

Threshold Concepts in Geography

SciMaG – Work Package 2

Threshold concepts are conceptual gateways that can open a previously inaccessible way of thinking about a subject and enable further learning. They are commonly described as potentially transformative, irreversible, integrative, bounded, and troublesome. Not every difficult or important concept is necessarily a threshold concept; the key issue is whether understanding it changes the learner's way of seeing and using disciplinary knowledge.

Identified Threshold Concepts

Environment/Space as a Threshold Concept

Environment and space provide the setting and relational structure in which natural and human processes occur.

Threshold characteristic	Explanation
Troublesome	Learners must move beyond seeing space as a static backdrop and recognise interacting processes.
Transformative	Space becomes a dynamic system rather than merely a location.
Integrative	It connects physical geography, human geography, ecology, and regional processes.
Bounded	It is bounded by geographical understandings of spatial organisation and environmental relationships.
Irreversible	Spatial-system thinking becomes a durable basis for interpreting geographical phenomena.

Related SciMaG learning activity: S1 and S2; G14

Earth's Rotation and Revolution as a Threshold Concept

Earth's rotation and revolution explain day and night, seasons, time, and many large-scale patterns.

Threshold characteristic	Explanation
Troublesome	The motions are not directly experienced visually, and learners commonly develop misconceptions about seasons.
Transformative	Earth is understood as a dynamic body moving within a larger astronomical system.

Integrative	It connects astronomy, climate, seasons, time zones, weather, and environmental processes.
Bounded	It is bounded by Earth's motions, axial tilt, and their relation to the Sun.
Irreversible	The model becomes a stable explanatory framework for recurring planetary phenomena.

Related SciMaG learning activity: S1 and S2; G14

Geographical Map as a Threshold Concept

Maps are abstract representations of space that support spatial analysis and interpretation.

Threshold characteristic	Explanation
Troublesome	Learners must understand symbols, scale, projection, selectivity, and spatial relationships.
Transformative	Learners shift from observing space directly to analysing abstract spatial representations.
Integrative	Maps connect physical and human geography and support applications in ecology, history, economics, and GIS.
Bounded	Cartographic representations are bounded by conventions, scale, projection, and purpose.
Irreversible	Map-reading and spatial interpretation become durable skills.

Related SciMaG learning activity: S1 and S2; G14

Cartographic/Geographical Coordinate System and Position as a Threshold Concept

The coordinate system provides a precise framework for locating places on Earth.

Threshold characteristic	Explanation
Troublesome	Learners must coordinate latitude, longitude, hemispheres, reference systems, and spatial orientation.
Transformative	Geographical location becomes precise and systematic rather than approximate.
Integrative	It connects cartography, spatial analysis, physical geography, human geography, and GIS.
Bounded	The concept is bounded by conventions and reference systems used to define position.

Irreversible	Coordinate-based spatial reasoning becomes a lasting foundation for geographical analysis.
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Related SciMaG learning activity: S1 and S2; G14

References

Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education*, 49(3), 373–388. <https://doi.org/10.1007/s10734-004-6779-5>