Gobartimes

# Green Schools Network

# ACTIVITY SHEET

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## Why talk about MINING



For millennia mankind has extracted minerals from the subsoil. Especially metal ores have been treasured throughout history. Did you know that the use of some metals changed human lifestyle so dramatically that whole eras such as the Iron Age are named after them? Today we depend on mining more than ever. But mining has a frightening dark side too. It contaminates rivers and lakes, destroys vast areas of forest and farmland and displaces and infects local communities and workers. In present day India, mining threatens people and environment more than ever before. Let's not pretend it does not happen and let's see what's going on in the mining areas of the country on this activity sheet.

**Name**.....

**School Name** .....

**Class**..... **Date** .....

### Activity 1:

You will know most of the following items from your daily life. Did you also know that they all contain materials gained through mining? First find out which minerals are contained in which items. For this do some research in you science book or on the internet. Then match the minerals with the mining sites on the map.

**Stainless Steel**

**Glass**

*Iron*

*Chromium*

**Internet wire**

_____

**Aluminium foil**

*Processed Bauxite*

**Music tape**

*Chromium*

**Concrete**

_____

_____

_____

_____

**Electrical Wire**

_____




**Car battery**

*Lead*

**Frame of bicycle**

_____

_____

**Drill bits**

*Diamonds*

_____

**Electricity**

*Coal*

_____

**Brass bell**

_____

_____

**Beverage can**

_____

_____



*Hi! I am Pandit Gobar Ganesh. You will find me in Gobar Times—a magazine that tells you how your everyday life is linked to the world around you. Hooked, huh? If you want to know more about me and GobarTimes visit us at:*

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**Gobar Gyan: Mining and waste**

In 2005 mining generated 1.8 Giga tonnes (1 800 000 000 000 kg) of solid waste only in India. Can you imagine how heavy it is? It is more than three times the weight of the total world population. But how does it come to this huge amount?

Imagine yourself treasure hunting. What would you do to lift a buried treasure chest? Maybe you would grab a shovel and dig your way down to it. This is exactly what happens in 80% of India's mines. The only differences are that the treasure is not in a chest but scattered through the rock and that it is deep beneath the earth's surface. All the rocks above which have to be moved finally end up in soaring mountains of debris.



**Gobar Gyan: Mining Air and Water**

But why are these man made mountains so harmful? First they occupy lots of space and form veritable debris deserts. In dry season the wind blows out huge amounts of dust and pollutes the air. Depending on the kind of debris, this dust may be toxic. Secondly parts of the rocks are dissolved in the rainwater during rainy season. This leads to the formation of acid and the solution of toxic heavy metals. When the rainwater flows out of the debris into the next river or lake it has been transformed into a lethal cocktail for humans, plants and animals.

**Activity 2:** When did you have water from a steel glass last time? Find out how much mining waste is created to produce your steel glass.

| Property | Calculation | Result | Unit |
|---|---|---|---|

First of all weigh your steel glass as precisely as possible.

| | | | |
|---|---|---|---|
| Weight of your steel glass | – | | Gram [g] |

Your glass contains approximately 89 % iron. How much is this in gram for your glass?

| | | | |
|---|---|---|---|
| Iron contained in your glass | Weight of your steel glass x 89/100 | | Gram [g] |

For each gram iron gained from Indian mines approximately 2.6 gram of waste are produced. Calculate here how much waste the iron in your steel glass has generated.

| | | | |
|---|---|---|---|
| Waste from iron production | Iron contained in your glass x 2.6 | | Gram [g] |

Stainless steel contains approximately 11% chromium. How much is this in Gram for your glass?

| | | | |
|---|---|---|---|
| Chromium contained in your glass | Weight of your steel glass x 11/100 | | Gram [g] |

For each gram of chromium contained in your glass 24 gram waste have been generated. The amount is so high because chromium is gained through open cast mining.

| | | | |
|---|---|---|---|
| Waste from chromium production | Chromium contained in the glass x 24 | | Gram [g] |

Virtually your glass does not only consist of iron and chromium but of another very important material which is also gained through mining. Coal has provided all the energy to transform the iron and chrome ores which are mined from the rock into stainless steel your glass is made of.

To produce one gram of stainless steel 4 grams of coal have to be burnt. Calculate now how much coal has been burnt to produce your glass.

| | | | |
|---|---|---|---|
| Coal burnt to produce your glass | Total weight of your glass x 4 | | Gram [g] |

For each gram of coal 4 grams of waste were generated. See how much waste has been generated through coal combustion in the process of your glass's production.

| | | | |
|---|---|---|---|
| Waste generated through coal mining | Coal burnt to produce your glass x 4 | | Gram [g] |

In the final step of our calculations we will now add all the mining wastes generated to produce your glass. Can you imagine how much it will be for all glasses in India…?

| | | | |
|---|---|---|---|
| Solid mining waste generated to produce your stainless steel glass | Waste from iron mining + Waste from chromium mining + Waste from coal mining | | Gram [g] |

**Gobar Gyan: Mining in forest and tribal areas - a fatal overlap**



See again the map of Activity one. Have you realized that most of the mines are located in the least developed states of India? With India's densest forests these states are the nation's green lung. And they shelter much of India's tribal population. In other words "India's major mineral resources lie under it's richest forests and the land of it's poorest population." [State of India's Environment 6th Report, p 2]

Until present 1.64 lakh hectare of forest have been diverted by mining which equals to more than half of Goa's area. But what about the people who need the forest and their land to live? It is a cruel truth that only between 1950 and 1991, 26 lakh people were displaced to make way for mining projects. This is more than the present population of Nagpur, Maharashtra. Millions more hold out breathing polluted air, drinking toxic water and suffering with their land from the consequences of mining.

**Activity 3:** Every change origins in awareness. You have now learnt a lot about the adverse impacts of mining. But how much do other people know? Find out and conduct a survey. Compare your results in class.



You could ask the following questions.

- What do you know about mining in India?
- Where in India does mining mainly take place?
- Which problems are caused by mining?
- How does mining in forest areas affect the environment?

Go through this sheet again and see what else you could ask.

- _____
- _____
- _____

Doing this Activity you might realize how little people know about mining and its effects. Let's not leave it at that. Try to read more about mining and become an expert in this field. Than make a collage about mining with the material you have found during your research and display it in your school or publish it in your school bulletin.

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