

# Fallen Rocks: A Participatory Land Art Installation for Community Engagement in Bergslagen's Past and Present Mining Landscape

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## Abstract

Mining regions with long industrial histories face ongoing challenges related to community development, environmental legacies, and generational renewal, even where mining remains active. This paper presents *Fallen Rocks*, a land art installation in Bergslagen, Sweden, as an approach to community engagement in mining-related sustainability issues. Around forty locally sourced rocks form a labyrinth-like structure designed for physical interaction. The installation is complemented by digital experiences introducing mining processes, resource use, and environmental aspects such as energy, emissions, and water-related challenges. The project illustrates how cultural and participatory approaches can support dialogue on mining effects, resource management, and long-term environmental responsibility.

**Keywords:** Lindesberg municipality, digital tools, science education, STEM

## Introduction

### *Bergslagen – Historical context*

Bergslagen region in south-central Sweden has a long and well-documented mining history dating back to at least the 15th century, forming one of Sweden's most important early industrial landscapes. In small Bergslagen municipalities like Lindesberg, iron ore mining and copper extraction supported the development of local communities and contributed significantly to Sweden's economic and technological growth. Mining shaped not only the physical landscape but also social structures, cultural identity, and patterns of settlement, with generations of miners and their families forming the backbone of these communities (Fig. 1).

Over time, the region has undergone major transformations, from small-scale medieval operations to industrialized mining in the 20th century, followed by closures during the 1970s and 1980s driven by economic restructuring, global competition, and technological change. But mining has not disappeared from the region. Active operations such as Boliden Zinkgruvan

(Askersund), Boliden Garpenberg (Hedemora), and Lovisagruvan (Lindesberg), as well as ongoing limestone extraction, demonstrate continued importance of mineral production in Bergslagen.

This coexistence of historical mining environments and active operations makes Bergslagen a place where past, present, and future intersect in a tangible way. In this context, the introduction of a site-specific, land art-inspired installation offers a way to connect these different time perspectives through physical experience and reflection. The installation, *Fallen Rocks*, builds on the region's visible geological and industrial heritage and invites reflection on both the legacy of mining and its ongoing role in shaping sustainable futures. This perspective is also reflected in local political support. At the inauguration of *Fallen Rocks*, the Chair of the Municipal Executive Board in Lindesberg stressed the importance of preserving the region's history and described the integration of art into this context as "excellent" (pers. comm., inauguration of *Fallen Rocks*, 2025).



Figure 1 Mine workers in Stripa Mine in the 1930s. Photo source: Lindsberg Cultural Heritage Archive.

### *Metals, minerals and geoscience literacy for sustainable futures*

Future societies will depend heavily on access to raw materials for the energy transition, digitalization, and the development of sustainable infrastructure. This creates a need not only for technical solutions, but also for public understanding and engagement in questions related to mining, land use, and resource management. At the same time, to secure competence, attracting future generations to the mining sector is essential.

However, public perceptions of the mining sector remain challenging. A national Swedish survey showed that almost six out of ten respondents could not imagine working in the mining industry, while more than seven out of ten perceived a conflict between mining and environmental issues (SGU 2025). These attitudes are problematic in a context where society increasingly depends on responsibly produced metals and minerals, and where the industry is working continuously to improve environmental performance and sustainability practices.

Education therefore plays a key role in strengthening understanding of mineral resources, and the role of mining in sustainable development. Introducing children and young people to these perspectives at an early stage can help build both knowledge and engagement around complex sustainability challenges. Research also shows that learning is strengthened when information is connected to sensory experience and emotional engagement (Boström and Svantesson 1998; Dunn *et al.* 1992). Visualization and experiential learning approaches can help make otherwise abstract scientific concepts more tangible and meaningful (Cook 2006; Wu and Shah 2004).

Artistic and interactive approaches can hence complement traditional education by engaging multiple senses and inviting curiosity-driven exploration. By allowing visitors to physically and intuitively engage with geological materials, understanding of the role of metals and minerals in society can be deepened and support more informed discussions about sustainable resource use.



### *Artistic perspective and conceptual foundation*

The artistic concept of *Fallen Rocks* is rooted in the land art tradition, where artworks are created in direct relation to a specific landscape and often use natural materials found on site. For the artist Veronika Geiger, this approach is closely connected to an interest in geology, deep time, and the relationship between humans and the earth.

The idea of the installation emerged through visits to mining environments in Bergslagen, particularly the underground spaces of Boliden Zinkgruvan. These spaces were experienced as labyrinth-like structures, both fascinating and disorienting, leading to the development of a spatial concept where visitors move through an open maze of stones. The labyrinth becomes a metaphor for how humans navigate and try to understand the world, inspired in part by literary references and reflections on how children intuitively engage in complex environments.

The title *Fallen Rocks* carries multiple meanings. It refers both to the physical material, rocks that have been moved and reassembled, and to the often-overlooked human experiences connected to mining, including risk, labor, and loss. In this way, the installation introduces an existential dimension to the mining landscape, acknowledging that the materials underpinning modern society come at a cost. At the same time, the work remains open to interpretation, allowing each visitor to form their own understanding.

### **Methods**

#### *Development of artwork*

The development of *Fallen Rocks* was based on a close collaboration between artistic practice and scientific knowledge. The conceptual framework, spatial design, and material composition were led by the artist, while geological and contextual knowledge was contributed by the project partners. This transdisciplinary approach allowed different forms of understanding, analytical and experiential, to coexist within the same installation.

A central aspect of the artistic process was the strong connection to place. In land art practice, the location is an integral part of the work itself. The installation was therefore developed in direct relation to the Bergslagen landscape, its geological conditions, and its mining history. Through site visits, dialogues with miners, and field observations, the artist built an understanding of both the physical environment and the human experiences connected to it.

The design of the installation as an open, labyrinth-like structure reflects both the spatial experience of underground mining and a conceptual interest in movement, perception, and orientation. The intention was to create a space that visitors can enter from multiple directions, move through freely, and experience from within. Physical engagement is considered essential, as it enables a more immediate and sensory connection to the materials and the environment. The installation is intended to be used: walked through, touched, explored, and even played in, especially by children and young people, who are seen as naturally inclined to engage intuitively with such environments. By encouraging this type of interaction, the artwork aims to create conditions for reflection, curiosity, and personal interpretation.

#### *Rock collection and installation process*

Collection of rocks was carried out during the summer of 2025. All materials were sourced from the area surrounding Zinkgruvan in Askersund municipality, where the active mine operated by Boliden Zinkgruvan is located (Fig. 2).

Rocks were selected to represent a wide range of mineralogical compositions, as well as variation in size and shape. Following collection, the materials were temporarily placed in the parking area outside Zinkgruvan Mine Museum. At this stage, the artist documented each rock through photography and recorded characteristics such as colour, size, and form, forming the basis for a detailed layout plan and spatial design of the installation.



The rocks were transported from Zinkgruvan to Lindesberg in November 2025 and temporarily stored near the installation site. Ground preparation was carried out over one day, during which the topsoil was removed and replaced with a base layer of coarse rock material (20–50 mm), followed by a layer of gravel (0–16 mm).

### Digital tools

In parallel with development of the artwork, a set of digital tools consisting of games and interactive environments were developed through collaboration between geoscientists, educators, and digital designers with the aim of translating complex mining-related concepts into accessible and engaging formats.

The work focused on identifying key themes in the mining value chain and exploring how these could be communicated through interactive and experience-based learning. Attention was given to lowering barriers to engagement, by emphasizing interactivity, and curiosity-driven learning. The digital layer was integrated into the artwork using QR codes (Tab. 1).

Together, these tools broaden the understanding of mining beyond extraction, addressing the full lifecycle of materials and introducing environmental aspects such as energy use, emissions, mine water management, contamination risks, and long-term stewardship of former and active mining areas.

## Results and Discussion

### *Installation and inauguration as a social process*

*Fallen Rocks* was assembled according to plan during one working week in mid-November 2025, and inauguration took place in December (Fig. 3). The inauguration event brought together residents and representatives from the regional mining sector. It began with presentations at the local library, followed by a joint visit to the installation site, where the artwork was formally introduced through a ribbon-cutting ceremony.

The event can be understood as both a symbolic and practical handing over of the installation to the community of Lindesberg. Notably, the artwork was immediately taken into active use, with visitors entering and exploring the labyrinth. Digital components also attracted notable interest during the inauguration, with many visitors asking questions about their content and use. This early interaction suggests the potential of the installation to function as an open and shared space.

### *Experiential engagement and accessibility*







This type of interaction aligns with previous research emphasizing the importance of physical accessibility and participation in shaping visitor experiences in art–science contexts. Such environments can facilitate states of ‘flow’, characterized by immersion



Figure 2 Collection of rocks and documentation, summer 2025, Zinkgruvan, Askersund municipality.



Table 1 Name of games, area they cover and QR-code to access the game.

Drillrunner	Mine Rider	Connect Rush	Slingshot Savant	Periodic Slingshot	Ore Scanner
Exploration, underground mining practices.	Exploration, underground mining practices.	Large-scale mining systems, connectivity.	Metals in society and global distribution.	Metals in society and global distribution.	Links to everyday life.
					

and engagement (Renowden *et al.* 2022), and support learning processes where understanding emerges through movement, sensory experience, and reflection.

Research on art–science practices also shows that immersive and participatory approaches can strengthen both cognitive and emotional engagement with complex environmental issues, making abstract concepts easier to relate to and reflect upon (Xu 2025). In *Fallen Rocks*, the possibility to move through, touch, and explore the installation creates similar conditions, particularly for children and young people, who often engage intuitively with materials and spatial environments.

Participatory and aesthetic approaches such as *Fallen Rocks* may also broaden participation by reaching audiences who are less likely to engage with traditional forms of science communication. Similar observations have been reported in school-based environmental projects in Bergslagen, where pupils showed increased interest in science and sustainability issues when working with local mining-related environmental challenges through practical and participatory activities (Sartz and Bäckström 2014). Previous studies further indicate that science-based art exhibits can increase interest in scientific topics, particularly among visitors without a formal STEM background, suggesting that such formats can lower barriers to engagement (Ricci *et al.* 2023).

At the same time, arts-based and outdoor learning approaches have been shown to strengthen individuals’ sense of connection to the natural environment and foster emotional

engagement with environmental issues (Gray and Birrell 2015). Within environmental ethics, similar ideas are reflected in discussions of land art, where working with natural materials and landscapes can contribute to a deeper appreciation of nature and encourage more reflective attitudes towards environmental responsibility (Brady 2007).

It is anticipated that *Fallen Rocks* may contribute to increased awareness of the relationship between natural resources, industrial activity, and everyday life, although these longer-term educational and community effects remain to be evaluated.

*Future work and long-term engagement*

Future work will focus on evaluating how the installation functions over time as a platform for dialogue, learning, and community engagement. Planned activities include collaborations with local schools, recurring public events connected to Geology Day, and continued dialogue with the municipality and regional stakeholders. Future studies could also explore how participatory and place-based art installations influence young people’s interest in geoscience, mining, and environmental sustainability, as well as perceptions of mining-related environmental challenges such as land and water management.

**Conclusions**

This paper presents *Fallen Rocks* as a transdisciplinary approach that combines art, science, and local collaboration to engage communities in mining-related sustainability issues. By integrating a site-specific land art installation with digital educational tools,



Figure 3 Fallen Rocks in Lindesberg, Sweden, December 2025.

the project demonstrates how physical experience, materiality, and interactive learning can contribute to dialogue on resource use, environmental responsibility, and the societal role of mining.

An important insight from the project is the value of creating open and accessible spaces for dialogue, where different perspectives, local, industrial, scientific, and societal can meet. Such approaches may support increased understanding of complex issues related to mining, including environmental impacts, mine water challenges, legacy issues, and long-term stewardship of land and water. At the same time, the project highlights practical considerations that should not be overlooked, such as long-term maintenance, safety aspects, and the integration of public installations into everyday environments.

The installation is intended to function as a lasting meeting place in Lindesberg, offering opportunities for reflection, learning, and engagement over time. Through the combination of physical and digital elements,

*Fallen Rocks* may contribute to a broader understanding of the importance of metals, minerals, and geoscience in modern society, while encouraging more informed and inclusive dialogue on sustainable mining and future resource management.

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### References

- Boström L, Svantesson I (1998) Learning styles in practice. Jönköping: Brain Books AB [in Swedish]
- Brady E (2007) Aesthetic regard for nature in environmental and land art. *Ethics Place Environ* 10(3): 287–300
- Cook MP (2006) Visual representations in science education: the influence of prior knowledge and cognitive load theory on instructional design principles. *Sci Educ* 90(6): 1073–1091



- Dunn R, Dunn K, Treffinger DJ (1992) All children are talented – in their own way. Wiley [in Swedish]
- Gray T, Birrell C (2015) ‘Touched by the Earth’: a place based outdoor learning programme incorporating the Arts. *J Advent Educ Outdoor Learn* 15(4): 330–349
- Renowden C, Beer T, Mata L (2022) Exploring integrated ArtScience experiences to foster nature connectedness through head, heart and hand. *People nat* 4(2): 293–587
- Ricci K, McLaughlin B, Hua J (2023) Impact of a science art exhibit on public interest and student comprehension of disease ecology research. *J Microbiol Biol Educ* 24(1): 1–8.
- Sartz L, Bäckström M (2014) Chemistry and environmental research as a part of education – an example from Sweden. In: Oral AY, Bahsi ZB (eds) 1st Int Con Exhib Curr Trends Sci Tech Educ, p 27-32, SCITEED 2014
- SGU (2025) Attityder till svensk gruvnäring 2024 – Novusrapport. Geological Survey of Sweden (SGU), Uppsala, Sweden [in Swedish]
- Wu HK, Shah P (2004) Exploring visuospatial thinking in chemistry learning. *Sci Educ* 88(3): 465-492
- Xu C (2025) From art to action: Case studies of art-science in creative practices. *J Mus Educ* 50(2): 210–224