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Ready-to-use ESL/EFL Lessons by Sean Banville

World's lightest material invented

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http://www.breakingnewsenglish.com/1111/111121-lightest_material.html

Contents

THE ARTICLE

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

Scientists have invented the world's lightest material. It is so light that it can rest on top of a dandelion. Researchers from the University of California, the California Institute of Technology, and HRL Laboratories created the material they call ''ultralight metallic microlattice'' (UMM). It is 100 times lighter than styrofoam – the material commonly used in packaging goods – and 10,000 times lighter than ultralight aerogels and carbon foams (also used for packing). Lead researcher Tobias Shandler of HRL explained why the material is so light. He said: "The trick is to fabricate a lattice of interconnected hollow tubes with a wall thickness 1,000 times thinner than a human hair.'' It is so hollow that it is 99 per cent air.

The new material has been made largely of the metal nickel, but Bill Carter, a manager at HRL, said it could be made out of other materials. He said UMM is so light that: "It takes more than 10 seconds…for the lightest material we've made to fall if you drop it from shoulder height.'' The developers believe there are dozens of uses for UMM and that it will be in many everyday objects within the next decade. Computer experts say UMM will help create lighter and faster computers. Another use is impact protection - researchers say that when it is squashed to half its height, the material almost rebounds back to its original form. Other uses include sound dampening and thermal insulation.

WARM-UPS

1. INVENTIONS: Walk around the class and talk to other students about inventions. Change partners often. Sit with your first partner(s) and share your findings.

2. CHAT: In pairs / groups, decide which of these topics or words from the article are most interesting and which are most boring.

> *scientists / material / dandelion / laboratories / ultralight / packaging / fabricate / metal / 10 seconds / feather / dozens / decade / experts / protection / impact*

Have a chat about the topics you liked. Change topics and partners frequently.

3. FUTURE INVENTIONS: What would you like to see? Complete this table with your partner(s). Change partners and share what you wrote. Change and share again.

Invention for...	What?	Why?
computers		
cars		
studying English		
fashion		
games		
pollution		

4. NON-NATURAL: Students A **strongly** believe everything will be human-made in the future; Students B **strongly** believe most things will be natural. Change partners again and talk about your conversations.

5. BEST INVENTIONS: What are they? Rank these and share your rankings with your partner. Put the best at the top. Change partners and share your rankings again.

- wheel
- iPad
- electricity
- television
- jeans
- penicillin
- computers
- airplanes

6. LIGHT: Spend one minute writing down all of the different words you associate with the word 'light'. Share your words with your partner(s) and talk about them. Together, put the words into different categories.

BEFORE READING / LISTENING

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

1. TRUE / FALSE: Read the headline. Guess if a-h below are true (T) or false (F).

a. The world's lightest material is made from dandelions. T / F
b. Three different institutions invented the lightest material. T / F
c. The material is 100 times lighter than commonly-used packaging. T / F
d. The new material has tubes that are 1,000 thinner than human hair. T / F
e. The new material can be made from lots of different things. T / F
f. The new material is so light it floats on the air if you drop it. T / F
g. No one has thought of any uses for it yet. T / F
h. There is very little damage to the material if it gets squashed. T / F

2. SYNONYM MATCH: Match the following synonyms from the article.

1.	invented	a.	specialists
2	rest	b.	common
3.	commonly	c.	mainly
4.	trick	d.	flattened
5.	hollow	e.	often
6.	largely	f.	secret
7.	everyday	g.	sit
8.	experts	h.	protection
9.	squashed	i.	created
10.	insulation	j.	empty

3. PHRASE MATCH: (Sometimes more than one choice is possible.)

1.	It is so light that it can rest on	a.	hollow tubes
2	100 times	b.	objects
3.	material commonly	c.	it is 99 per cent air
4.	a lattice of interconnected	d.	of the metal nickel
5.	It is so hollow that	e.	lighter than styrofoam
6.	made largely	f.	its height
7.	drop it from	g.	top of a dandelion
8.	everyday	h.	insulation
9.	squashed to half	i.	used in packaging goods
10.	thermal	j.	shoulder height

WHILE READING / LISTENING

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

GAP FILL: Put the words into the gaps in the text.

Scientists have invented the world's lightest material. It is (1) _____ light that it can rest on (2) _____ of a dandelion. Researchers from the University of California, the California Institute of Technology, and HRL Laboratories created the material they (3) _____ ''ultralight metallic microlattice'' (UMM). It is 100 times lighter than styrofoam – the material commonly (4) _____ in packaging goods – and 10,000 times lighter than ultralight aerogels and carbon foams (also used for packing). Lead researcher Tobias Shandler of HRL explained (5) _____ the material is so light. He said: "The (6) _____ is to fabricate a lattice of interconnected hollow tubes with a wall thickness 1,000 times (7) _____ than a human hair.'' It is so hollow that it is 99 per cent (8) _____.

used

thinner

top

why

so

air

call

trick

The new material has been made (9) _____ of the metal nickel, but Bill Carter, a manager at HRL, said it could be made out of (10) _____ materials. He said UMM is so light that: "It takes more than 10 seconds…for the lightest material we've made to fall if you (11) _____ it from shoulder height.'' The developers believe there are (12) _____ of uses for UMM and that it will be in many everyday objects (13) _____ the next decade. Computer experts say UMM will help create lighter and faster computers. Another use is (14) _____ protection - researchers say that when it is (15) _____ to half its height, the material almost rebounds back to its original (16) _____. Other uses include sound dampening and thermal insulation.

dozens

other

squashed

impact

largely

drop

form

within

LISTENING – Listen and fill in the gaps

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

Scientists have invented the world's lightest material. _____ it can rest on top of a dandelion. Researchers from the University of California, the California Institute of Technology, and HRL Laboratories _____ they call "ultralight metallic microlattice" (UMM). It is 100 times lighter than styrofoam – the material _____ packaging goods – and 10,000 times lighter than ultralight aerogels and carbon foams (also _____). Lead researcher Tobias Shandler of HRL explained why the _____. He said: "The trick is to _____ of interconnected hollow tubes with a wall thickness 1,000 times thinner than a human hair." It is so hollow that it is 99 per cent air.

The new material has _____ of the metal nickel, but Bill Carter, a manager at HRL, said it could be made out of other materials. He said UMM is so light that: "It takes more than 10 seconds…for the lightest material we've made to fall if you drop it _____." The developers believe there _____ for UMM and that it will be in many _____ the next decade. Computer experts say UMM will help create lighter and faster computers. Another use is _____ - researchers say that when it is squashed to half its height, the material almost rebounds back to its original form. Other uses include _____ and thermal insulation.

AFTER READING / LISTENING

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

1. WORD SEARCH: Look in your dictionary / computer to find collocates, other meanings, information, synonyms … for the words 'ultra' and 'light'.

ultra	**light**

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

2. ARTICLE QUESTIONS: Look back at the article and write down some questions you would like to ask the class about the text.

- Share your questions with other classmates / groups.
- Ask your partner / group your questions.

3. GAP FILL: In pairs / groups, compare your answers to this exercise. Check your answers. Talk about the words from the activity. Were they new, interesting, worth learning…?

4. VOCABULARY: Circle any words you do not understand. In groups, pool unknown words and use dictionaries to find their meanings.

5. TEST EACH OTHER: Look at the words below. With your partner, try to recall how they were used in the text:

• rest • call • 100 • trick • lead • air	• largely • other • drop • within • half • sound

STUDENT INVENTIONS SURVEY

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

Write five GOOD questions about inventions in the table. Do this in pairs. Each student must write the questions on his / her own paper.
When you have finished, interview other students. Write down their answers.

	STUDENT 1 _____	STUDENT 2 _____	STUDENT 3 _____
Q.1.			
Q.2.			
Q.3.			
Q.4.			
Q.5.			

- Now return to your original partner and share and talk about what you found out. Change partners often.
- Make mini-presentations to other groups on your findings.

INVENTIONS DISCUSSION

STUDENT A's QUESTIONS (Do not show these to student B)

a) What did you think when you read the headline?

b) What springs to mind when you hear the word 'invention'?

c) What do you think is the world's greatest ever invention?

d) What do you think of the ultralight metallic microlattice?

e) Would you like to be an inventor?

f) How do you think the scientists invented UMU?

g) Are you impressed by the numbers in the first paragraph?

h) Would you be a good scientists?

i) What's the world's worst ever invention?

j) What would be a good name for this new invention ?

INVENTIONS DISCUSSION

STUDENT B's QUESTIONS (Do not show these to student A)

a) Did you like reading this article?

b) What was the last invention that excited you?

c) What would you like to invent?

d) Do you think inventions of the past were more exciting than today's inventions?

e) Who is the world's greatest inventor?

f) What uses can you think of for UMU?

g) Do you need a faster and lighter computer? Why?

h) Who are the inventors of the 21st century?

i) What will be the most important invention in the future?

j) What questions would you like to ask lead researcher Tobias Shandler?

LANGUAGE – MULTIPLE CHOICE

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Scientists have invented the world's lightest material. It is (1) _____ light that it can (2) _____ on top of a dandelion. Researchers from the University of California, the California Institute of Technology, and HRL Laboratories created the material they call ''ultralight metallic microlattice'' (UMM). It is 100 times lighter than styrofoam – the material (3) _____ used in packaging goods – and 10,000 times lighter than ultralight aerogels and carbon foams (also used for packing). (4) _____ researcher Tobias Shandler of HRL explained why the material is so light. He said: "The (5) _____ is to (6) _____ a lattice of interconnected hollow tubes with a wall thickness 1,000 times thinner than a human hair.'' It is so hollow that it is 99 per cent air.

The new material has been made (7) _____ of the metal nickel, but Bill Carter, a manager at HRL, said it could be made out of other materials. He said UMM is so light that: "It takes more than 10 seconds…for the lightest material we've made to fall if you drop it from shoulder (8) _____.'' The developers believe there are dozens of uses for UMM and that it will be in many (9) _____ objects within the next decade. Computer experts say UMM will help create lighter and faster computers. Another use is impact (10) _____ - researchers say that when it is (11) _____ to half its height, the material almost rebounds back to its original form. Other uses include sound dampening and (12) _____ insulation.

Put the correct words from the table below in the above article.

1.	(a)	such	(b)	very so	(c)	very	(d)	so
2.	(a)	relax	(b)	rest	(c)	chill out	(d)	hang
3.	(a)	commonly	(b)	commoner	(c)	common	(d)	commons
4.	(a)	Iron	(b)	Steel	(c)	Lead	(d)	Gold
5.	(a)	thick	(b)	tick	(c)	trick	(d)	tweak
6.	(a)	fabrication	(b)	fabricate	(c)	fabricated	(d)	fabricates
7.	(a)	largely	(b)	largess	(c)	largest	(d)	large
8.	(a)	breadth	(b)	length	(c)	width	(d)	height
9.	(a)	all day	(b)	everyday	(c)	daytime	(d)	days
10.	(a)	protective	(b)	protects	(c)	protect	(d)	protection
11.	(a)	polished	(b)	demolished	(c)	squashed	(d)	abashed
12.	(a)	thermal	(b)	threat	(c)	thimble	(d)	thought

WRITING

From http://www.BreakingNewsEnglish.com/1111/111121-lightest_material.html

Write about **inventions** for 10 minutes. Correct your partner's paper.

HOMEWORK

1. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

2. INTERNET: Search the Internet and find out more about inventions. Share what you discover with your partner(s) in the next lesson.

3. INVENTIONS: Make a poster about inventions. Show your work to your classmates in the next lesson. Did you all have similar things?

4. UMU: Write a magazine article about the new ultralight metallic microlattice. Include imaginary interviews with the inventors and some industrialists.

Read what you wrote to your classmates in the next lesson. Write down any new words and expressions you hear from your partner(s).

5. LETTER: Write a letter to the inventors. Ask them three questions about ultralight metallic microlattice. Give them three ideas on how it could be used. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

ANSWERS

TRUE / FALSE:

a. F b. T c. T d. F e. T f. F g. F h. T

SYNONYM MATCH:

1.	invented	a.	specialists
2	rest	b.	common
3.	commonly	c.	mainly
4.	trick	d.	flattened
5.	hollow	e.	often
6.	largely	f.	secret
7.	everyday	g.	sit
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PHRASE MATCH:

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7.	drop it from	g.	top of a dandelion
8.	everyday	h.	insulation
9.	squashed to half	i.	used in packaging goods
10.	thermal	j.	shoulder height

GAP FILL:

World's lightest material invented

Scientists have invented the world's lightest material. It is (1) **so** light that it can rest on (2) **top** of a dandelion. Researchers from the University of California, the California Institute of Technology, and HRL Laboratories created the material they (3) **call** ''ultralight metallic microlattice'' (UMM). It is 100 times lighter than styrofoam – the material commonly (4) **used** in packaging goods – and 10,000 times lighter than ultralight aerogels and carbon foams (also used for packing). Lead researcher Tobias Shandler of HRL explained (5) **why** the material is so light. He said: "The (6) **trick** is to fabricate a lattice of interconnected hollow tubes with a wall thickness 1,000 times (7) **thinner** than a human hair.'' It is so hollow that it is 99 per cent (8) **air**.

The new material has been made (9) **largely** of the metal nickel, but Bill Carter, a manager at HRL, said it could be made out of (10) **other** materials. He said UMM is so light that: "It takes more than 10 seconds…for the lightest material we've made to fall if you (11) **drop** it from shoulder height.'' The developers believe there are (12) **dozens** of uses for UMM and that it will be in many everyday objects (13) **within** the next decade. Computer experts say UMM will help create lighter and faster computers. Another use is (14) **impact** protection - researchers say that when it is (15) **squashed** to half its height, the material almost rebounds back to its original (16) **form**. Other uses include sound dampening and thermal insulation.

LANGUAGE WORK

1 - d 2 - b 3 - a 4 - c 5 - c 6 - b 7 - a 8 - d 9 - b 10 - d 11 - c 12 - a