

MINERAL RESOURCES WORKSHOP (DIDACTIC SUITCASE)

This workshop is based on a set of ten minerals, six of them metallic (cinnabar, sphalerite or blende, galena, magnetite, malachite and wolframite) and four non-metallic (fluorspar, lepidolite, kyanite and feldspar). Students must relate the aforementioned minerals with everyday objects, such as thermometers, mobile phone batteries, toothpaste, light bulbs, horseshoes, cables, etc. The objective of the activity is to familiarize the students with the mineral ores from which the metals come (in the case of metallic minerals) or the non-metals with which these objects have been manufactured. To accomplish this, the objects and the minerals will be presented and accompanied by various clues which will help to relate them to the objects. The clues are numbered from 1 to 4, so that the degree of difficulty decreases. That is, clue number 1 is more difficult than clue number 4.

We will work with a dozen minerals and, if possible, with a maximum of 15 students per pack. It will be best to work simultaneously with 30 participants, which is usually the average number of students per class in Secondary Education. For that reason, the didactic suitcase contains two packages with a total of two sets of clues-cards, two sets of minerals and two sets of objects. Two instructors are needed to act as teachers, one for each team. With the help of the mentioned clues, each team must relate the mineral with its uses. Attached is a table in which the obtained scores should be written down according to the successes or failures. Once the activity is done the teacher can summarize the workshop and add some additional information using a presentation which contains explanations and figures of other applications and uses of the metallic minerals, the main deposits from which they come, their abundance and their interest in the industry.

The suitcase contains two packs, each one of them with a set of minerals and other set of objects, in order to organise two teams to compete among them.

OPERATION OF THE WORKSHOP

Two teams of students and two instructors are established (they can be two teachers or two students). The material is presented in two trays (not included in the suitcase): one with the minerals and another with the objects. The group chooses one of the ten minerals, the one they prefer, and the monitor tells them what mineral it is (in case the students do not know the mineral). If, for example, the group chooses malachite, the instructor will tell them to try to relate that mineral to the object that has been made from it. In this case it is the cable, since malachite is a carbonate of copper and the cables are made of this metal. If the team is able to relate the object to the mineral in the first try, you will get a direct hit that is valued with 5 points. This score will be noted by the instructor in the attached table. The team may risk relating an object to the mineral in question. In this case, if they fail, 0 points will be noted. The instructor should recommend that they should always use the clues, because this way you can make sure that you have some points. If the team is not able to relate the mineral to the object, you can request the first clue to the monitor. In this case, the clue says: "The metal that forms this mineral is soft and red. Its generalized use gave name to the Chalcolithic period, established from the year 5000 B.C. "

If, with this clue, the team finds out that the cable is the object related to the malachite, they will score 4 points (success with clue 1). If this is not the case, they will have to ask for clues until they finishes them. Clue 4 equals 1 point and is always immediate. That is using that clue the correct reply is assured. - This procedure should be used with all pieces, removing the ore

and the object from the trays once they have been successfully linked. This way difficulty decreases as the game progresses, as fewer and fewer objects and minerals remain. - Once the relationship between objects and minerals has been established, all the points will be added up and one of the two teams will be the winner.

MATERIAL INCLUDED WITH THE SUITCASE

The didactic suitcases include the following elements:

- 10 minerals: kyanite, cinnabar, sphalerite or blende, fluorite, galena, lepidolite, magnetite, malachite, wolframite and feldspar.
- 10 objects: a thermometer embedded in resin to prevent deterioration, a horseshoe, a coffee dish, a fishing line, a mobile battery, a zinc plate, a soda can, a light bulb, electrical cables and an empty tube of toothpaste.
- An hourglass that can be used to measure the time of each team in guessing the answers. This is left to the instructor's choice, but its use is recommended because it speeds up the development of the activity.
- A pen drive with a presentation to reinforce in class the knowledge acquired in the development of the workshop.
- 40 plastified sheets with the necessary clues to relate the minerals to the objects (4 clues per mineral).
- A table that will serve to record the scores obtained by the two teams.
- A table with the solutions of the workshop.
- A sheet with the characteristics of the ten minerals included in the clues. They can be photocopied and handed to the student after the activity.