

Earth/Space Science DTAMS Assessment – Version 1
 Diagnostic Teacher Assessments in Mathematics and Science—Middle School

Date _____ Start time _____ Finish time _____

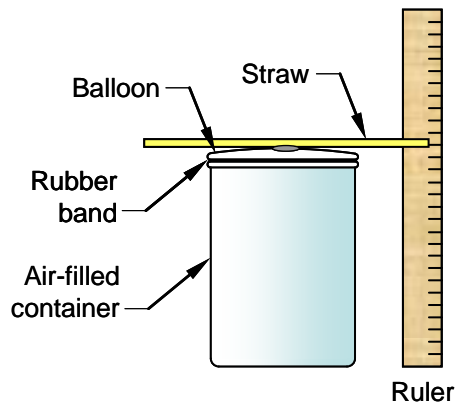
Please provide the following information about yourself:

Years teaching experience (0 if preservice) _____	Last 4 digits of Social Security number (or any 4-digit number you'll remember) _____ (used as identifier on score report)
Check grade level(s) currently teaching (or will be teaching if preservice). Mark one or more that best describes your situation. (please describe below if "other")	Check current (or future if preservice) teaching certificate grade level(s) . Mark one or more that best describes your situation. (please describe below if "other")
Pre-K _____ K-3 _____ 4-5 _____ 6-8 _____ 9-12 _____ other _____	Pre-K _____ K-3 _____ 4-5 _____ 6-8 _____ 9-12 _____ other _____
Number of college & graduate earth science courses _____	Number of college & graduate life science courses _____
Number of college & graduate physical science courses _____	Sex (M/F) _____
Content area of teaching certificate	
<p>Mark one or more that best describes your situation.</p> <p>If your certificate is a <u>general education certificate</u> that covers all subjects (e.g. as many elementary certificates do) but doesn't specifically include a separate science certification, please <u>mark "not science"</u>.</p> <p>If your certificate includes content areas in addition to science, please choose from the list on the right based on the science content portion only and <u>do not mark</u> the "not science" category.</p>	<p>not science _____</p> <p>general science _____</p> <p>biology/life science _____</p> <p>chemistry _____</p> <p>physics _____</p> <p>physical science _____</p> <p>earth science _____</p> <p>astronomy _____</p> <p>geology _____</p> <p>other science _____</p> <p>(please describe "other science")</p>

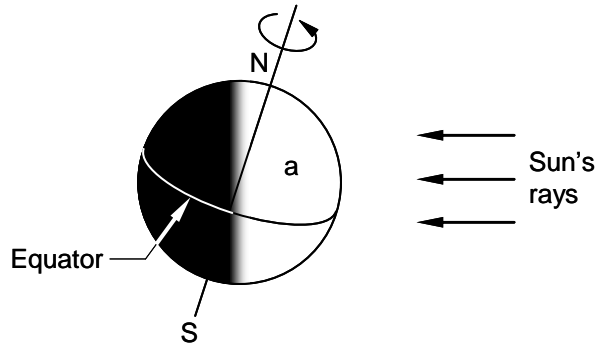
Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- ___ 1. The process by which sediment settles out of the water or wind carrying it is
- deposition.
 - erosion.
 - cementation.
 - compaction.
- ___ 2. Which type of stress produces reverse faults?
- tension
 - shearing
 - compression
 - deformation



- ___ 3. A student constructed the above apparatus with a flexible balloon sealing the top of an air-filled, metal canister. A straw pointer was attached to the top of the balloon, and a ruler placed at one unattached end of the straw. The next day the student observed that the tip of the straw had moved down. What does it mean when the straw goes down?
- The air pressure is rising and weather is likely to be fair.
 - The air pressure is rising and weather is likely to be cloudy or stormy.
 - The air pressure is falling and weather is likely to be fair.
 - The air pressure is falling and weather is likely to be cloudy or stormy.

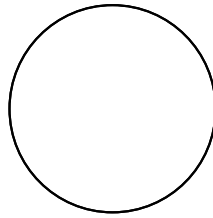


- ___ 4. The season of the year at point “a” on the diagram of the Earth above is
- spring.
 - fall.
 - summer.
 - winter.
- ___ 5. A scientist wants to investigate factors that are related to the prediction of the weather. Barometric pressure is measured every six hours and recorded. Observations of the weather are made and recorded along side the pressure data. These data could support which conclusion?
- Changes in pressure are correlated with changes in weather.
 - High and low pressure systems create stormy weather.
 - Changes in pressure create changes in weather.
 - Rain causes low air pressure.
- ___ 6. The hardest mineral on the Moh’s hardness scale is
- diamond.
 - apatite.
 - quartz.
 - talc.
- ___ 7. When examining a seismograph record of an earthquake, a geologist can determine the location of the earthquake’s origin (hypocenter) from
- calculations involving differences in P- and S- wave arrival times at 3 or more stations.
 - the amount of time it takes for the P-wave to arrive at the seismograph.
 - the difference between the amplitudes of the S- and P-wave traces on the graph.
 - the size of the surface waves.
- ___ 8. In North America, passive solar home design places most of the windows on the
- north side to minimize the heating effect of the summer sun.
 - south side to maximize the heating effect of the winter sun.
 - west side to maximize the heating effect of the afternoon sun.
 - east side to maximize the heating effect of the morning sun.

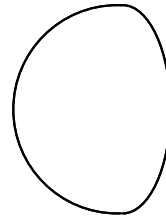
- ___ 9. Earthmoving equipment scrapes away dirt to expose ore in the process of
- smelting.
 - shaft mining.
 - scrape mining.
 - surface mining.



Crescent



Full



Gibbous

- ___ 10. What conclusion is supported by the observation that Mercury has crescent and gibbous, but not full, phases as seen from Earth?
- Mercury is the closest planet to the sun.
 - Mercury passes behind the sun.
 - The surface of Mercury is solid like the moon's surface.
 - Mercury's orbit is closer to the sun than Earth's orbit.
- ___ 11. Balloons expand as they rise because, at higher altitudes,
- there is less air pressure.
 - there is less wind.
 - the temperature of the air is cooler.
 - the air is drier.
- ___ 12. The amount of ultraviolet radiation that is reaching the Earth's surface is increasing, causing
- acid rain, which can damage the environment, human health, and property.
 - ozone depletion, which can cause the destruction of plankton populations in the oceans.
 - the earth's temperature to rise.
 - increased sunburn and skin cancer.
- ___ 13. A student designs an experiment to measure dew-point. Warm water is placed in a metal container. Ice-cold water is added in increments until condensation appears on the container's surface. Which factor must be controlled in order to perform an accurate measurement?
- the volume of water in the container
 - the thickness of the container
 - the amount of cold water added each time
 - the surface area of the container

- ___ 14. A mountain island in the Pacific Ocean is subject to prevailing winds that blow from the west across the mountain to the east. The land on the island will be
- subject to extremes of temperature because of ocean currents.
 - green and lush on both sides of the island.
 - lush and green on the west side and dry on the east side.
 - dry and hot on both sides of the island.
- ___ 15. Based on the principle of uniformitarianism, the best explanation for deep river canyons, such as the Grand Canyon in the Western U.S., is
- all canyons were created at the same time when the earth was created.
 - periodic, widespread floods over the continents eroded the land.
 - water erosion over long time periods carved canyons.
 - continental drift pulled mountains apart leaving a deep valley.
- ___ 16. Which group of planets is in the correct order moving from the outer edges of the solar system toward the sun?
- Mercury, Venus, Earth
 - Mars, Jupiter, Uranus
 - Saturn, Mars, Venus
 - Uranus, Mars, Saturn
- ___ 17. A weakness of paleontological investigations is that they are non-experimental because, for example, the age of a sample cannot be controlled. This weakness is lessened by which of the following methodologies?
- Using the preferred procedure to measure the age of fossil-containing rock
 - Use of non-standard dating techniques
 - Having other paleontologists duplicate the procedure
 - Comparing the ages of fossils and rocks derived from a variety of methods
- ___ 18. Which of the following clouds is the most likely indicator of fair weather?
- cumulus
 - nimbostratus
 - stratus
 - cumulonimbus
- ___ 19. Erosion is a necessary part of the rock cycle because
- metamorphic rock is formed by the cementation of eroded particles.
 - no rock would ever change into a different type without first being eroded.
 - erosion transports rock particles, which are deposited in sediment and ultimately compressed into rock.
 - igneous rock is created by the melting of eroded particles within volcanoes.

- ____ 20. A geologist measures the specific gravity of a rock sample. Which next step would best aid in the identification of the sample?
- Measure specific gravity using another technique to triangulate the measurements.
 - Repeat the measurement of specific gravity with another sample from a different location.
 - Compare the color of the sample with a chart of minerals.
 - Perform a streak test on the sample.
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Open Response Directions

Write responses to parts (a) and (b) in the space provided. If more space is needed, please use the back of the paper and indicate that your response continues on the back.

Directions for part (a):

In each question, students expressed a misconception. Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. Explain the science in as much depth as possible, even if that level of depth would be inappropriate to expect middle school students to know. Your explanation should demonstrate a thorough knowledge of the underlying science – simply stating the opposite of the students' misconception without further explanation is not sufficient.

Directions for part (b):

Explain how you would address this misconception using best instructional practices. Please describe the classroom instruction, including what the students and teacher are doing, in enough detail so that the reader can envision what is happening. For example, if you refer to a specific lesson, textbook, activity, piece of equipment, or media, assume the reader is not familiar with it and explain how it is used to support student learning. Assume you have access to any equipment that would be available in a reasonably well-funded K-12 school setting so that your proposed instruction is feasible to implement.

21. While on a field trip at a rock quarry, your students argue that the folded rock layers they see are evidence that rocks were a lot softer when they folded in the ancient past than they are now.

(a) Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. (See directions at beginning of the open response section for more detailed directions.)

(b) Explain how you would address this misconception using best instructional practices. (See directions at beginning of the open response section for more detailed directions.)

22. Your students assert that deserts are created in coastal areas because ocean salt water is being evaporated and deposited as rain on the ground, thus making the soil salty and infertile.
- (a) Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. (See directions at beginning of the open response section for more detailed directions.)
- (b) Explain how you would address this misconception using best instructional practices. (See directions at beginning of the open response section for more detailed directions.)

23. Your students believe that the chain of Hawaiian Islands was formed because a mid-oceanic ridge exists at that location in the Pacific Ocean.

(a) Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. (See directions at beginning of the open response section for more detailed directions.)

(b) Explain how you would address this misconception using best instructional practices. (See directions at beginning of the open response section for more detailed directions.)

24. Your students claim that tides are caused primarily by the winds blowing water toward shore or away from shore.

(a) Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. (See directions at beginning of the open response section for more detailed directions.)

(b) Explain how you would address this misconception using best instructional practices. (See directions at beginning of the open response section for more detailed directions.)

25. Your students explain that the phases of the moon are caused by the earth's shadow falling on the moon.
- (a) Please describe the currently accepted scientific explanation of the phenomenon that the students are not understanding. (See directions at beginning of the open response section for more detailed directions.)
- (b) Explain how you would address this misconception using best instructional practices. (See directions at beginning of the open response section for more detailed directions.)