

Who wants to be a geomorphologist? Gamification in a BSc teaching course – SUPPLEMENTARY MATERIAL

This annex reports ten questions that were used for the quizzes of the “Who wants to be a geomorphologist?” didactical activity.

The correct answers are underlined.

After the answers, a note explains the main didactical objectives of each quiz.

1) During a meteorological event that lasted 24 hours, the mean rainfall intensity recorded was 2 mm/h. How many liters of water were intercepted by a roof 100 m² wide?

OPEN ANSWER (correct answer = 4800)

NOTE. The objective here was becoming familiar with the measuring units used for rainfall and having a correct perception of rainfall measures.

2) All other factors being equal, in which circumstances thermoclastism is more intense?

- a) Cold climate, with temperatures constantly below zero
- b) Climate with constantly warm temperatures
- c) Mild climate alternating hot and cold temperatures

NOTE. Before the quiz, a basic explanation of the thermoclastism was provided, all implications were indirectly explained with the quizzes.

3) All other factors being equal, in which circumstances thermoclastism is more intense?

- a) Homogenous rock constituted by a single type of mineral.
- b) Heterogenic rock, composed by different kinds of minerals.

NOTE. Before the quiz, a basic explanation of the thermoclastism was provided, all implications were indirectly explained with the quizzes.

4) Which of the following features increase the erosion of a hill?

- a) The hillslopes are short.
- b) The hillslopes are steep.
- c) Abundant vegetation.
- d) The hillslopes are terraced to grow olive trees.
- e) The hillslopes are clayey, with a very low permeability.

NOTE. Instead of directly explaining the main erosion predisposing factors, a quiz was delivered including the main factors as correct answers and their contrary as wrong answers.

5) What do you see at the foot of the peaks?



- a) Eluvial deposits
- b) Colluvial deposits
- c) Alluvial deposits
- d) Bank deposits (nevermind geomorphology, I want the ca\$h!)

NOTE: twofold objective. I) Putting in practice the theory (all terms were explained) and understanding the difference between memorizing a definition and understanding it. II) Internal check for the teacher, to understand the level of commitment of the students: how many of them would select the clearly wrong but funny answers? (actually, none)

6) Among the following expressions related to landslide processes, select the ones that are either technically correct or scientifically sound.

- a) “Smottamento” [impossible to translate, it is a commonly used dialectal term not used by the scientific community]
- b) Lahar.
- c) Debris flow.
- d) Mountain crumble.
- e) Wet, rapid, and retrogressive translational slide.
- f) Very wet, slow, cryoclastic, exogenous earth flow.

NOTE: The objective was to pay attention to the technical terms, avoid informal terms (answer “a” and “d”), and not to get misled by “high-sounding” geomorphological terms that here were used out of the correct context (f).

7) All of the following are correct terms to classify a landslide. However, one of them describes a phenomenon that is almost impossible to occur. Which one?

- a) Very slow humid rockfall
- b) Wet, slow, quiescent, retrogressive, earth rotational slide.
- c) Extremely slow active earth flow

8) Why the so called “pescaie” [a sort of typical check dams] were built in the Arno river in the city of Florence?

- a) To reduce the fluvial erosion downstream
- b) To reduce the fluvial erosion upstream
- c) To have cleaner water
- d) To let the water flow faster
- e) Exclusively for amusement (summertime sunbathing)
- f) To stabilize the riverbed

NOTE. After explaining some concepts of fluvial geomorphology, this question was used to let the students put the theory in practice, engaging with a familiar case study. Indirectly, this quiz also explained the students what this strange feature of “their” city is: the students had seen the “pescaie” many times, but they had never questioned about their functioning and history.

9) Dunes and beaches: select all true statements.

- a) Beach dunes may protect the inland during storm surges.
- b) Like desert dunes, beach dunes are usually without vegetation.
- c) The formation of dunes is fostered by absence of wind.
- d) The presence of the outlet of a sediment-rich river fosters the formation of dunes in the beach.

NOTE. Instead of explicitly explain how delicate (and important) the equilibrium of the beach dunes is, this quiz was delivered. Any further explanation was left to the interactive discussion after the quiz.

10) What are the triangular landforms that can be seen near Pontassieve (surroundings of Florence, Italy)?



- a) Triangular facets
- b) Flat irons
- c) None of the above

NOTE. Very hard question for a first-year student. A correct answer required a complex reasoning. The definition of the terms “a” and “b” was delivered during the lesson. In particular, it was explained that triangular facets are associated with faults. Afterwards, it was explained that the valleys around Florence were formed during the tectonic evolution of the Apennine mountain belt, when a system of faults opened the intermontane basins where at present the Arno river flows.