

GOAL EDUCATIONAL RESOURCE

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TITLE OF THE CASE	Can we dare say modern society does not need mineral raw materials?
SHORT CASE DESCRIPTION	Mining is an activity that has been done for ages all over the world. Nevertheless, it is undeniable that it causes environmental impacts in sites that have a profound ecological and cultural importance to the people who have lived there for many years. Mining damages are not only about the land and environment, they are also about people. But can we dare say we can live without it? In this case we explore the possible lithium mining in Portugal where huge controversies are being established between inhabitants, mass media, geology experts and mining companies.
KEYWORDS	Geoethical values; Lithium; Mining; Transparent communication.
PRIOR KNOWLEDGE	Exploitation; Exploration; Mineral resources; Mining.
AIM	Promote a reflection about the increasing demand for minerals from developing countries and upon transparent dissemination of information by all actors directly involved in mining.
OBJECTIVES	<ul style="list-style-type: none"> • To defend social and cultural values to preserve the land where mining is made. • To appraise the need for mineral resources in the smooth running of modern society life in the 21st century. • To explain geoscientist work to better preserve the land and environment in mining sites. • To value the sense of respect for those who live in a land for thousands of years. • To defend a concrete commitment to managing the economic, social and environmental challenges related to mining and ensure responsible extraction of minerals. • To select open communication strategies engaging all actors involved in mining process. • To plan trusting and transparent dissemination by all actors directly involved in mining in order to promote a sustainable benefit for all parties.

- To judge activities that do not protect the environment and do not minimize nor mitigate negative impacts on land and communities.

CASE

FIRST SCENARIO:

Lithium (Li) is the third element of Mendeleev's periodic table (fig.1). Currently, given the lithium's properties and its main compounds, such as carbonates, chlorides, and lithium hydroxide. This element has high potential recognized applied to technology, especially green technologies, presenting a great economic and environmental importance.

In Portugal, there are several regions with high potential for lithium exploration, located mainly in the north and center of the country. The possible exploitation of lithium in Portugal has caused great controversy, mainly in the populations near the potential exploration and exploitation zones.

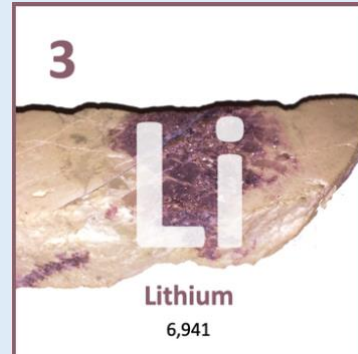
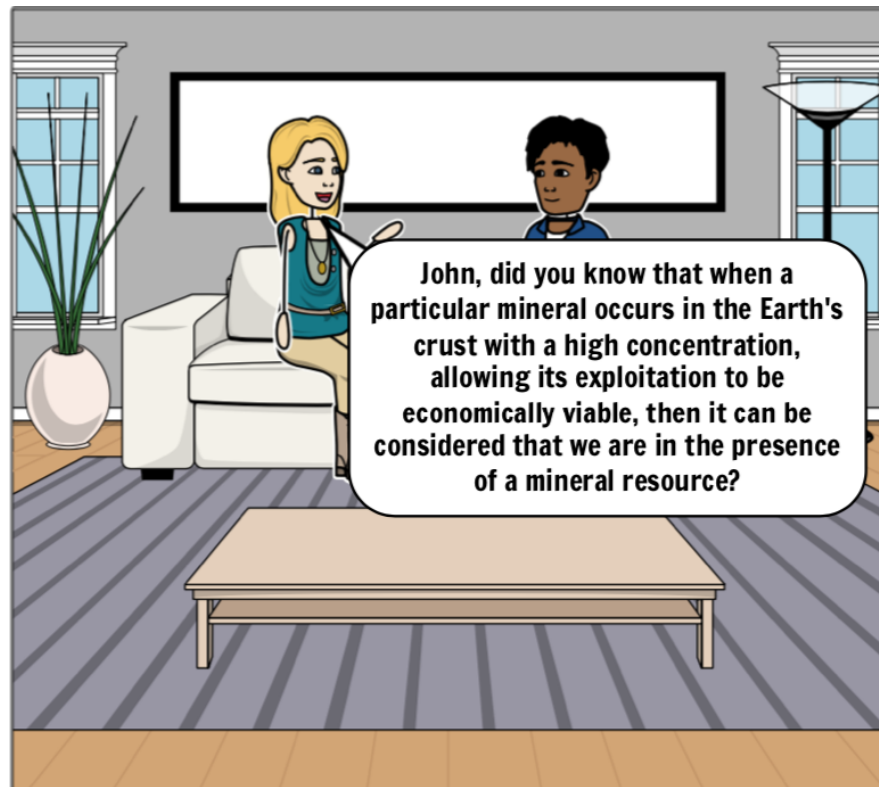
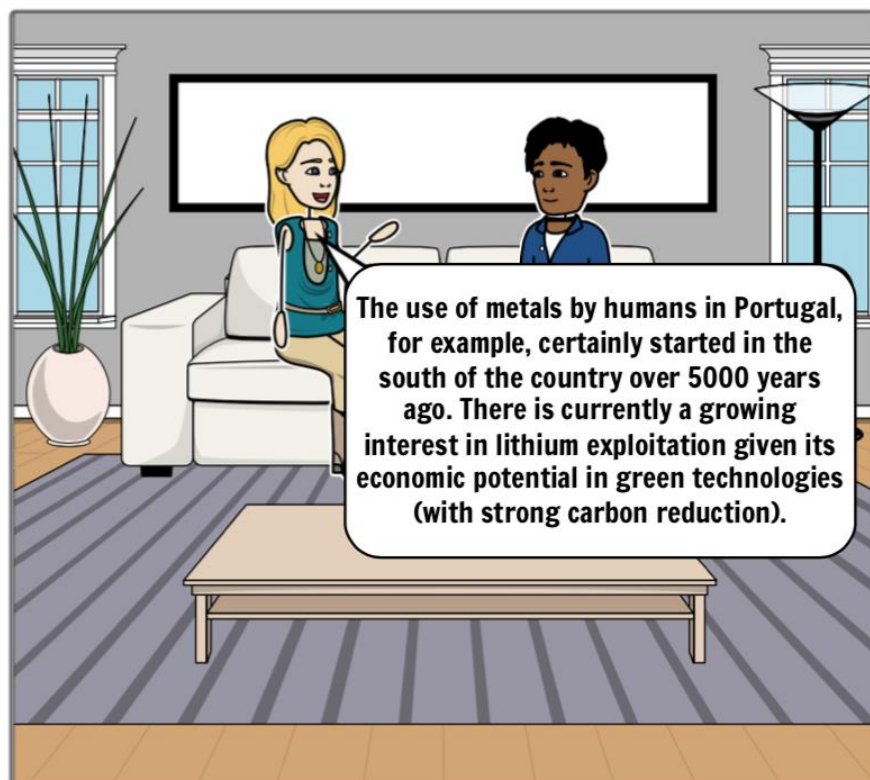
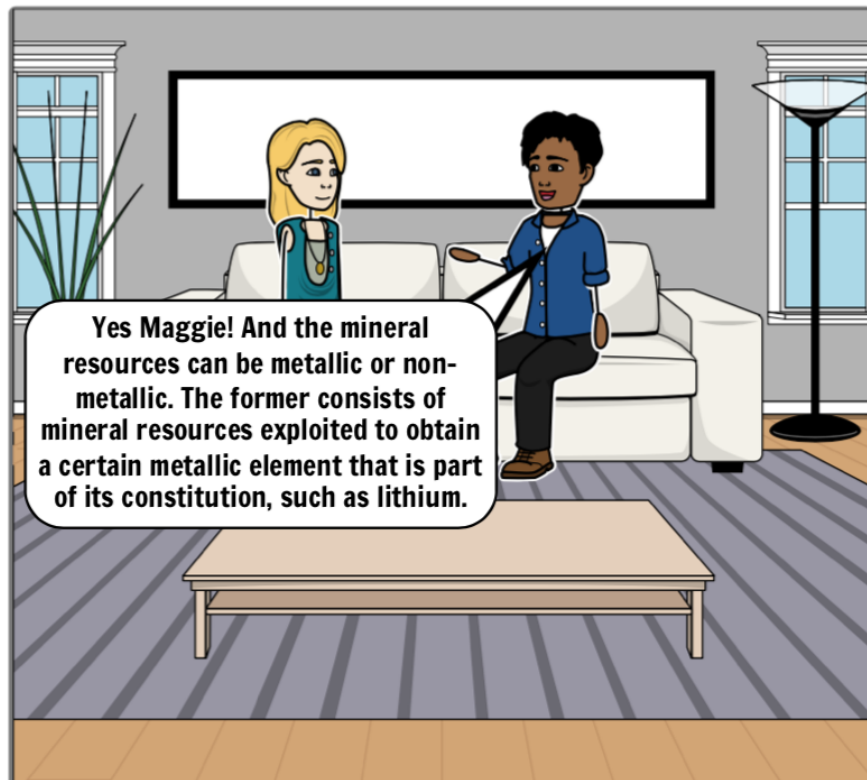
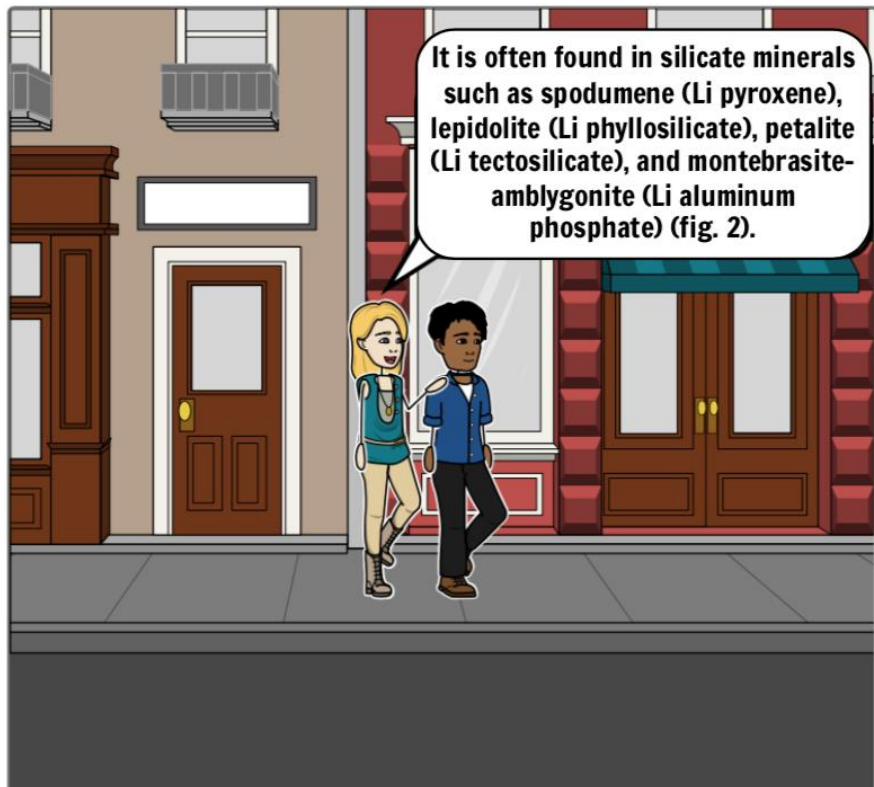


Fig. 1 – Lithium: present on lepidolite mineral (Li phyllosilicate). Credits: Tiago Ribeiro (2019).

1. Read the dialogue about the lithium, also known as Portuguese white petroleum.







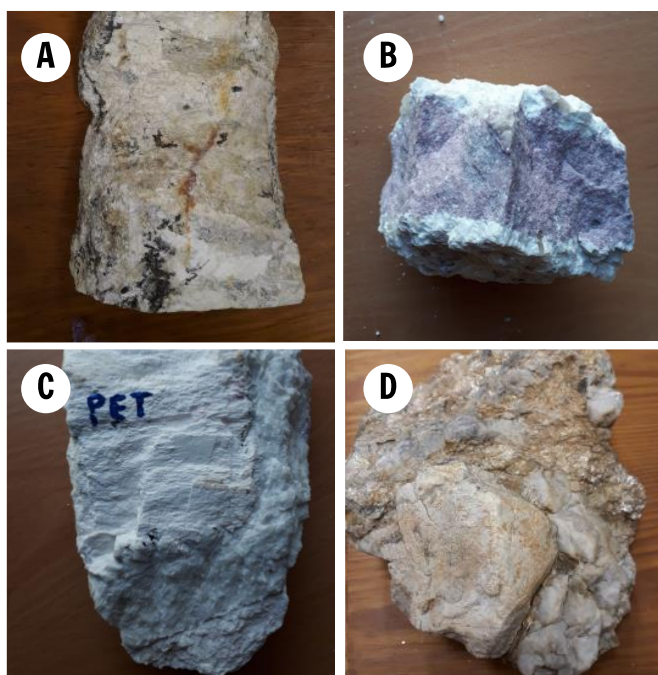
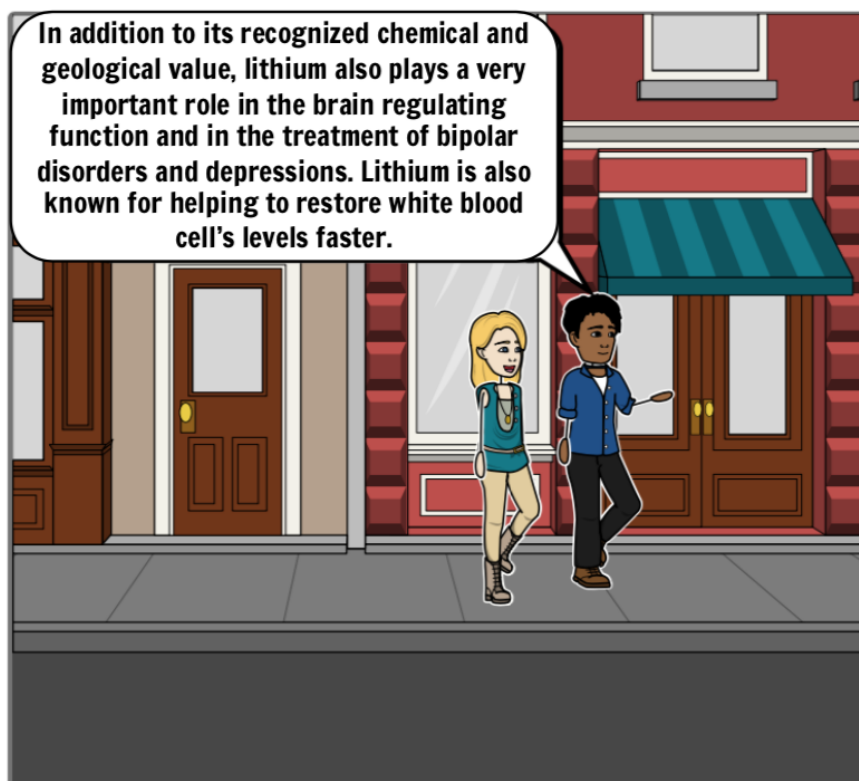
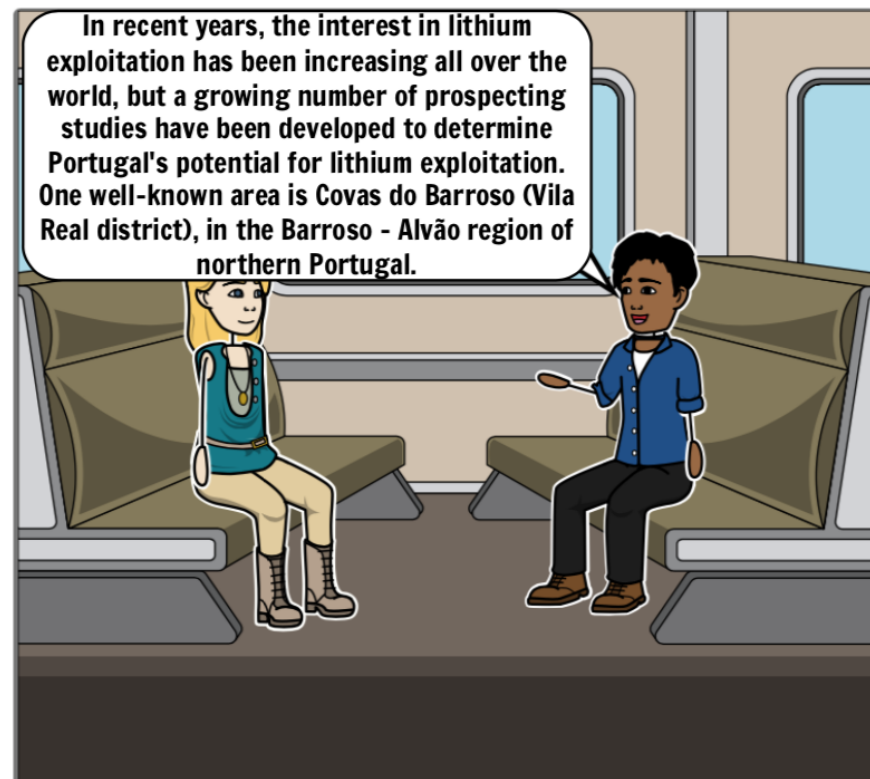
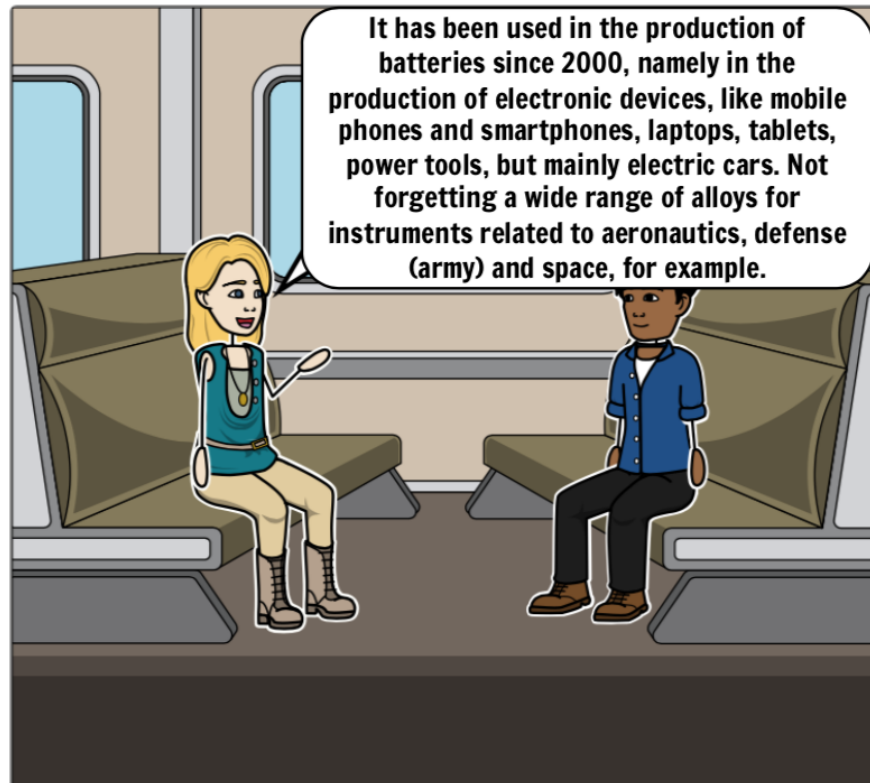


Fig.2 - Lithium minerals' hand specimens: A. Spodumene (Li pyroxene); B. Lepidolite (Li phyllosilicate); C. Petalite (Li tectosilicate); D. montebrasite-amblygonite (Li aluminum phosphate). Credits: Alexandre Lima (2019).





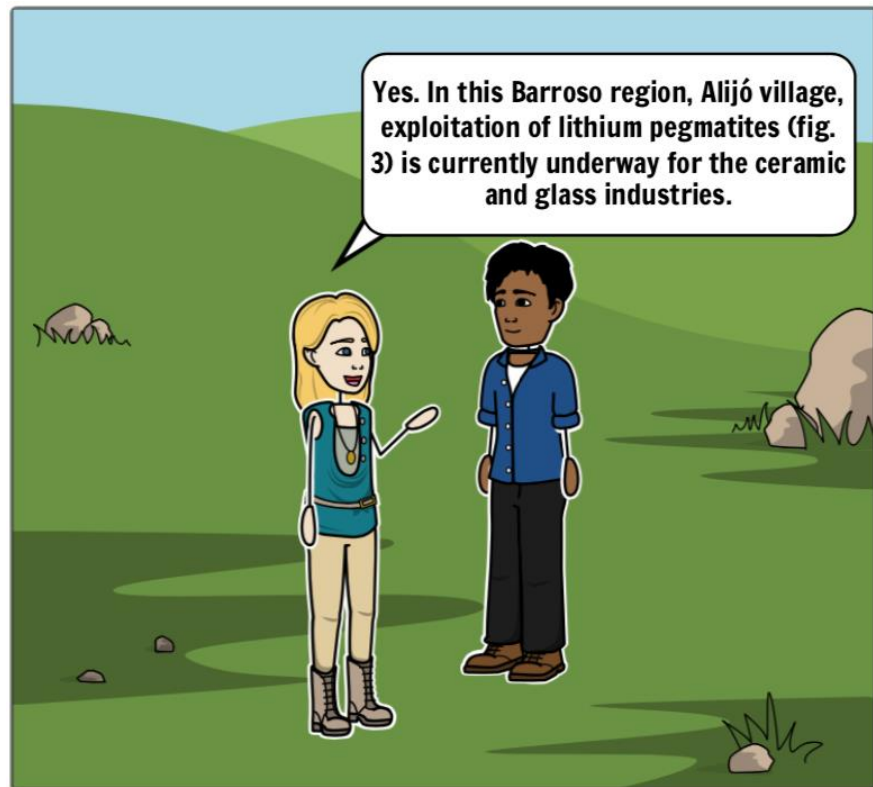
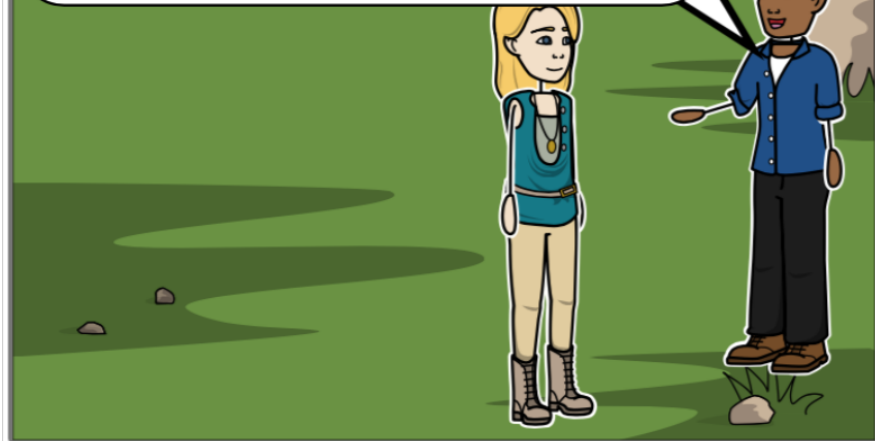


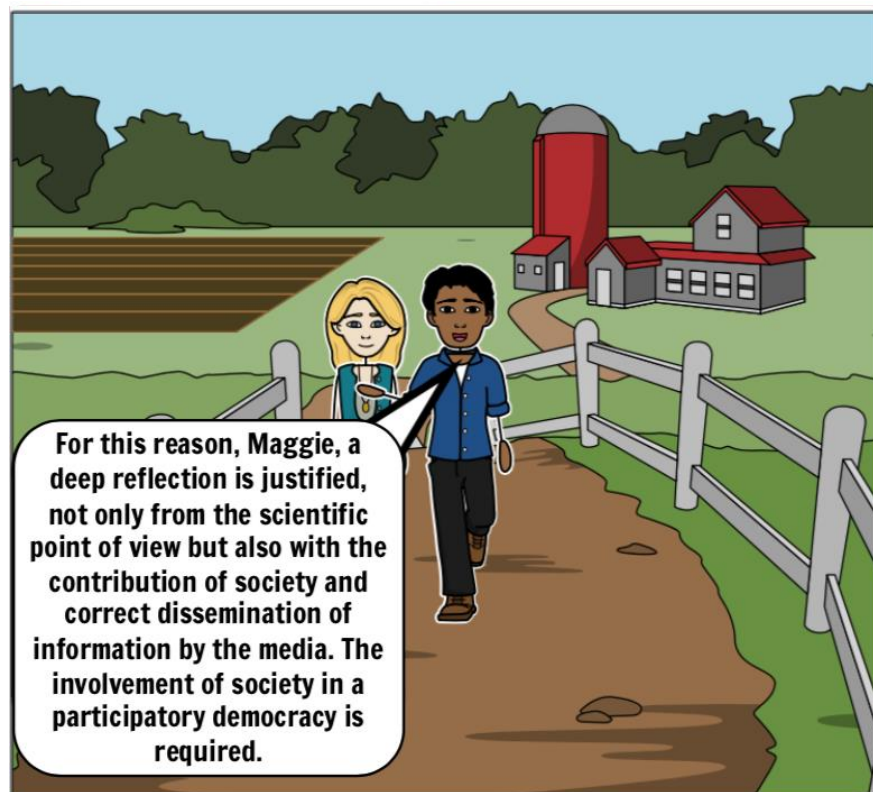
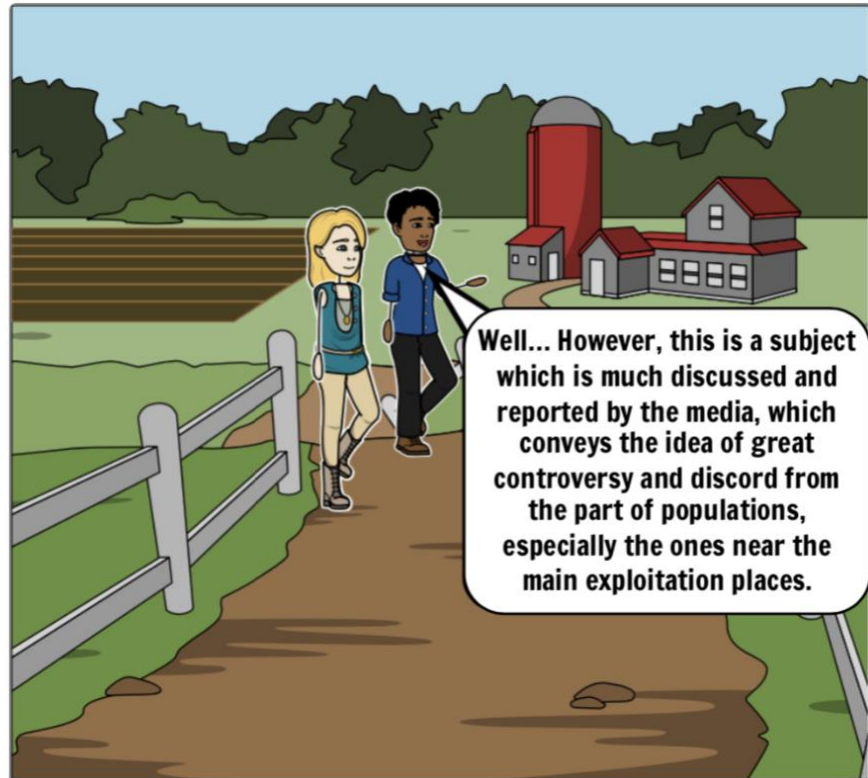
Fig.3 – Lithium pegmatite exploitation in the village of Alijó (Barroso's region). Credits: Alexandre Lima (2019).

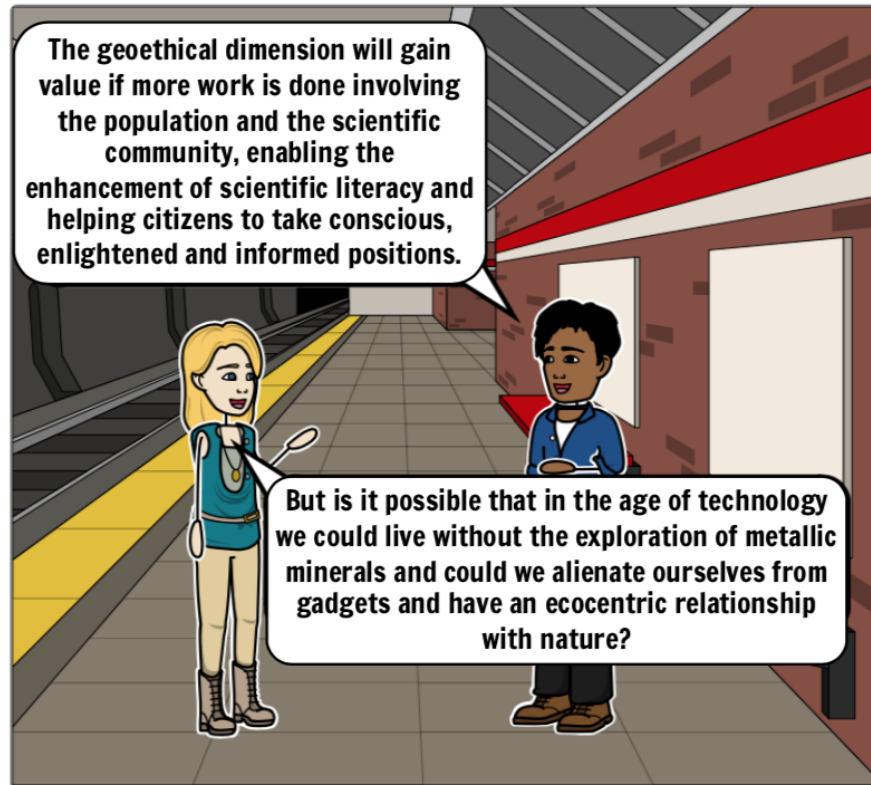
The Portuguese possible case of lithium exploitation has been discussed, similarly to other countries, given the increase in lithium consumption, which has registered a significant increase in recent years. Lithium production has been largely done in countries such as Chile, Australia, and Argentina. Nowadays, although the main sources of lithium are litiniferous brines, spodumene is the most widely exploited lithium ore, notably in China, Australia, and Brazil. It is likely to return to the United States, Canada, and Russia.



I know. Given that the spodumene's reserves in Portugal are considered equivalent to those in Finland - where the first European lithium exploitation is about to start -, some experts think that Portugal's reserves should be also a target of research, encouraging its application on the lithium batteries.





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Clever Prototypes, LLL © 2019**SECOND SCENARIO:**

The possibility of spodumene-based lithium deposits' exploitation in Covas do Barroso (Portugal) is being discussed. This public controversy has created a vast deal of information from the media, leading to the existence of radical opinions in society, particularly in the inhabitants of this region. Although there is talk about the existence of lithium mining activities in Barroso, these activities are still under analysis. Before advancing the lithium exploitation, a favorable environmental impact evaluation study is compulsory. Without it, the companies are simply authorized to perform prospecting operations.

	<p>1. Watch the video https://youtu.be/SVfUk32LmgQ.</p> <div data-bbox="477 271 1348 759" data-label="Image"> </div>
<p>QUESTIONS</p>	<ol style="list-style-type: none"> 1. What are the consequences of a not correct dissemination of mining procedures by all actors involving in the mining process? 2. How important is the mining process dissemination given by the mass media to inform inhabitants? 3. Suggest ways of how the negative impacts in environment and local communities can be minimized and mitigated? 4. List a plan of rehabilitation based on environmentally and socially sustainable standard elements and management systems in a mining site. 5. Can we dare say modern society does not need mineral raw resources? - compile a list of resources you use everyday that depend on raw materials to be built (you can start with your <i>smartphone</i>...).
<p>PROCEDURE</p>	<ol style="list-style-type: none"> 1. Watch the video <i>Geoethics and responsible use of geo-resources</i> (https://www.youtube.com/watch?v=G1eRIoV_6uw). 2. Read the <i>White paper on responsible Mining</i> written by IAPG Task Group on Responsible Mining (https://goal-erasmus.eu/wp-content/uploads/2018/10/White_Paper_on_Responsible_Mining_IAPG_2017.pdf) and think in possible answers for the questions. <p>Important links:</p> <ul style="list-style-type: none"> • https://www.publico.pt/2019/05/13/economia/opinioao/litio-metal-futuro-portugal-1872284?fbclid=IwAR1GdfDswTzhYnOQ6gKzG_ulj54gtc7wzuE3SL%20tyfgkV7qbL6tw1hK1ghdU • https://www.youtube.com/watch?v=IXawf9OBOyw
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