MINERAL MINING IN AFRICA

(Examinable under Item2 photographic analysis and interpretation)

Activity1:1

In Senior two you learnt about mining in East Africa, using that knowledge, attempt the tasks below.

1. Define the term mining and identify the main minerals in East Africa
2. Describe the main types of mining used in East Africa
3. Explain the problems of each type of Mining.

Mining refers to the extraction of natural resources in their raw state from the environment

MINERALS IN AFRICA

Activity 1.2

Africa is endowed with many minerals. The map in figure 1:1 (Fountain Book4) & longhorn learners guide page 3 shows some of these minerals and the main mining areas in Africa. Use it to do the tasks below.

1. Identify the main minerals mined I Africa.
2. Draw a sketch map of Africa showing the main minerals and the mining centers.
3. Draw a table with three columns, mining countries, main mineral and method used in the mining.
4. Identify the industrial uses of identified minerals

In Africa, mining has greatly improved from its traditional or natural state sustaining a given society to a modern one sustaining national economies in the continent like;

COUNTRIES	MINERALS	MINING METHODS
Libya	Oil	Drilling
Zambia	Copper	Open cast & Underground
Sierra Leone	Diamond	Open cast
Egypt	Oil Iron ore	Drilling Underground
South Africa	Gold, Diamonds Uranium	Underground Opencast Underground
Liberia	Iron ore	Underground
Congo	Copper Cobalt Coal Zinc	Underground Open cast & underground Open cast Underground
Nigeria	Oil	Drilling

USES OF MINERALS TOWARDS INDUSTRIAL DEVELOPMENT

Mineral	Industrial use/ uses
Copper	• Making household utensils • Making wires for electrical equipment • Minting of coins(money) • Making military weapons (like bullets) • Making machinery bearings • Good alloy with zinc to form brass
Gold	• Mainly used in jewelry industry. • Used in gold craft industries
Diamond	• Used in making jewelry • Making industrial equipment like drill bits and abrasive drilling wheels. • Cutting tools in industries • White sparkling diamonds are cut into pyramidal gems.
Oil	• Providing fuel for transport vehicles, airplanes, ships, railway transport • Used to generate thermal electricity used in industries, homes, and institutions • Oil is a lubricant in vehicles, machinery and other appliances (Greece, engine oil) • Used in making plastics, fertilizers, insecticides, drugs, perfumes, detergents, acids, synthetic rubber and fibres • Making tar (Asphalt), • Making gases, and spirits
Iron ore	• Making of iron sheets • Making cooking utensils • Making car bodies • Making machinery • Making cutlery • Making angle bars for construction etc.

METHODS OF MINING

Activity1:3

In groups, study photographs A-C in figure 25.2 (learner`s Book pages 3-5 longhorn), A-C in figure 25.3 (learner`s Book pages 5-7) and A-C in figure 25.4 learner`s Book 7-9) showing mining methods and do the tasks that follow.

1. Which of the photographs show,
   a) Open cat mining
   b) Underground mining
   c) Drilling
2. Suggest minerals that can be mined using each of the method identified.
3. With the help of the identified diagram, explain the method
4. What are the advantages and disadvantages of each of the identified method?

1. Open cast mining

This method is used to extract minerals that occur near the earth`s surface. The top soil is removed and the mineral ore is blasted using explosives. The mineral ore is then crushed to reduce the size. It is then loaded into trucks and taken to the processing plants.

Advantages of open cast mining

- It's cheap
- It is faster because the mineral is near the surface
- It's used to mine low-grade minerals over a wide area.
- Large machinery can be used because of a wide space.

Disadvantages of open cast mining

- Natural vegetation is destroyed exposing the soil
- Pits are created & water collects in them encouraging breeding of mosquitoes which spread malaria.
- Heaps of wastes are created
- Noise pollution

2. Shaft/ underground mining

This is used to extract ore from below the surface of the earth surface. Vertical shafts are dug into the ground to appropriate levels. From these, horizontal tunnels leading to the ore body are constructed. Supporters are provided from the roof to the floor of the tunnels. The copper ore is then blasted using explosives causing shattering. The ores are crushed and loaded on small wagons and taken to the vertical shaft, and lifted to the surface, and taken to processing plants.

Advantages of underground mining

- Minerals that occur deep underground are mined
- The earth`s surface is not destroyed

Disadvantages of underground mining

- Accidents due to collapse of tunnels
- Landslides due to instability of the land
- Air pollution within tunnels causing deaths

3. Drilling

This is used to extract liquids and fluids from the ground. A drill (derrick) with a bit is sunk into the ground to drill into/ cut through the rock layers to reach ail below. Upon reaching the liquid, the crude oil rushes out by natural pressure or pumped out to the surface using oil pumps if natural pressure is weak.

The oil is then transported through pipes, fuel tankers, trucks to the refinery

ADVANTAGES OF DRILLING METHOD

- They are easy to set up and organize in terms of number and equipment
- They are easy to monitor
- Many can be used as purely fitness activities
- Players are unable to hind in many of them because they are quite structured and tightly controlled

DISADVANTAGES

- Disruption of wildlife habitats hence affecting the ecosystems and water sources.
- High costs associated with drilling equipments and operations
- Risky/Accidents due to borehole instability
- Air pollution due to spills of leaks of drilling fluids and emissions.
- Limited access to certain mineral deposits
- Ground instabilities due to explosive materials used leading to cracking of surface and collapse of houses.

Case studies of major mining countries in Africa

1. Gold mining in South Africa.

Activity 1.4

Study the map in Figure 25.5 showing mining in South Africa and do the following tasks. (learner`s Book 9-11 longhorn)

1. Copy the map in Figure 25.5 showing mining in South Africa into your notebook.

2. Identify other minerals which are mined in South Africa and where they are mined.
3. Suggest methods of mining used in the extraction of gold in South Africa.
4. Why do you think Gold mining is important to the development of South Africa
5. Explain the problems affecting Gold mining in South Africa.
   Present your work to the rest of the class through discussion.

2. Copper mining in Zambia.

Activity 1.5

Study the map in Figure 25.6 showing mining in South Africa and do the following tasks. (learner`s Book 11-12 longhorn)

1. Copy the map in Figure 25.6 showing mining in Zambia into your notebook.
2. Identify other minerals which are mined in Zambia and where they are mined.
3. Suggest methods of mining used in the extraction of Copper in Zambia
4. Why do you think Copper mining is important to the development of Zambia
5. Explain the problems affecting Copper mining in Zambia.
   Present your work to the rest of the class through discussion.

3. Copper mining in Democratic Republic of Congo.

Activity 1.6

In pair study the map in Figure 25.7 showing mining in South Africa and do the following tasks. (learner`s Book 13-14 longhorn)

1. Copy the map in Figure 25.7 showing mining in **Democratic Republic of Congo** into your notebook.
2. Identify other minerals which are mined in **Democratic Republic of Congo** and where they are mined.
3. Suggest methods of mining used in the extraction of Copper in **Democratic Republic of Congo**
4. Why do you think copper mining is important to the development of **Democratic Republic of Congo**
5. Explain the problems affecting copper mining in **Democratic Republic of Congo**.
   Present your work to the rest of the class through discussion.

4. Oil mining in Nigeria.

Activity 1.6

In pair study the map in Figure 25.8 showing mining in South Africa and do the following tasks. (learner`s Book 13-15 longhorn)

1. Copy the map in Figure 25.8 showing mining in **Nigeria** into your notebook.
2. Identify other minerals which are mined in **Nigeria** and where they are mined.
3. Suggest methods of mining used in the extraction of Oil in **Nigeria**
4. Why do you think Oil mining is important to the development of **Nigeria**
5. Explain the problems affecting Oil mining in **Nigeria**.
   Present your work to the rest of the class through discussion.

General factors favoring mining in Africa.

Note:

1. **Ensure the learners are guided on the application of CK, CU, AP. Let learners present at least three points with emphasis on the application on the success criteria and then present more point to them.**
2. **Factors, problems, solutions and benefits of mining across all case studies of Africa are more less the same**

Sample of factors

- Presence of large reserves /deposits of iron ore which encourage investment in the mining sector/making mining economically viable. (estimated about one billion tonnes)
- High quality of the iron ore which encourages mining investment by large companies.
- Presence of cheap labour to work in the mines provided by local people and migrants from neighboring countries.
- Presence of skilled labour to carry out extraction and processing provided by foreigners and locally trained people.
- Presence of large sums of capital to invest in the mining sector provided by foreign and local companies.
- Presence of a ready market for gold both locally and internationally.
- Availability of large power supply for mining and processing such as hydroelectricity, coal and oil.
- High level of technology used by mining companies such as use of caterpillars, shaft /underground mining to increase production.
- Developed transport and communication system such roads and railway to transport iron ore to the coast for marketing.
- Positive/supportive government policy such as encouraging local and foreign investors, controlling the mining activities.

- Increased research to discover more valuable gold fields and advancing the mining technology.

Benefits of mining in Africa

- Development of infrastructure like roads, railways, schools leading improved standards of living
- Generation of government revenue
- Development of social services such schools, hospitals, markets leading to improvement on people`s standard of living
- Sources of employment opportunities to miners hence leading to improvement in their standards of living
- Sources of income through employment as drivers, accountants by the mining companies leading their improved standards of living
- Sources of foreign exchange through export of minerals like Copper, Gold, Oil etc. which is used to improve on other sectors.

Challenges facing the mining sector

- Shortage of skilled labour to work in the mines and related industries which undermines production.
- Price fluctuations of minerals on the world market leading to uncertain incomes.
- Competition with other iron ore producing countries Zimbabwe, Swaziland, Sierra Leone, Nigeria, Mauritania, South Africa which discourages the available market.
- Accidents occur during mining leading to loss of life such as due to falling rocks.
- Exhaustion of some high grade mineral deposits in some regions due to over exploitation.
- Over dependence on foreign companies such as American companies in exploiting iron ore, which leads to profit repatriation and hence discouraging further investment in mining.
- Iron ore deposits occur in hilly areas making the development of transport routes difficult.
- Inadequate capital to invest in the mining sector, which undermines the quality and quantity of production. High costs are involved in exploiting, setting up railway lines and developing processing centres.
- High costs of mining due to increasing depth of the mines.
- Continuous heavy rainfall which makes iron ore turn into mud during the rainy period.
- Political instability in the country in the recent past characterized by civil wars, which also discourages production.

Steps taken to improve the mining sector

- Campaign for national security to increase the confidence of mining investors.
- Opening up new deposits where some are exhausted
- Use of the conveyor belts to transport the ore down the hills to the railhead.
- Recruiting labour from neighboring countries to minimize labour shortage.
- Carrying out market research in order to expand market for the minerals.
- Controlling production to reduce the effects of price fluctuations.
- Emphasis on production of high value minerals such as gold and diamonds to offset the high costs of mining.
- Attraction of more foreign investors to invest in the mining sector such as American companies.
- Opening alternative routes for copper exports to control problems of political unrest in particular countries.
- Building political relations with the neighbors for easy exportation of mineral products.
- Replacement of the old and outdated machinery with new modern machinery to increase production.
- Emphasize processing of mineral ores into manufactured goods to minimize the effects of price fluctuations on the world market.
- Pumping fresh air into the mines to reduce suffocation.
- Supporting tunnels to control / prevent collapsing.

Note: the application part will vary from learner to learner.