Minerals and Mining

Minerals in our houses

If you look around in your house you will find walls made of mud bricks or just mud joined with cement and sand. Your house may be whitewashed with white lime. Your floors may be paved with Kadapa stones. Pillars and rafters may be made of granite stones. You may be wearing ornaments made of silver or gold. You might have silver or copper, lead, chrome, aluminum etc. You may be using copper for preparing granite blocks and sell them off, can we plant another rock or make it in some way? Since it is not possible to regenerate these resource they are called non-renewable or finite resources. Most minerals are non-renewable. If we continue using them we will reach a stage when we will not have any more of it. Let us take the case of gold: it occurs in very limited quantities in deep mines. The only gold mine in India—the Kolar Gold Fields had to be closed down. Similarly coal or petroleum. There is only a limited amount of these available on the earth. If we finish them then there will not be any more of it. These are called non-renewable sources of energy.

Classify the following natural objects into renewable and non-renewable resources. Put a tick (✓) against those which are minerals and cross (×) which are not minerals.

<table>
<thead>
<tr>
<th>Minerals and Mining</th>
<th>Non-renewable Resources</th>
<th>Renewable Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>×</td>
<td></td>
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<tr>
<td>Iron ore</td>
<td>✓</td>
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Some important minerals and their uses

You may already know about the uses of some minerals like iron ore, sand, petroleum, limestone, coal etc. In modern industry we use many kinds of minerals. Hence, these minerals have become very important in our lives. Uses of some important minerals are given here. You can look up your library for more information and even check on the internet about them.

Bauxite: Aluminum is extracted from bauxite ore. Bauxite has become an important mineral in our times because of its light weight. It is used in making aircrafts, utensils, electric wires etc., and also extensively in packaging of food products.

Mica: It is a shiny mineral and is used extensively in electrical and electronic industry. It has many properties which make it useful—it can be thin, it is a non-conductor of electricity and heat.

Iron ore: It is a heat resistant mineral which is used extensively in industry and also for household roofing. However, it is known to be very bad for health of those working on them, and its usage is not being banned all over the world.

Chrome: It is used for preparing ‘stainless steel’ utensils. Since it does not corrode (unlike iron or copper) it is used both for cooking food and also for storing industrial liquids like acids.

Asbestos: It is a heat resistant mineral which is used extensively in industry and also for household roofing. However, it is known to be very bad for health of those working on them, and its usage is not being banned all over the world.

Barite: This is a group of ores from which an element called Barium is extracted. Barium is used for industrial and medical purposes. Barite is also used in drilling deep holes for petroleum and natural gas.

Feldspar: It is one of the raw materials used in making of glass and ceramic ware (like wash basins etc).

Mineral Resources of Andhra Pradesh

Andhra Pradesh is very rich in mineral resources. It is a large producer of granites of various colours, Kadapa stones, etc used in buildings. It also produces limestone and dolomite used in cement industry. Northern districts have large coal deposits (Kothagudem in Godavari valley) while the Krishna-Godavari basin has great potential for mineral oil and gas. AP is historically known for its famous diamond mines too and some of the largest diamonds in the world were found here.

In addition to these we have large deposits of asbestos, barites, mica, chrome, feldspar, vermiculite, etc.

<table>
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<tr>
<th>Mineral Resources of Andhra Pradesh</th>
<th>District</th>
<th>Mineral</th>
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Minerals and Mining

Mining the Minerals

Minerals can be taken out for use by humans through a process of mining or digging the earth. There are several ways of mining – we can just make a large pit and keep extracting the minerals. We can blast and remove granites, barytes etc. This is called open-cast mining. We can build underground tunnels to mine minerals that lie very deep. This is called underground mining. Just as we use a well or drill a tube well to get mineral water, we can drive very deep tube wells to get crude oil or natural gas. In many places china stone is obtained by drilling into sea bed like in Bombay High near Mumbai.

Most of the mining practices result in disturbing the surface area—it can mean cutting down forests, destroying fields and habitations, creating large pits or mounds. Mines also need large amounts of water to wash the minerals. This results in polluting the nearby rivers and water sources. This usually means that older use of the land cannot be continued and farmers or tribal people have to leave the land. Even people who live nearby face problems created by mining. At the same time mining employs a large number of people who come to live in nearby areas and build new habitations. It thus provides livelihood for nearly 10 lakh people in India and over one lakh people in Andhra Pradesh. The work of miners is also very hazardous, as they are constantly exposed to accidents besides breathing in poisonous substances which cause long term health damage.

Look at the following picture and guess which of them is open cast mine, underground mine and drill mining for oil (Fig. 6.1, 6.2, 6.3).

If there is mining activity in your area find out about the people who work and live there and also about how it affects the environment around it. Also find out how many people benefit from it.
To whom do the Minerals Belong?

Minerals usually occur deep in the earth. They in fact do not belong to any particular owner but belong to all people of the country and have to be used in everyone’s interest. That is why all mineral wealth of a state is considered the property of the government. The government uses the minerals keeping in mind the interests of all people of the country.

How does the government use the minerals?

At the time of independence mines were mostly owned and operated by private owners and companies. They were interested only in getting as much as possible in short time and did not care for proper development of the mines or about the safety of the workers. In 1970s the government took over all mines. It owned and operated most of the mines and sold the minerals to various factories or traders or exported them. In this way it was able to control the extent of mining so that there is no over exploitation or use of methods which were dangerous or harmful to people, especially the workers. It could also ensure that the important minerals like fuels, precious metals etc., were mined for public use and not for private profit.

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Danger and Safety Measures

The safety officer also explained to us that it was always a risk to go down as accidents may occur. A tunnel may fall down or get flooded by water or there can be fire and suffocation due to poisonous gases. He explained that the mine management has developed elaborate safety arrangements to prevent such accidents and that we should also take necessary precautions. He also explained how to face such accidents with the help of the safety kit. We put on the safety kit and got ready to go down. We reported at muster point for online registration.

● Can you name these instruments?
● What is the use of the stick?

Why is there a light on the helmet?

Did you identify the lamp in the picture? What purpose does it serve?

Now we reached the entrance of the mine. Actually this is a lift that carries people in and out of the mine. The two of us and the safety manager along with the miners entered the lift. The lift in-charged closed the sides and gave signals to Under Ground lift operator by ringing a bell using a code.

Inside the mine

Our lift went down about 500 feet below the ground level. It was like going deep down a well. We were gripped by fear as the lift rapidly slid down and we kept hearing water falling somewhere. The safety Officer who was with us explained: “It is ground water. You know that when we dig, we find water. We have to pump this water out, otherwise it will flood our mine tunnels. All the water is directed to a pool from which it is pumped out of the mine.” He further told us that the company has a Project and Planning Wing which takes care of designing these aspects of the mines. The lift stopped and we stepped into a narrow tunnel called mine shaft. As we washed we noticed electrical lines, hose pipes carrying water, a narrow rail track on the ground etc. When coal is mined it is loaded onto small wagons which are pulled on these rails till the lift from where it is taken to the ground level. Our guide pointed out that we were actually walking through a coal layer (also called coal seam) and that there was coal on both sides and above and below us! We were surprised to see walls of the mine to be bright and not black. Our guide explained that this is because they are painted with dyes to prevent oxidation and degradation of coal and also to enhance reflection and give us light.

Blasting the coal

Now we were approaching to the coal drilling area or “face”. Every day the supervisor inspects the coal seam and gives instructions for that day’s mining – where the mining is to be done, and what safety measures had to be taken. Different groups of people are assigned different tasks. One group was drilling holes with pneumatic air compressor to plant the explosive rods. Resin packets were inserted to keep them in place. These explosives will be set off (detonated) by an electrical device. Strong rock like coal is broken in this manner so that it can be cut and transported. This process is called “blasting”. It is a hazardous process as sometimes, the blast can bring down the entire mine face causing death of the miners. It has to be therefore done with great care and calculation.

Another group of miners was arranging wooden and iron supports to support the roof so that it may not fall down on the heads of the miners. One group was ready with flexible moveable motor known as drilling machine. This would be used to cut the coal after the blast. Now the blasting hole is ready, as you can see in Fig. 6.7.

When the entire preparation for blasting was complete, everyone withdrew to safe places. Then a warning whistle was blown and then the detonator was set off. Suddenly, the whole mine...
barytes mineral in the world. The barytes

Open Pit Mines

beams and posts. Weak so, it was supported with wooden

couldn’t breathe and were coughing. They walked over the coal

Two or three miners entered the dust

colony using their

In this mine coal is transported through

Transporting coal

In this mine coal is transported through

physically load the coal onto small wagons

which carried the coal. Now dumper

machines load the coal onto the conveyor belts which carry the coal to the ground

level. Then the coal is graded and loaded

onto trucks and railway wagons. Singareni

mainly supplies coal to thermal power

plants of the government. Remaining coal

is purchased by other companies.

Welfare

Singareni Collieries provides quarters

with roads, drinking water, utilization water. It
gives electricity at nominal charges. It establishes schools and hospitals.

Safety and Health Checkups

Director General of mines safety

monitors safety aspects and periodical

medical examination. The workers

underground are not only exposed to

accidents, but constantly inhale coal dust

which causes the dreaded ‘Black lung
disease’, a form of TB. There are detailed

guidelines for medical check up of

the miners and their treatment. Employees

below 45 years will have thorough routine

checkups every 5 years. Employees above

45 years will have thorough routine

checkups every 3 years. Miners with black

lung disease are usually transferred to a
different department over the ground.

New trends in Mining industry and miners

Recently there has been a great increase

in demand for coal, especially for thermal

power plants. However, our mines are not able to
cater to this demand due to low productivity. Hence the SCCL is devising plans for increasing production by shifting
to open cast mining. It has therefore set up
about 15 open cast mines and introduced fully automatic machines through private contractors. These will be producing much more coal but employ very few people. It is also said that the coal reserves of these open cast mining areas will be exhausted in 10 to 15 years after which there can be no mining in this area.

Read a news report of 29 June 2009:

Singareni coal mines open wounds

By Our Correspondent

WARANGAL June 28: Singareni Collieries Company Limited (SCCL) has decided to adopt open cast mining (OCM), to meet the demand for coal. The decision could render 20,000 people homeless and affect 200 villages. The miners will also affect an estimated 3,000 hectares of forests.

"If the mining underground produces 5,505 tonnes of coal a day open
cast mines produce 10,000 tonnes per day and kill 100 people at a much lesser cost," said a senior SCCL official. While it is true that open
cast mining will displace thousands of families, destroy house and belongings and
cause loss of livelihood to people. According to the company official, the company will pay compensation for the affected farmers.

In the open pit mines almost all work is done by machines. Shovel, bulldozers are used to remove over burden at the top soil and rocks which are a waste. Six metre high

benches are made (benches are vertical section of a mine from where the mineral is removed) next to a ten

metre road. The road goes all the way down to the bottom of the pit connecting all the

temporarily. This is loaded by huge machine dumpers onto
ten tonne capacity tipper trucks. The miners here are not underground but the open pit type. Look at Fig 6.9 to get an idea of how this mining is done. In the picture you can see a section that has been left un-dug. This is a monument of this mine and it also indicates how deep the mine is. Barytes available in the upper layers are of lower grade while those mined from a depth are of higher grade. Quality is determined by the grain size of the stone. Upper layer barytes are in grey colour while at lower levels it is white or cream white. Once the mineral deposit was discovered, it was tested in the labs and found to be of high quality. Surveys showed that it is available in very large quantities. A plan for mining barytes in the village was developed and the villagers who lived there were rehabilitated.

● How do you think this dilemma can be resolved? Is it fair to produce coal at a low price when it causes the loss of livelihood, lands and damages the

environment?

Mangampeta Barytes

Open Pit Mines

Mangampeta is in YSR Kadapa district and has one of the largest reserves of

barytes mineral in the world. The barytes reserves were discovered in 1960 and it has been mined since 1967. Nearly 1200 families lived in this village, which were

shifted to a new site and rehabilitated by Andhra Pradesh Mineral Development Corporation (APMDC, a government company) which now owns and operates the mines. The Barytes mines are the pride of
APMDC as it earns huge profits from these mines.

● Find out about the uses of Barytes from the box given in page 64. Why do you think demand for barytes is increasing?

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Look at the women working in the mines in Fig 6.11. They are drilling holes for blasting with explosives. You can see the wires of the blast detonator. Do you see the women wearing any protective gloves or shoes? What are they wearing on their heads?

The ore is transported by the trucks to above the ground where it is crushed into fine powder and packed in large bags and sent off in trucks and railway wagons. See Fig. 6.12. This is the crushing and packing plant.

There are about 600 workers in this mine. Of these about 152 are regular employees of the APMDC who get regular salary and benefits as per government norms. The rest are contract workers and trainees who are paid minimum wages only.

Fig 6.12: Crushing and packing plant

Compare the mining in the coal belt with the mining in Mangampeta. What are the similarities and what are the differences?

You must have got an idea of how we mine our precious resources, what kind of livelihood people get from it and how it is necessary to control the damage done to the environment by mining?

Key words

Improve your learning
1. Create a flow chart showing the visit to the underground mining.
2. Create a table to classify major health challenges; precautions; and care taken towards protecting mine workers as follows: 1. While working in the mines 2. While being employed.
3. Janaki is currently a farm labourer. She wants to become a miner. Can you explain what changes will occur in her nature of work; employment scenario; health risks etc.
4. Narrate the difference in requirement of labour in mine while using machines and human labour.
5. How has been the contribution of mining to economy identified in this chapter?
6. What aspects of regulations in the mining by the government do you agree with? And why?
7. See the map of Andhra Pradesh showing minerals in this chapter and identify the minerals found in your district.
8. Read the paragraph under the heading 'To whom do the minerals belong' and answer the following:
   The minerals do not belong to any particular person but they belong to all people. How do you justify?
9. Look at the image below. There are two different statements made by two different people. What aspect of mining are they talking about?