify a chemical reaction that takes place within nonliving sources that releases CO_2 into the atmosphere.

   CO_2 is constantly being added to and removed from the atmosphere. Extra CO_2 in the atmosphere may contribute to global warming.

   c. Explain why the chemical reactions you described in **part a** and **part b** may now be adding more or less CO_2 to the atmosphere when compared to the past.

Science-11-6-DOK 2-SC-HS-4.6.4 -While parts A and B require basic recall, Part C demands that the students describe a relationship between the components of the system. **(Big Idea: Energy Transformations)**