

Lesson 7 - Aluminium

Teacher's notes

- ✓ The students must have the handouts with the power point presentation in front of them in order to take notes on them. The power point file is *L7.Aluminium*
- ✓ Some samples of aluminium can be brought to the classroom with typical uses: a beverage can (it be compared with tin), a CD, a milk pack and also other examples of daily use of aluminium can be commented (window and board frames, car bodies, cookware, kitchen foil...)
- ✓ The environmental issue about aluminium could be commented as well. Aluminium production has a high consumption of electricity and therefore a high emission of carbon oxide. There is a specific exercise on this topic

Vocabulary

Earth's crust, electrolytic process, alumina, bauxite

Task 2

a) For Natural Gas:

$$\begin{aligned} \text{Amount of CO}_2 &= 15 \text{ gr. Al} \frac{1 \text{ tAl}}{10^6 \text{ grAl}} \frac{15 \text{ MWh}}{1 \text{ tAl}} \frac{450 \text{ KgCO}_2}{1 \text{ MWh}} = \frac{15 \times 15 \times 450}{10^6} \text{ kg CO}_2 = \\ &= 0.10125 \text{ kg CO}_2 = \mathbf{101.25 \text{ gr. CO}_2} \end{aligned}$$

For Oil:

$$\begin{aligned} \text{Amount of CO}_2 &= 15 \text{ gr. Al} \frac{1 \text{ tAl}}{10^6 \text{ grAl}} \frac{15 \text{ MWh}}{1 \text{ tAl}} \frac{500 \text{ KgCO}_2}{1 \text{ MWh}} = \frac{15 \times 15 \times 500}{10^6} \text{ kg CO}_2 = \\ &= 0.1125 \text{ kg CO}_2 = \mathbf{112.5 \text{ gr. CO}_2} \end{aligned}$$

For Coal:

$$\begin{aligned} \text{Amount of CO}_2 &= 15 \text{ gr. Al} \frac{1 \text{ tAl}}{10^6 \text{ grAl}} \frac{15 \text{ MWh}}{1 \text{ tAl}} \frac{1000 \text{ KgCO}_2}{1 \text{ MWh}} = \\ &= \frac{15 \times 15 \times 1000}{10^6} \text{ kg CO}_2 = 0.225 \text{ kg CO}_2 = \mathbf{225 \text{ gr. CO}_2} \end{aligned}$$

b) From recycled aluminium there is a saving of 95% of the energy invested, therefore the solution in every case will be 5% of the amounts calculated above:

For Natural Gas:

$$5\% \text{ of } 101.25 \text{ gr.} = \mathbf{5.06 \text{ gr.}}$$

For Oil:

5% of 112.5 gr. = **5.6 gr.**

For Coal:

5% of 225 gr. = **11.25 gr.**

Task 3

Statement	T/F?
Aluminium is a very usual substance and it can be found free in the nature	F
Alumina is aluminium oxide	T
From 5 tonnes of bauxite we can get some 1 tonne of aluminium at the end of the process	T
The Bayer process is used to obtain aluminium from alumina	T
Bauxite is the main ore of aluminium	T
The modern production of aluminium doesn't pollute at all	F
Using recycled aluminium to produce aluminium we need only 5% of the energy needed than if we produce it from the ore	T