

Grade 8 Natural Science Worksheet

Mining

Rocks are made up of minerals. Some rocks contain minerals which are metals. Gold, copper and iron are examples of metals that can be found mixed in with rock. These metals can be mined from the rock in which they are found. Other minerals can be found as crystals within the rock itself, or in veins in the rock. Precious and semi-precious gems can also be mined from the rock.

Part One: Research on mining

You will need to do some research on mining in order to answer these questions.

1. How are minerals and precious gems removed from deep under the ground?
[10]
2. Name 10 different metals or gems that are mined in South Africa. Say where these minerals are mined in South Africa.
[20]
3. Which do you think is the most important mineral in South Africa? Why do you say this?
[4]
4. Are minerals, precious metals and gems renewable or non-renewable natural resources? Give reasons for your decision.
[2]

Part Two: A debate about a hypothetical situation

This activity is a debate about a **hypothetical** situation. That means that although the situation is not real, it could be happening somewhere in South Africa or it might have happened in the past, or could happen in the future. You need to think about the **ethics** in this situation. Ethics are moral issues of what is right and what is wrong. The members of your class must role play the following situation, in the form of a debate.

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Peaceville is a small town on the coast. It is an area of great natural beauty with rare birds and insects living in the river which has its estuary at Peaceville. The air is unpolluted and the people are content to live together in their quiet little town. One day, a young boy who lives in Peaceville discovered a precious mineral along the banks of the river, 5km outside Peaceville. Very soon, the media had heard about this discovery and Peaceville changed forever. The State immediately claimed ownership of the whole town and surrounding areas. Mining companies moved into the area to investigate the extent of the deposits of the valuable mineral. Conservation organisations began to protest the way the environment was being ruined and the fact that the rare birds and insects may go extinct.

Who owns Peaceville and its valuable mineral deposits?

Rubric to assess participation in debate

Criteria	Level 4 [4]	Level 3 [3]	Level 2 [2]	Level 1 [1]
Learner cooperated during the debate and was well disciplined.	Outstanding.	Good.	Satisfactory.	Poor.
Learner contributed to the debate in a meaningful fashion.	Outstanding.	Good.	Satisfactory.	Poor.
Learner role played the part ascribed to him/her.	Outstanding.	Good.	Satisfactory.	Poor.
Learner was able to use the debate in order to come to a personal opinion on the subject.	Outstanding.	Good.	Satisfactory.	Poor.

[16 marks]

Part Three: Negative aspects of mining

The mining of minerals and gems can make a country very wealthy. Mining also provides jobs for thousands of people. However, mining is not without its risks and negative aspects.

What are the negative aspects associated with mining? Write your ideas in point form.

[12 marks]

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Suggested Solutions

Question number	Possible marks	Solution
1.1	10	<p>Learner answers will vary; mark accordingly. These are some points that could be present in learner answers:</p> <p>Rocks containing useful or valuable minerals are mined from the ground in a number of ways, ✓ depending on the form in which the mineral to be mined is found. ✓ Metal ores and veins of crystals ✓ are mined in different ways. The mining technique used will also depend on the depth, value and amount of the metal ore or veins of gems. ✓</p> <p>If the valuable mineral is found in large amounts underground, tunnels are dug beneath the earth's surface to reach it. ✓ Ore and veins near the surface of the earth can be dug out from an open pit. ✓</p> <p>Once the rock containing the valuable mineral is brought to the surface of the earth, a number of processes exist to extract the gems or metal. ✓</p> <p>The rock containing the ore is crushed ✓ and then smelted ✓ to extract the metal. Gems are carefully cut from the rocks they are embedded in. ✓</p>
1.2	20	<p>Learner answers may vary:</p> <p>Gold (Gauteng, eastern Mpumalanga), silver (Welkom), diamonds (Kimberley, North West coast, Pretoria), coal (southern Gauteng, Mpumalanga, Newcastle), platinum (Ermelo, North West), copper (Springbok), lead (Aggeneys), zinc (Aggeneys), chromium (North West, Limpopo Province), iron (Western Cape, Upington, North West), tin (Limpopo Province), titanium (Richards Bay), uranium (Welkom, Klerksdorp, southern Gauteng, Phalaborwa), vanadium (North East, Limpopo Province, Phalaborwa), manganese (Upington, Mpumalanga), limestone (Western Cape, Kimberley, Port Elizabeth), other precious and semi-precious gemstones (Northern Cape, Phalaborwa)</p>
1.3	4	Learners must choose the mineral they consider to be most important and justify their decision.
1.4	2	Minerals are non-renewable natural resources that were formed millions of years ago and cannot be replaced.
2	16	Facilitate the learners' debate. Help the learners to see all sides of the argument/debate into land ownership, mineral rights and personal rights. The learners may have to do some research in order to fully benefit from the debate.
3	12	<p>Mining often destroys natural environments. Mining for a single tonne of ore can produce thousands of tonnes of waste rock and sand which may be spread out over a large area. ✓✓</p> <p>Plant and animal life in areas around a mine may be badly affected. ✓✓</p>

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		<p>Water sources may be polluted when wastes are pumped into water supplies. ✓✓</p> <p>Air may be polluted as a result of the mining process. ✓✓</p> <p>People living in mining areas may have greater chances of developing infections and lung disorders such as asthma due to air pollution. ✓✓</p> <p>Mining is a hazardous occupation. Miners are often trapped underground or hurt and killed in mining accidents. ✓✓</p>
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Appendix of Assessment Tools

Rubric to assess participation in debate

Criteria	Level 4 [4]	Level 3 [3]	Level 2 [2]	Level 1 [1]
Learner co-operated during the debate and was well disciplined.	Outstanding.	Good.	Satisfactory.	Poor.
Leaner contributed to the debate in a meaningful fashion.	Outstanding.	Good.	Satisfactory.	Poor.
Learner role played the part ascribed to him/her.	Outstanding.	Good.	Satisfactory.	Poor.
Learner was able to use the debate in order to come to a personal opinion on the subject.	Outstanding.	Good.	Satisfactory.	Poor.