

## Rare earth metals shortage

Look at your mobile phone, Blackberry or low energy light bulb. Now ask yourself what is inside it? Yes, it is made with different components. The technology is great. But what are the components made with? The chances are some of them are made with rare earth metals. Where do these rare earth metals come from? The answer is probably China. Certainly 95% of the world's rare earth metals are currently mined there. So why should you worry about it? Simple, if China stops the exports of these rare earth metals then your mobile phone can't be built, as it needs certain components made with these rare earth metals to build a part of it. As it goes, China has decided to slash exports of these rare earth metals that have left the West scrabbling for alternative sources.

There are 17 metals that make up these rare earth metals. Until recently most people had never heard of these obscure elements. However, they are the magic ingredients that make many modern electronics function. Many have exotic names like terbium, dysprosium and europium. In China though they are known as 'industrial vitamins', as they are used in green technologies such as electric cars, solar panels and wind turbines. Rare earth metals are also used not only for civilian use but for warfare. They help hi-tech armies and are used for toughening tank armour. They help guide smart bombs and power night-vision goggles.

In 2010, China cut rare earth metals export quotas by 70% from 29,000 to 8,000 tons. In 2011, China is expected to further reduce quotas by 11%. Yet demand has soared, as have prices. Some analysts are predicting a shortfall of 20,000 tons by 2014. Neodymium (used in computers and lasers) is reportedly now impossible to obtain outside China. At US\$72 a kilo, cerium oxide, used in polishing glass and lenses, is now 15 times more expensive than it was a year ago. So why is the world now in this position? Because while we all focused our minds on the price of oil that comes mainly from the Middle East, no one took much notice of the rare earth metals, which are found mainly in China. It is a wake up call for the West!

Rare earth metals were first discovered by a Swedish amateur geologist in 1787 in a feldspar quarry outside Stockholm. Then only a chemical

**Category: Technology / Economic / Business**  
**Level: Intermediate / Upper intermediate**

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curiosity, but by the 20<sup>th</sup> century they had been used in an increasing number of electronic and industrial applications. Until 1949, Brazil and India produced most of the world's rare earth metals. After this South Africa stepped in with its monazite mines. In the 1980s, when the electronics industry took off, it was America who led production from a mine at Mountain Pass California, USA. By the 1990s however, US dominance quickly disappeared due to China flooding the market with cheap rare earth metals forcing the closure of many mines including that of Mountain Pass. A good example of this: Sony Walkmans used samarium-cobalt magnets that were the only ones light enough to run a cassette recorder powered by two AA batteries. The samarium-cobalt was mined at Mountain Pass.

Analysts expect that the two biggest miners of rare earth metals, Australia's Lynas and Molcorp of the US, could deliver an additional 60,000 tons by 2015 to counter China's policy. Today rare earth metals can be found in China at the Baiyunebo iron-ore mine, about 80 miles (130km) north of Baotou, and in the hills of Longnan County in Southern Jiangxi and Guangdong. Some of these 'mines' are low tech and when seen the simple filtration systems used look more like a Heath Robinson type of setup. Yet their operations cradle some of the world's most high tech gadgets.

Is China right to cut its export of rare earth metals? Maybe its argument is economic? China says it is consolidating production and putting a vital resource on a more sustainable footing. China itself will need these rare earth metals due to its own burgeoning technology industries and its attempt to lead the world in green technologies. The other reason could be environmental. China's policy gets companies to relocate there in order to use its rare earth metals. It is even stockpiling rare earth metals to keep the price high. Prices could fall or even collapse, forcing the closure of many of these Chinese mines. Yet whilst China is putting restrictions on the exports of the metals themselves, there are no restrictions on the export of products made in China using these rare earth metals. China has welcomed the world to find alternative sources of rare earth metals. China is making companies think twice about wasting resources. But will this stimulate production elsewhere? The situation is not as dire as some analysts fear. China though could hold the world to ransom by withholding rare earth metals. Coincidentally, consignments of rare earth metals to Japan were recently not signed off by Chinese custom officials during a fishing dispute with Japan – a charge China denies.

## EXERCISES

**1. Rare earth metals:** Briefly, what are rare earth metals? What are they used for? Go round the room swapping details.

**2. Dictation:** The teacher will read four to six lines of the article slowly and clearly. Students will write down what they hear. The teacher will repeat the passage slowly again. Self-correct your work from page one - filling in spaces and correcting mistakes. Be honest with yourself on the number of errors. Advise the teacher of your total number of errors. Less than five is very good. Ten is acceptable. Any more is room for improvement! More than twenty - you need to do some work!

**3. Reading:** The students should now read the article aloud, swapping readers every paragraph.

**4. Vocabulary:** Students should now look through the article and underline any vocabulary they do not know. Look in dictionaries. Discuss and help each other out. The teacher will go through and explain any unknown words or phrases.

**5. The article:** Students should look through the article with the teacher.

- a) What is the article about?
- b) What do you think about the article?

**6. Let's think!** Think of five places in the world where you can find rare earth metals. Then add five gadgets whose components are partly made with rare earth metals. Write them below. Explain to your partner why you chose these.

Five places where there are rare earth metals	Five gadgets whose components are partly made with rare earth metals
1	1
2	2
3	3
4	4
5	5

**The teacher** will choose some pairs to discuss their findings in front of the class.

**7. Let's think!** In pairs. On the board write as many words as you can to do with **rare earth metals**. *One-two minutes*. Compare with other teams. Using your words compile a short dialogue together.

**8. Let's talk! Earth FM:** *In pairs*. You are in the *Earth FM* radio studio. One of you is the presenter; the other student is the guest. Today's interview is: *Rare earth metals*. *5 minutes*.

**9. Let's debate!** *In pairs*. Students A think China now has too much power in controlling rare earth metals. Students B think the markets should dictate the price.

Rare earth metals shortage – 15<sup>th</sup> May 2011

**10. Let's think!** Think of five rare earth metals. Then add five reasons to be worried by China's restrictions of rare earth metals. Write them below. Explain to your partner why you chose these. What is your conclusion?

Five names of rare earth metals	Five reasons to be worried by China's restrictions of rare earth metals
1	1
2	2
3	3
4	4
5	5

**The teacher** will choose some pairs to discuss their findings in front of the class.

**11. Let's do 'The Article Quiz':** Have the students quiz each other in pairs. They score a point for each correct answer and half a point each time they have to look at the article for help. See who can get the highest score!

**Student A**

- 1) Name three of the devices in the article.
- 2) Which country mines 95% of the rare earth metals?
- 3) How many metals make up these rare earth metals?
- 4) What military uses are these rare earth metals used for?
- 5) Where will you find some Heath Robinson type gadgets?

**Student B**

- 1) What year did a Swedish amateur geologist discover rare earth metals?
- 2) What is a wake up call to the West?
- 3) What green technologies does China make using rare earth metals?
- 4) What happened in 2010?
- 5) What happened at Mountain Pass?

**12. Let's roleplay: A rare earth metals conference:** In groups. Choose to be one of the following people. You are at a rare earth metals conference in Brussels. You can each give your viewpoint then debate the topic as that person.

- |   |                                   |
|---|-----------------------------------|
| 1) A Chinese miner of rare earth metals | 3) The Chinese Minister of Mining |
| 2) An electronic company                | 4) A trader of rare earth metals  |

**The teacher** will choose some groups to roleplay to the class.

**13. Let's write an e-mail:** Write and send a 200 word e-mail to your teacher about: **Rare earth metals**. Your e-mail can be read out in class.

**14. Sentence starters:** Finish these sentence starters. Correct your mistakes. Compare what other people have written.

- a) Rare earth metals \_\_\_\_\_
- b) China \_\_\_\_\_
- c) Mobile phones \_\_\_\_\_

## DISCUSSION

### Student A questions

- 1) What do you think about what you read?
- 2) What gadgets do you use? Why?
- 3) Would you like to visit a rare earth metal works in China? Why? Why not?
- 4) How do the markets react to rare earth metals news? Explain.
- 5) What does a commodity trader do? How? Explain.
- 6) Why has China cornered the rare earth metals market?
- 7) Would you like to be a miner and dig rare earth metals? Why? Why not? Explain.
- 8) Why is the West scrabbling for alternative sources of rare earth metals?
- 9) What three bits of advice would you give the makers of mobile phones that need rare earth metals in order that your mobile phone works?
- 10) What alternatives are there to rare earth metals?

### Student B questions

- 1) Did the headline make you want to read the article?
- 2) What is the economic impact of increased prices of rare earth metals?
- 3) Do you think the abandoned mines in, for example, Mountain Pass, California, might be reopened if prices continue to rise? Explain.
- 4) Why is China taking this action of restricting supply of rare earth metals?
- 5) Why did China flood the market with rare earth metals then suddenly restrict it?
- 6) Is the situation as dire as some analysts fear?
- 7) Do you know of any 'Heath Robinson' type of set ups?
- 8) Have you got a Sony Walkman hiding somewhere in a cupboard?
- 9) Why is this 'a wake up call to the West'?
- 10) Did you like this discussion?

## SPEAKING

Let's discuss! Rare earth metals / Uses / Commodity markets

*Allow 10-15 minutes – As a class / small groups / pairs / 1 to 1*

Consider the following points to discuss:

Rare earth metals / Uses / Commodity markets
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The teacher can moderate the session.

## GAP FILL: READING:

*Put the words into the gaps in the text.*

### Rare earth metals shortage

Look at your mobile phone, (1)\_\_\_\_\_ or low energy light bulb. Now ask yourself what is inside it? Yes, it is made with different components. The (2)\_\_\_\_\_ is great. But what are the (3)\_\_\_\_\_ made with? The chances are some of them are made with rare earth metals. Where do these rare earth metals come from? The answer is probably China. Certainly 95% of the world's rare earth metals are (4)\_\_\_\_\_ mined there. So why should you worry about it? Simple, if China stops the exports of these rare earth metals then your mobile phone can't be built, as it needs certain components made with these rare earth metals to build a part of it. As it goes, China has decided to (5)\_\_\_\_\_ exports of these rare earth metals that has left the West (6)\_\_\_\_\_ for alternative sources. There are 17 metals that make up these rare earth metals. Until recently most people had never heard of these (7)\_\_\_\_\_ elements. However, they are the magic ingredients that make many modern electronics function. Many have (8)\_\_\_\_\_ names like terbium, dysprosium and europium.

In China though they are known as 'industrial (1)\_\_\_\_\_', as they are used in green technologies such as electric cars, solar panels and wind (2)\_\_\_\_\_. Rare earth metals are also used not only for civilian use but for (3)\_\_\_\_\_. They help hi-tech armies and are used for toughening tank armour. They help guide smart bombs and power night-vision goggles. In 2010, China cut rare earth metal export quotas by 70% from 29,000 to 8,000 tons. In 2011, China is expected to further reduce (4)\_\_\_\_\_ by 11%. Yet (5)\_\_\_\_\_ has soured, as have prices. Some (6)\_\_\_\_\_ are predicting a (7)\_\_\_\_\_ of 20,000 tons by 2014. Neodymium (used in computers and lasers) is reportedly now (8)\_\_\_\_\_ to obtain outside China. At US\$72 a kilo, cerium oxide, used in polishing glass and lenses, is now 15 times more expensive than it was a year ago. So why is the world now in this position? Because while we all focused our minds on the price of oil that comes mainly from the Middle East, no one took much notice of the rare earth metals, which are found mainly in China. It is a wake up call for the West!

*components*

*exotic*

*obscure*

*slash*

*Blackberry*

*currently*

*scrabbling*

*technology*

*turbines*

*demand*

*vitamins*

*analysts*

*warfare*

*impossible*

*shortfall*

*quotas*

## GRAMMAR

Put the words into the gaps in the text.

### Rare earth metals shortage

Look at (1)\_\_\_ mobile phone, Blackberry or low energy light bulb. Now ask yourself (2)\_\_\_ is inside it? Yes, it is made with different components. The technology is great. But what are the components made (3)\_\_\_? The chances are some of them are made with rare earth metals. Where do these rare earth metals come from? The answer is probably China. Certainly 95% of the world's rare earth metals are currently mined there. So why (4)\_\_\_ you worry about it? Simple, if China stops the exports of these rare earth metals (5)\_\_\_ your mobile phone can't be built, as it needs certain components made with these rare earth metals to build a part of it. As it goes, China has decided to slash exports of these rare earth metals that have left the West scrabbling for alternative sources. There are 17 metals that make up (6)\_\_\_ rare earth metals. Until recently most people had never heard of these obscure elements. (7)\_\_\_, they are the magic ingredients that make (8)\_\_\_ modern electronics function. Many have exotic names like terbium, dysprosium and europium.

In China though they are known as 'industrial vitamins', (1)\_\_\_ they are used in green technologies such as electric cars, solar panels and wind turbines. Rare earth metals are also used not only for civilian use (2)\_\_\_ for warfare. They help hi-tech armies (3)\_\_\_ are used for toughening tank armour. They help guide smart bombs and power night-vision goggles. In 2010, China cut rare earth metals export quotas by 70% from 29,000 to 8,000 tons. In 2011, China is expected to further reduce quotas (4)\_\_\_ 11%. (5)\_\_\_ demand has soured, as have prices. Some analysts are predicting a shortfall of 20,000 tons by 2014. Neodymium (used in computers and lasers) is reportedly now impossible to obtain outside China. At US\$72 a kilo, cerium oxide, used in polishing glass and lenses, is now 15 times more expensive than it was a year ago. So (6)\_\_\_ is the world now in this position? Because while (7)\_\_\_ all focused our minds on the price of oil that comes mainly from the Middle East, no one took much notice of the rare earth metals, which are found mainly in China. It is a wake up call (8)\_\_\_ the West!

**many**

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## SPELLING TEST

The teacher will ask the class individually to spell the following words that are in the article. Afterwards, check your answers with your teacher, using the following ratings: **Pass = 12, Good = 15, Very good = 18, Excellent = 20**

1	sustainable	11	curiosity
2	applications	12	geologist
3	dominance	13	impossible
4	enough	14	analysts
5	filtration	15	technologies
6	gadgets	16	though
7	consolidating	17	obscure
8	stimulate	18	alternative
9	coincidentally	19	components
10	consignments	20	commodities

### LINKS

<http://www.reuters.com/article/2011/03/22/us-china-rareearth-idUSTRE72L10I20110322>

<http://www.nytimes.com/2010/12/15/business/global/15rare.html>

<http://www.unitednuclear.com/rareearthshortage.htm>

[http://www.channel4.com/news/articles/science\\_technology/rare+earth+shortage+threatens+green+revolution/3451837.html](http://www.channel4.com/news/articles/science_technology/rare+earth+shortage+threatens+green+revolution/3451837.html)

[http://en.wikipedia.org/wiki/Rare\\_earth\\_element](http://en.wikipedia.org/wiki/Rare_earth_element)

<http://www.telegraph.co.uk/science/8385189/Rare-earths-why-China-is-cutting-exports-crucial-to-Western-technologies.html>

### ANSWERS

GAP FILL: Rare earth metals shortage: Look at your mobile phone, **Blackberry** or low energy light bulb. Now ask yourself what is inside it? Yes, it is made with different components. The **technology** is great. But what are the **components** made with? The chances are some of them are made with rare earth metals. Where do these rare earth metals come from? The answer is probably China. Certainly 95% of the world's rare earth metals are **currently** mined there. So why should you worry about it? Simple, if China stops the exports of these rare earth metals then your mobile phone can't be built, as it needs certain components made with these rare earth metals to build a part of it. As it goes, China has decided to **slash** exports of these rare earth metals that have left the West **scrabbling** for alternative sources. There are 17 metals that make up these rare earth metals. Until recently most people had never heard of these **obscure** elements. However, they are the magic ingredients that make many modern electronics function. Many have **exotic** names like terbium, dysprosium and europium. In China though they are known as 'industrial **vitamins**', as they are used in green technologies such as electric cars, solar panels and wind **turbines**. Rare earth metals are also used not only for civilian use but for **warfare**. They help hi-tech armies and are used for toughening tank armour. They help guide smart bombs and power night-vision goggles. In 2010, China cut rare earth metals export quotas by 70% from 29,000 to 8,000 tons. In 2011, China is expected to further reduce **quotas** by 11%. Yet **demand** has soared, as have prices. Some **analysts** are predicting a **shortfall** of 20,000 tons by 2014. Neodymium (used in computers and lasers) is reportedly now **impossible** to obtain outside China. At US\$72 a kilo, cerium oxide, used in polishing glass and lenses, is now 15 times more expensive than it was a year ago. So why is the world now in this position? Because while we all focused our minds on the price of oil that comes mainly from the Middle East, no one took much notice of the rare earth metals, which are found mainly in China. It is a wake up call for the West! (V2)

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