

VIRTUAL GEOCACHING B/C

1. **DESCRIPTION:** Contestants will use a handheld GPS device to follow a series of waypoints to caches and answer a series of questions.

A TEAM OF UP TO: 2 APPROXIMATE TIME: 50 minutes

2. **EVENT PARAMETERS:**

- a. Each team is allowed one 8.5" x 11" sheet of paper that may contain information on both sides in any form and from any source without any annotations or labels affixed along with two stand-alone non programmable, non-graphing calculators.
- b. Contestants must supply a handheld GPS Unit, pen or pencil, and a clipboard.
- c. Contestants may not take with them during competition additional supplies including: other electronic devices, maps, or closed bags.
- d. The event is held outside regardless of the weather, so appropriate dress for physical activity under the prevailing conditions is required.

3. **THE COMPETITION:** The exam will consist of coordinates or a series of coordinates. Participants will use online maps to determine waypoints and answer a series of consecutive questions in the correct order. Participants will be given an online map and document containing waypoints. Participants must be able to determine standard features on the map, including but not limited to determining coordinate locations. Exam questions will be based on the following topics below. At least 20% of test questions must come from each of the main areas:

- a. Locating the correct waypoints using the coordinates and online maps providing proof of correct location.
- b. Geocaching, including the following:
 - i. The history of geocaching
 - ii. The technology associated with geocaching
 - iii. Proper use of a GPS device
 - iv. Types of caches
 - v. Different GPS formats
- c. The 2023-2024 topic for geocaching: **Weathering and Erosion**
 - i. Methods of weathering including: physical, chemical, biological, and freeze-thaw
 - ii. Agents of erosion including: water, wind, ice, gravity, biota, and anthropologic
 - iii. The similarities, differences, and different types of weathering and erosion
 - iv. Describe and infer chemical reactions and environments of weathering and erosion
 - v. Describe and analyze different examples of weathering and erosion in real-life examples
 - vi. Division C only: Using charts, and graphs to analyze weathering and erosion due to running water, glaciers, and wind
- d. Interpretation of the map, including the following:
 - i. Features on the map and in the margins of the map
 - ii. Contours, distances, elevations, and calculations involved measured or derived quantities
 - iii. Sector Reference System, geographic coordinates in degrees, minutes, and seconds, UTM coordinates, and the Public Land Survey System grids (PLSS)

- iv. Direction of stream flow, stream gradients, slope calculations, and profile analysis
- v. Interpretation, analysis, and intuition of map features at locations

4. SAMPLE TASKS/QUESTIONS:

- a. Given the coordinate, use the map to discern the the location.
- b. How many satellites are required for a GPS device to view a 3D position?
- c. Which of the following geocaching cache types would be the best fit for the current location?
- d. What erosional agent most likely produced a butte landform?
- e. Which of the following environments would most likely produce oxidation and chemical weathering?
- f. Identify the direction of glacial flow by erosional features.
- g. Use the Hjulstrom curve to determine the deposition of sediments based on a river's speed.

5. SCORING:

- a. Each correct waypoint successfully obtained in the proper sequence will be awarded an assigned value. Each correct response to the waypoint questions will also be awarded an assigned value. Values of questions may be weighted.
- b. Highest score wins, with tiebreakers determined by the event supervisor.

- 6. SPECIAL EQUIPMENT:** An entry-level handheld GPS unit (see latest offerings from the Garmin or Magellan companies) is sufficient for this event. Cell phones equipped with GPS units will not be allowed.

Resources:

- www.geocaching.com
- Introductory earth science textbooks such as *Earth Science* (E.J. Tarbuck, F.K. Lutgens, D. Tasa) and *Earth Science* (Glencoe).