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GOAL EDUCATIONAL RESOURCE

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TITLE OF THE CASE	Introduction to geoethics: definition, concepts, and application
SHORT CASE DESCRIPTION	This is the introductive resource of a course or module on geoethics, providing the definition, a theoretical framework, key-concepts, and themes.
KEYWORDS	Earth system; Geoethical domains; Geoethics; Responsibility; Social role of geoscientists; Values.
PRIOR KNOWLEDGE	Basic knowledge on one or more disciplines included in geosciences.
AIM	Introducing the audience to the basic theoretical framework of geoethics, by illustrating its main characteristics.
OBJECTIVES	• To know the definition of geoethics. • To understand essential information about elements of the theoretical framework of geoethics. • To raise questions, reflect and discuss about the meaning of concepts proposed by geoethics. • To put in evidence the centrality and significance of the principle of responsibility. • To become more aware on the social role of geoscientists and commitments towards the Earth system. • To know some keywords used in the geoethical analyses.
CASE	Every course on geoethics needs for a basic introduction to the main concepts. This educational resource is based on a video that provides a short overview on the theoretical framework of geoethics: its definition, the principle of responsibility, the four geoethical domains of the geoscientist's experience (individual, inter-personal, societal, environmental domains) and the main characteristics of geoethics (actor-centric on individual geoscientist, geoscience knowledge based, vitue-ethics, context-dependent in space and time). The video is formed by 8 blocks entitled: 1) An ethical reflection for geoscientists; 2) What is geoethics?; 3) What is the geoscientist's responsibility?; 4) Individual and inter-personal

	domains; 5) Societal and environmental domains; 6) What are the main characteristics of geoethics?; 7) What are the main areas of application of geoethics?; 8) Towards a new way of thinking our interaction with the Earth system. Video contents are built on several key-concepts currently used in ecological and geoethical thinking: Socio-Ecological Systems, Earth System, Conservation, Economic Development, Sustainable Development, Geodiversity, Biodiversity, Humans as a "geological force", Future Generations. The video is conceived as a tool to set up further reflections and discussions aimed at raising students' awareness about individual, professional, social, and environmental roles and responsibilities of geoscientists, and at building a shared framework of values to be adopted for helping society to become more sustainable and respectful towards abiotic and biotic elements on the planet.
QUESTIONS	**1.** On what can we base our main life decisions? **2.** What does it mean the word "responsibility" and which can be its implications in our daily life experience? **3.** Which is the definition of geoethics, and what meanings can you discover in it? **4.** What is the social role of geoscientists, as researchers and/or professionals? Which can be their ethical and social obligations? How they can help society to face global changes? **5.** Do you think it is realistic to find a sustainable balance between conservation of the planet and the economic development to ensure people safety and healthy life? **6.** Which can be the values that could guide humans' respectful behaviors toward the Earth system?
PROCEDURE	**Preparation:** **1.** Watch the video "Introduction to geoethics: definition, concepts, and application" (https://www.youtube.com/watch?v=j3qBw0kSWs0&t=2s) without any preliminary introduction or comment.  **2.** Elaborate questions (1 through 6). **3.** Watch the video again and stop it at the end of each block to start a more in-depth discussion and reflection about contents of the specific block. **4.** Read the introduction on geoethics by Peppoloni et al., 2019 (http://docs.wixstatic.com/ugd/5195a5_23670a25b64a46249a971718c2fa6c9f.pdf). **Working Group (4-5 students):** **1.** Open a discussion on possible meaning and implications of key-concepts listed in the section "Case". Each group should report briefly results of the discussion to all other groups.

2. Each student should write down his/her list of values on which he/she takes the most important decisions affecting his/her life. Discuss about a possible list of shared values in the group. Summarize the results at the end of the group work. This group work aims at showing the importance of dialogue to establish a reasonable alignment of values in a group of people (or society), regarding a common issue.
3. Each group should list 10 global problems affecting humanity and Earth system. Each group should report briefly results of the discussion to all other groups.
4. Set a current scenario: each working group should plot a graph [x axis: societal capacity to solve the problems (low, medium, high); y axis: importance of the issue for society (low, medium, high)]. Each point in the graph will be related to the following geoethical issues: a) mining; b) groundwater depletion; c) soil degradation; d) anthropogenic risks; e) natural risks; f) air pollution; g) plastic pollution; water pollution; h) fossil energy; i) renewable energy; l) nuclear energy; m) sea-level rise; n) climate change; o) reduction of biodiversity; p) population increase. Each working group aims at discussing own perception about the importance of the above issues for society, and own idea about the capacity of society to solve or make them sustainable in the future.
5. Build future scenarios: each working group should plot a graph [x axis: time interval (10- 50-100 years); y axis: priority for society (low-medium-high)]. Each point in the graph will be related to the following geoethical issues: a) mining; b) groundwater depletion; c) soil degradation; d) anthropogenic risks; e) natural risks; f) air pollution; g) plastic pollution; water pollution; h) fossil energy; i) renewable energy; l) nuclear energy; m) sea-level rise; n) climate change; o) reduction of biodiversity; p) population increase. Each working group aims at giving own idea on the time evolution of the societal priorities for each issue, based on own idea of future development of human societies.
6. Answer the questions raised.

REFERENCES

Main reference:

Peppoloni, S., Bilham, N. & Di Capua, G. (2019). Contemporary Geoethics within Geosciences. In M. Bohle (Ed.), *Exploring Geoethics: Ethical Implications, Societal Contexts, and Professional Obligations of the Geosciences*. Cham: Palgrave Pivot. (http://docs.wixstatic.com/ugd/5195a5_23670a25b64a46249a971718c2fa6c9f.pdf - Open access pre-print version of the eBook chapter)

Further references:

Bobrowsky P., V.S. Cronin, G. Di Capua, S.W. Kieffer & S. Peppoloni. (2017). The Emerging Field of Geoethics. In L.C. Gundersen (Ed.), *Scientific Integrity and Ethics in the Geosciences. Special Publication American Geophysical Union*. Hoboken: John Wiley and Sons, Inc.

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Peppoloni S. & Di Capua G. (2015). The Meaning of Geoethics. In M.Wyss & S. Peppoloni (Eds), *Geoethics: Ethical challenges and case studies in Earth Sciences*. Amsterdam: Elsevier. (https://f420cbad-ec08-4c39-902f-b0e5afecb44a.filesusr.com/ugd/5195a5_0156301931f9429da6db4bc4843eb605.pdf - Open access pre-print version of the eBook chapter).

Website:

- http://www.geoethics.org/ (IAPG – International Association for Promoting Geoethics)