

www.**Breaking News English**.com

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

"1,000 IDEAS & ACTIVITIES FOR LANGUAGE TEACHERS"

The Breaking News English.com Resource Book

<http://www.breakingnewsenglish.com/book.html>

Scientists create energy-making artificial leaf

http://www.breakingnewsenglish.com/1103/110329-alternative_energy.html

Contents

The Article	2
Warm-ups	3
Before Reading / Listening	4
While Reading / Listening	5
Listening Gap Fill	6
After Reading / Listening	7
Student Survey	8
Discussion	9
Language Work	10
Writing	11
Homework	12
Answers	13

29th March, 2011

THE ARTICLE

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

Scientists at the Massachusetts Institute of Technology (MIT) have created what could be a breakthrough in providing clean, alternative energy. Researchers have invented an artificial leaf that splits water into hydrogen and oxygen and stores the energy in a fuel cell. The device is about the size and shape of a playing card, but is even thinner. It is made from silicon and electronic components. The MIT team says it could power a home in a developing country for a whole day just by putting it into water under the Sun. The artificial leaf is also cheap to produce. Research team leader Daniel Nocera said a prototype of his leaf in his laboratory operated non-stop for over 45 hours with no drop in activity.

Technology that can efficiently turn sunlight and water into energy has long been seen as the Holy Grail of science. The conversion of solar energy into hydrogen is one of the answers to the question of how to provide an effective alternative to fossil fuels and thus end our dependence on oil. Nocera's invention could even help save the planet, by turning around global warming. Furthermore, in light of the events at Fukushima, Japan, it might also prove to be a safe replacement for nuclear energy. However, this is all wishful thinking at the moment. The technology, although highly promising, is still in its early stages of development. In the near future, it could provide energy to people in remote areas of sunnier countries.

WARM-UPS

1. ALTERNATIVE ENERGY: Walk around the class and talk to other students about alternative energy. 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 / breakthrough / clean energy / hydrogen / silicon / developing countries / technology / Holy Grail / solar energy / fossil fuels / inventions / global warming

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

3. ENERGY: What are the pros and cons? Complete this table with your partner(s). Change partners and share what you wrote. Change and share again.

	Pros	Cons
Artificial leaf		
Nuclear		
Solar		
Wind power		
Thermal		
Fossil Fuel		

4. CLEAN ENERGY: Students A **strongly** believe it will come in our lifetime; Students B **strongly** believe it won't. Change partners again and talk about your conversations.

5. SAVING: What would you not use to save energy? Rank these and share your rankings with your partner. Put the ones you would not use at the top. Change partners and share your rankings again.

- television
- elevators
- cars
- electric toothbrushes
- air conditioning
- computers
- airplanes
- lights

6. ARTIFICIAL: Spend one minute writing down all of the different words you associate with the word 'artificial'. 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/1103/110329-alternative_energy.html

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

- | | |
|---|-------|
| a. Researchers have made an artificial, living plant. | T / F |
| b. The device the scientists made is the size of a microwave oven. | T / F |
| c. All the device needs to work is water and sunlight. | T / F |
| d. The device can provide power to one home for at least a day. | T / F |
| e. Scientists have been searching for a long time for such an invention. | T / F |
| f. This new discovery could end our reliance on fossil fuels. | T / F |
| g. The inventor asked everyone to think and wish more. | T / F |
| h. The artificial leaf could be operational in the not so distant future. | T / F |

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

- | | |
|----------------|-----------------|
| 1. alternative | a. divides |
| 2. artificial | b. considering |
| 3. splits | c. parts |
| 4. components | d. reliance |
| 5. non-stop | e. synthetic |
| 6. conversion | f. likely |
| 7. dependence | g. continuously |
| 8. in light of | h. substitute |
| 9. promising | i. distant |
| 10. remote | j. changing |

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

- | | |
|---------------------------------------|--------------------------|
| 1. a breakthrough in providing clean, | a. hydrogen and oxygen |
| 2. splits water into | b. for nuclear energy |
| 3. made from silicon and | c. in activity |
| 4. power a home in a | d. into energy |
| 5. for over 45 hours with no drop | e. developing country |
| 6. turn sunlight and water | f. alternative energy |
| 7. The conversion of solar | g. on oil |
| 8. end our dependence | h. of development |
| 9. a safe replacement | i. electronic components |
| 10. still in its early stages | j. energy into hydrogen |

Scientists create energy-making artificial leaf – 29th March, 2011

WHILE READING / LISTENING

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

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

Scientists at the Massachusetts Institute of Technology (MIT) have (1) _____ what could be a breakthrough in providing clean, alternative energy. Researchers have (2) _____ an artificial leaf that splits water into hydrogen and oxygen and (3) _____ the energy in a fuel cell. The device is about the size and shape of a playing card, but is even (4) _____. It is made from silicon and electronic components. The MIT team says it could (5) _____ a home in a developing country for a whole day just by putting it into water under the Sun. The artificial leaf is also cheap to (6) _____. Research team leader Daniel Nocera said a (7) _____ of his leaf in his laboratory operated non-stop for over 45 hours with no (8) _____ in activity.

produce
power
invented
prototype
created
drop
stores
thinner

Technology that can (9) _____ turn sunlight and water into energy has long been seen as the Holy Grail of (10) _____. The conversion of (11) _____ energy into hydrogen is one of the answers to the question of how to provide an effective alternative to fossil (12) _____ and thus end our dependence on oil. Nocera's invention could even help save the planet, by turning around global warming. Furthermore, in (13) _____ of the events at Fukushima, Japan, it might also prove to be a safe replacement for nuclear energy. However, this is all (14) _____ thinking at the moment. The technology, although highly promising, is still in its early (15) _____ of development. In the near future, it could provide energy to people in (16) _____ areas of sunnier countries.

fuels
science
stages
wishful
solar
efficiently
remote
light

LISTENING – Listen and fill in the gaps

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

Scientists at the Massachusetts Institute of Technology (MIT) have created _____ breakthrough in providing clean, alternative energy. Researchers have invented an artificial leaf _____ hydrogen and oxygen and stores the energy in a fuel cell. The device is about the size and shape of a playing card, _____. It is made from silicon and electronic components. The MIT team says it could _____ developing country for a whole day just by putting it into water under the Sun. The artificial leaf is _____. Research team leader Daniel Nocera said a prototype of his leaf in his laboratory operated non-stop for over 45 hours _____.

Technology that can efficiently turn sunlight and water into energy has _____ the Holy Grail of science. The conversion of solar energy into hydrogen is one of the answers to the question of how to provide _____ to fossil fuels and thus end our dependence on oil. Nocera's invention could even _____, by turning around global warming. Furthermore, _____ at Fukushima, Japan, it might also prove to be a safe replacement for nuclear energy. However, this is _____ at the moment. The technology, although highly promising, is still in its early stages of development. _____, it could provide energy to people in remote areas of sunnier countries.

AFTER READING / LISTENING

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

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

alternative	energy
--------------------	---------------

- 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:

<ul style="list-style-type: none">• created• splits• stores• thinner• cheap• drop	<ul style="list-style-type: none">• turn• solar• fossil• turning• wishful• remote
--	--

STUDENT ALTERNATIVE ENERGY SURVEY

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

Write five GOOD questions about alternative energy 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.

ALTERNATIVE ENERGY 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 'artificial'?
- c) What do you think about what you read?
- d) Do you think there will be a great form of alternative energy one day?
- e) Are you worried about our current forms of energy?
- f) How would this invention change the world if all homes and cars used it?
- g) Do you think it sounds too good to be true?
- h) Do you think this could be the greatest invention ever?
- i) What's your favourite form of alternative energy?
- j) What do you do to conserve energy?

Scientists create energy-making artificial leaf – 29th March, 2011
More free lessons at www.BreakingNewsEnglish.com

ALTERNATIVE ENERGY DISCUSSION

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

- a) Did you like reading this article?
- b) What do you think is the Holy Grail of science?
- c) Do you think scientists will ever find the Holy Grail mentioned in the article?
- d) What's wrong with fossil fuels?
- e) What happens if fossil fuels run out before we find an alternative?
- f) Have we become too greedy for energy?
- g) Do you think this invention could reverse global warming?
- h) What do you think of nuclear energy?
- i) What three adjectives would you use to describe this activity (and why)?
- j) What questions would you like to ask the inventor of this device?

Scientists create energy-making artificial leaf – 29th March, 2011
More free lessons at www.BreakingNewsEnglish.com - Copyright Sean Banville 2011

LANGUAGE – MULTIPLE CHOICE

From http://www.BreakingNewsEnglish.com/1103/110329-alternative_energy.html

Scientists at the Massachusetts Institute of Technology (MIT) have created what could be a (1) _____ in providing clean, alternative energy. Researchers have invented an artificial leaf that (2) _____ water into hydrogen and oxygen and (3) _____ the energy in a fuel cell. The device is about the size and shape of a playing card, but is even thinner. It is made from silicon and electronic components. The MIT team says it could power a home in a developing country for a (4) _____ day just (5) _____ putting it into water under the Sun. The artificial leaf is also cheap to produce. Research team leader Daniel Nocera said a prototype of his leaf in his laboratory operated non-stop for over 45 hours with no drop (6) _____ activity.

Technology that can efficiently turn sunlight and water into energy has (7) _____ been seen as the Holy Grail of science. The conversion (8) _____ solar energy into hydrogen is one of the answers to the question of how to provide an effective alternative to fossil fuels and (9) _____ end our dependence on oil. Nocera's invention could even help save the planet, by turning around global warming. Furthermore, in (10) _____ of the events at Fukushima, Japan, it might also prove to be a safe replacement for nuclear energy. However, this is all (11) _____ thinking at the moment. The technology, although highly (12) _____, is still in its early stages of development. In the near future, it could provide energy to people in remote areas of sunnier countries.

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

- | | | | | |
|-----|----------------|--------------|-----------------|------------------|
| 1. | (a) breaking | (b) breaker | (c) breakdown | (d) breakthrough |
| 2. | (a) splits | (b) attacks | (c) pulls | (d) cracks |
| 3. | (a) shops | (b) malls | (c) stores | (d) markets |
| 4. | (a) all | (b) whole | (c) entire | (d) every |
| 5. | (a) at | (b) by | (c) for | (d) to |
| 6. | (a) on | (b) an | (c) in | (d) to |
| 7. | (a) long | (b) length | (c) lengthy | (d) longing |
| 8. | (a) by | (b) at | (c) to | (d) of |
| 9. | (a) this | (b) these | (c) those | (d) thus |
| 10. | (a) lightness | (b) light | (c) lightweight | (d) lighten |
| 11. | (a) wishful | (b) wishes | (c) wished | (d) wishy-washy |
| 12. | (a) requesting | (b) offering | (c) promising | (d) declining |

Scientists create energy-making artificial leaf – 29th March, 2011

More free lessons at www.BreakingNewsEnglish.com - Copyright Sean Banville 2011

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 alternative energy. Share what you discover with your partner(s) in the next lesson.

3. ALTERNATIVE ENERGY: Make a poster about the artificial leaf. Show your work to your classmates in the next lesson. Did you all have similar things?

4. CLEAN ENERGY: Write a magazine article about clean energy. Include imaginary interviews with a scientist working on the artificial leaf and the CEO of an oil company.

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 an energy expert. Ask him/her three questions about alternative energy. Give him/her three reasons why we need it. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

ANSWERS

TRUE / FALSE:

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

SYNONYM MATCH:

- | | |
|----------------|-----------------|
| 1. alternative | a. substitute |
| 2. artificial | b. synthetic |
| 3. splits | c. divides |
| 4. components | d. parts |
| 5. non-stop | e. continuously |
| 6. conversion | f. changing |
| 7. dependence | g. reliance |
| 8. in light of | h. considering |
| 9. promising | i. likely |
| 10. remote | j. distant |

PHRASE MATCH:

- | | |
|---------------------------------------|--------------------------|
| 1. a breakthrough in providing clean, | a. alternative energy |
| 2. splits water into | b. hydrogen and oxygen |
| 3. made from silicon and | c. electronic components |
| 4. power a home in a | d. developing country |
| 5. for over 45 hours with no drop | e. in activity |
| 6. turn sunlight and water | f. into energy |
| 7. The conversion of solar | g. energy into hydrogen |
| 8. end our dependence | h. on oil |
| 9. a safe replacement | i. for nuclear energy |
| 10. still in its early stages | j. of development |

GAP FILL:

Scientists create energy-making artificial leaf

Scientists at the Massachusetts Institute of Technology (MIT) have (1) **created** what could be a breakthrough in providing clean, alternative energy. Researchers have (2) **invented** an artificial leaf that splits water into hydrogen and oxygen and (3) **stores** the energy in a fuel cell. The device is about the size and shape of a playing card, but is even (4) **thinner**. It is made from silicon and electronic components. The MIT team says it could (5) **power** a home in a developing country for a whole day just by putting it into water under the Sun. The artificial leaf is also cheap to (6) **produce**. Research team leader Daniel Nocera said a (7) **prototype** of his leaf in his laboratory operated non-stop for over 45 hours with no (8) **drop** in activity.

Technology that can (9) **efficiently** turn sunlight and water into energy has long been seen as the Holy Grail of (10) **science**. The conversion of (11) **solar** energy into hydrogen is one of the answers to the question of how to provide an effective alternative to fossil (12) **fuels** and thus end our dependence on oil. Nocera's invention could even help save the planet, by turning around global warming. Furthermore, in (13) **light** of the events at Fukushima, Japan, it might also prove to be a safe replacement for nuclear energy. However, this is all (14) **wishful** thinking at the moment. The technology, although highly promising, is still in its early (15) **stages** of development. In the near future, it could provide energy to people in (16) **remote** areas of sunnier countries.

LANGUAGE WORK

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

Scientists create energy-making artificial leaf – 29th March, 2011

More free lessons at www.BreakingNewsEnglish.com - Copyright Sean Banville 2011