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Level 6

Scientists make see-through wood

19th May, 2016

<http://www.breakingnewsenglish.com/1605/160519-transparent-wood.html>

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Please try Levels 0, 1 and 2 (they are easier).

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THE ARTICLE

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Scientists have come up with a revolutionary new use for wood. They have devised a way to make it transparent. This could totally change the way many things in our lives are used and made. See-through wood could one day replace glass and be used in windows and tables, for iPhone screens, and in a whole assortment of other building materials. The innovation has come from researchers at the University of Maryland in the USA. They experimented with different ways to extract the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were very surprised by how transparent it could go. This can really open applications that can potentially replace glass and some optical materials."

The researchers worked with a small block of linden wood. They boiled it in water, sodium hydroxide and other chemicals for about two hours. A molecule called lignin, which gives wood its colour, disappeared during the boiling process. This left behind colourless cells, which effectively made the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It is better at insulating against the cold and it is biodegradable. Research is still in its infancy and the process can currently only be done on 10cm by 10cm blocks of wood that range in thickness between paper-thin and a centimeter thick. The researchers will now focus on applying the process on a much larger scale.

Sources: <http://www.techtimes.com/articles/158759/20160516/scientists-create-transparent-wood-stronger-more-insulating-glass.htm>
<http://www.engadget.com/2016/05/16/see-through-wood/>
<http://www.nytimes.com/2016/05/12/science/see-through-wood.html>

WARM-UPS

1. WOOD: Students walk around the class and talk to other students about wood. Change partners often and share your findings.

2. CHAT: In pairs / groups, talk about these topics or words from the article. What will the article say about them? What can you say about these words and your life?

scientists / revolutionary / transparent / see-through / materials / chemicals / glass / block of wood / boiled / disappeared / cells / insulating / the cold / thickness / process

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

3. GLASS: Students A **strongly** believe glass is better than wood; Students B **strongly** believe wood is better than glass. Change partners again and talk about your conversations.

4. SEE-THROUGH: How useful (or otherwise) would these things be if they were see-through? Complete this table with your partner(s). Change partners often and share what you wrote.

	Useful	Not useful
Doors		
Cups		
Fridges		
Our body		
Politicians' minds		
Small print		

5. REVOLUTIONARY: Spend one minute writing down all of the different words you associate with the word "revolutionary". Share your words with your partner(s) and talk about them. Together, put the words into different categories.

6. TRANSPARENT WOOD: Rank these with your partner. Put the best uses for transparent wood at the top. Change partners often and share your rankings.

- windows
- tables
- iPhone screens
- jam jars
- reading glasses
- car windscreens / windshields
- light bulbs
- marbles

BEFORE READING / LISTENING

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

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

- a. The article said the new use for wood was revolutionary. **T / F**
- b. The article says see-through wood could replace glass. **T / F**
- c. Researchers looked at ways to give the wood added colour. **T / F**
- d. Scientists were surprised at how transparent the wood became. **T / F**
- e. The researchers worked with large blocks of wood. **T / F**
- f. The researchers boiled the wood for around two hours. **T / F**
- g. Glass is still stronger than the transparent wood. **T / F**
- h. The transparent wood changes so it is no longer biodegradable. **T / F**

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

- | | |
|------------------|-----------------|
| 1. come up with | a. remove |
| 2. revolutionary | b. substitute |
| 3. totally | c. protecting |
| 4. extract | d. clear |
| 5. replace | e. innovative |
| 6. block | f. carrying out |
| 7. transparent | g. completely |
| 8. insulating | h. early stages |
| 9. infancy | i. create |
| 10. applying | j. chunk |

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

- | | |
|---------------------------------|----------------------|
| 1. come up with a revolutionary | a. infancy |
| 2. devised a way to make it | b. wood |
| 3. See-through | c. in water |
| 4. a whole | d. transparent |
| 5. potentially replace | e. in thickness |
| 6. They boiled it | f. new use |
| 7. better at insulating | g. much larger scale |
| 8. Research is still in its | h. glass |
| 9. blocks of wood that range | i. assortment |
| 10. applying the process on a | j. against the cold |

GAP FILL

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Scientists have come up with a (1) _____ new use for wood. They have (2) _____ a way to make it transparent. This could totally change the way many things in our lives are used and made. See-through wood could one day (3) _____ glass and be used in windows and tables, for iPhone screens, and in a whole (4) _____ of other building materials. The (5) _____ has come from researchers at the University of Maryland in the USA. They experimented with different ways to (6) _____ the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were very (7) _____ by how transparent it could go. This can really open applications that can (8) _____ replace glass and some optical materials."

replace
revolutionary
innovation
surprised
devised
potentially
assortment
extract

The researchers worked with a small (9) _____ of linden wood. They (10) _____ it in water, sodium hydroxide and other chemicals for about two hours. A molecule called lignin, which gives wood its colour, disappeared during the boiling (11) _____. This left behind colourless cells, which (12) _____ made the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It is better at (13) _____ against the cold and it is biodegradable. Research is still in its (14) _____ and the process can currently only be done on 10cm by 10cm blocks of wood that (15) _____ in thickness between paper-thin and a centimeter thick. The researchers will now focus on applying the process on a much larger (16) _____.

process
insulating
boiled
range
block
scale
effectively
infancy

LISTENING – Guess the answers. Listen to check.

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

- 1) Scientists have come up with a revolutionary new _____
 - a. uses for wood
 - b. used for wood
 - c. user for wood
 - d. use for wood
- 2) This could totally change the way many things in our lives are _____
 - a. used and make
 - b. uses and made
 - c. used and made
 - d. uses and make
- 3) used in windows and tables, for iPhone screens, and in a whole _____ building materials
 - a. a sort meant of other
 - b. as sort meant of other
 - c. assortment of other
 - d. a sort mint of other
- 4) They experimented with different ways to extract the chemicals _____
 - a. from woods
 - b. from woody
 - c. from wood
 - d. from wooded
- 5) open applications that can potentially replace glass and some _____
 - a. optical materials
 - b. optically materials
 - c. optic all materials
 - d. opt tickle materials
- 6) A molecule called lignin, which gives wood its colour, disappeared during _____
 - a. the boil in process
 - b. the boiling in process
 - c. the boiling processes
 - d. the boiling process
- 7) This left behind colourless cells, which effectively made the _____
 - a. wood transparency
 - b. wood transparent
 - c. wood transparencies
 - d. wood trans apparent
- 8) It is better at insulating against the cold and _____
 - a. it is biodegradable
 - b. it is biodegrading
 - c. it is biodegraded
 - d. it is biodegrade able
- 9) blocks of wood that range in thickness between paper-thin and _____
 - a. a centimeter thick
 - b. a centimeter thickness
 - c. a centimeter thickly
 - d. a centimeter thicket
- 10) The researchers will now focus on applying the process on a _____
 - a. much larger scale
 - b. much large a scales
 - c. much larger scaled
 - d. much large a scale

LISTENING – Listen and fill in the gaps

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Scientists have (1) _____ revolutionary new use for wood. They have devised a way to make it transparent. This could totally change the way many things (2) _____ used and made. See-through wood could (3) _____ glass and be used in windows and tables, for iPhone screens, and in a (4) _____ of other building materials. The innovation has come from researchers at the University of Maryland in the USA. They experimented (5) _____ extract the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We (6) _____ by how transparent it could go. This can really open applications that can potentially replace glass and some optical materials."

The researchers worked with (7) _____ linden wood. They boiled it in water, sodium hydroxide and other chemicals for about two hours. A molecule called lignin, (8) _____ its colour, disappeared during (9) _____. This left behind colourless cells, which effectively made the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It (10) _____ against the cold and it is biodegradable. Research is still in its infancy and the process (11) _____ be done on 10cm by 10cm blocks of wood that range in thickness between paper-thin and a centimeter thick. The researchers will now (12) _____ the process on a much larger scale.

COMPREHENSION QUESTIONS

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

1. Who came up with a revolutionary new idea?
2. What screens did the article say the transparent wood could replace?
3. What is the name of the university that did this research?
4. What did the chemicals the researchers extracted give to the wood?
5. What materials besides glass could the transparent wood replace?
6. What kind of wood did the researchers work with?
7. For how long did researchers boil the wood?
8. What kind of cells remained after the boiling process?
9. What is wood better at doing than glass against the cold?
10. How thin was the thinnest wood the researchers tested?

MULTIPLE CHOICE - QUIZ

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

- 1) Who came up with a revolutionary new idea?
 - a) woodcutters
 - b) scientists
 - c) forestry experts
 - d) carpenters
- 2) What screens did the article say the transparent wood could replace?
 - a) car windscreens
 - b) cinema screens
 - c) iPhone screens
 - d) TV screens
- 3) What is the name of the university that did this research?
 - a) Glassland
 - b) Woodland
 - c) Disneyland
 - d) Maryland
- 4) What did the chemicals the researchers extracted give to the wood?
 - a) transparency
 - b) colour
 - c) volume
 - d) smell
- 5) What materials besides glass could the transparent wood replace?
 - a) optical materials
 - b) biodegradable materials
 - c) glassy materials
 - d) waste materials
- 6) What kind of wood did the researchers work with?
 - a) linden
 - b) cedar
 - c) pine
 - d) mahogany
- 7) For how long did researchers boil the wood?
 - a) just under 2 hours
 - b) 2 hours and 22 seconds
 - c) exactly 2 hours
 - d) around 2 hours
- 8) What kind of cells remained after the boiling process?
 - a) bark cells
 - b) woody cells
 - c) colourless cells
 - d) grainy cells
- 9) What is wood better at doing than glass against the cold?
 - a) seeing
 - b) keeping birds out
 - c) keeping rain out
 - d) insulating
- 10) How thin was the thinnest wood the researchers tested?
 - a) a micron-and-a-half thin
 - b) paper thin
 - c) as thin as a hair
 - d) 1mm thin

ROLE PLAY

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Role A – Windows

You think windows are the best things that could be made from transparent wood. Tell the others three reasons why. Tell them why their things would be no good. Also, tell the others which is the most useless of these (and why): iPhone screens, jam jars or car windscreens.

Role B – iPhone screens

You think iPhone screens are the best things that could be made from transparent wood. Tell the others three reasons why. Tell them why their things would be no good. Also, tell the others which is the most useless of these (and why): windows, jam jars or car windscreens.

Role C – Jam jars

You think jam jars are the best things that could be made from transparent wood. Tell the others three reasons why. Tell them why their things would be no good. Also, tell the others which is the most useless of these (and why): iPhone screens, windows or car windscreens.

Role D – Car windscreens

You think car windscreens are the best things that could be made from transparent wood. Tell the others three reasons why. Tell them why their things would be no good. Also, tell the others which is the most useless of these (and why): iPhone screens, jam jars or windows.

AFTER READING / LISTENING

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

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

see	through
------------	----------------

- 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">• way• lives• whole• extract• surprised• some	<ul style="list-style-type: none">• boiled• disappeared• left• less• infancy• much
--	---

WOOD SURVEY

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Write five GOOD questions about wood 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.

WOOD DISCUSSION

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

1. What did you think when you read the headline?
2. What springs to mind when you hear the word 'wood'?
3. What do you think about what you read?
4. What could we use transparent wood for?
5. Why might transparent wood be better than glass?
6. Will demand for transparent wood mean a bigger danger to forests?
7. How good would unbreakable mobile phone screens be?
8. How big an innovation do you think this is?
9. What do we need glass for?
10. What other things would you like to be transparent?

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WOOD DISCUSSION

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

11. Did you like reading this article? Why/not?
12. What do you think of the process the scientists used?
13. How dangerous is glass?
14. When do you think we will start using transparent wood?
15. How useful is wood?
16. In what ways might glass be better than transparent wood?
17. Would you prefer to have transparent wood or glass?
18. What would a house built from transparent wood be like?
19. What will the transparent wood industry look like in 50 years?
20. What questions would you like to ask the researchers?

DISCUSSION (Write your own questions)

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

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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DISCUSSION (Write your own questions)

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

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

LANGUAGE - CLOZE

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Scientists have come (1) _____ with a revolutionary new use for wood. They have devised a (2) _____ to make it transparent. This could totally change the way many things in our lives are used and made. See-through wood could (3) _____ day replace glass and be used in windows and tables, for iPhone screens, and in a whole (4) _____ of other building materials. The innovation has come from researchers at the University of Maryland in the USA. They experimented with different ways to (5) _____ the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were very surprised by how transparent it could go. This can really open applications that can (6) _____ replace glass and some optical materials."

The researchers worked with a small block of linden wood. They boiled it in water, sodium hydroxide and other (7) _____ for about two hours. A molecule called lignin, which gives wood its colour, disappeared (8) _____ the boiling process. This left (9) _____ colourless cells, which effectively made the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It is better at insulating (10) _____ the cold and it is biodegradable. Research is still in its (11) _____ and the process can currently only be done on 10cm by 10cm blocks of wood that range in thickness between paper-thin and a centimeter thick. The researchers will now focus (12) _____ applying the process on a much larger scale.

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

- | | | | | |
|-----|---------------|-----------------|--------------|----------------|
| 1. | (a) up | (b) down | (c) over | (d) by |
| 2. | (a) how | (b) mean | (c) way | (d) chance |
| 3. | (a) once | (b) only | (c) one | (d) own |
| 4. | (a) testament | (b) allotment | (c) assorted | (d) assortment |
| 5. | (a) extract | (b) exact | (c) expect | (d) extant |
| 6. | (a) potential | (b) potentially | (c) portent | (d) potent |
| 7. | (a) chemistry | (b) chemists | (c) chemical | (d) chemicals |
| 8. | (a) while | (b) during | (c) along | (d) between |
| 9. | (a) among | (b) between | (c) behind | (d) front |
| 10. | (a) as | (b) with | (c) by | (d) against |
| 11. | (a) infant | (b) infanticide | (c) infants | (d) infancy |
| 12. | (a) to | (b) on | (c) as | (d) from |

SPELLING

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Paragraph 1

1. devised a way to make it rsnattpenar
2. a whole ssetaomrtn of other building materials
3. The nvanioitn has come from researchers
4. different ways to rctxeta the chemicals
5. applications that can lntyapltoe replace glass
6. some paitclo materials

Paragraph 2

7. A ocelumel called lignin
8. which eifelycevt made the wood
9. better at stgnaluiin against the cold
10. it is oibdegaelabdr
11. research is still in its ynicnaf
12. alpgpniy the process on a much larger scale

PUT THE TEXT BACK TOGETHER

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Number these lines in the correct order.

- () day replace glass and be used in windows and tables, for iPhone screens, and in a whole assortment of other building
- () with different ways to extract the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were
- () only be done on 10cm by 10cm blocks of wood that range in thickness between paper-
- () thin and a centimeter thick. The researchers will now focus on applying the process on a much larger scale.
- (**1**) Scientists have come up with a revolutionary new use for wood. They have devised a way to make it
- () materials. The innovation has come from researchers at the University of Maryland in the USA. They experimented
- () hydroxide and other chemicals for about two hours. A molecule called lignin, which gives wood its colour, disappeared
- () at insulating against the cold and it is biodegradable. Research is still in its infancy and the process can currently
- () the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It is better
- () during the boiling process. This left behind colourless cells, which effectively made
- () applications that can potentially replace glass and some optical materials."
- () The researchers worked with a small block of linden wood. They boiled it in water, sodium
- () very surprised by how transparent it could go. This can really open
- () transparent. This could totally change the way many things in our lives are used and made. See-through wood could one

PUT THE WORDS IN THE RIGHT ORDER

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

1. new use for wood Scientists have come up with a revolutionary .
2. have make devised it a transparent way They to .
3. extract to ways Different wood from chemicals the .
4. could were by it We surprised transparent go very how .
5. that potentially glass applications can replace Open .
6. with block wood worked small linden researchers a of The .
7. The dangerous less and stronger lot a is wood through - see .
8. the cold It is better at insulating against .
9. thickness between paper - thin and a centimeter thick Range in .
10. scale applying on larger on process much Focus the a .

CIRCLE THE CORRECT WORD (20 PAIRS)

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Scientists have come *down / up* with a revolutionary new use for wood. They have *devised / revised* a way to make it transparent. This could *total / totally* change the way many things in our lives are used and made. See-through wood could *one / only* day replace glass and be used in windows and tables, for iPhone screens, and in a whole *assorted / assortment* of other building materials. The *innovation / innovative* has come from researchers at the University of Maryland in the USA. They experimented with different ways to *extant / extract* the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were very *surprising / surprised* by how transparent it could go. This can *really / real* open applications that can potentially replace glass and some *optical / optician* materials."

The researchers worked with a small block of linden wood. They boiled it *in / by* water, sodium hydroxide and other *chemical / chemicals* for about two hours. A molecule called lignin, which *gives / giving* wood its colour, disappeared during the boiling *pretext / process*. This left behind colourless cells, which effectively made the wood *transparency / transparent*. The see-through wood is a lot *stronger / strength* and less dangerous than glass. It is better at *insulating / insulated* against the cold and it is biodegradable. Research is still in its *infancy / fancy* and the process can currently only be done on 10cm by 10cm blocks of wood that *large / range* in thickness between paper-thin and a centimeter thick. The researchers will now focus *on / at* applying the process on a much larger scale.

Talk about the connection between each pair of words in italics, and why the correct word is correct.

INSERT THE VOWELS (a, e, i, o, u)

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

Sc__nt__sts h__v__c__m__ _p w__th _ r__v__l__t__n__ry n__w
_s__f__r__w__d. Th__y h__v__d__v__s__d__ _w__y t__m__k__t
tr__nsp__r__nt. Th__s c__ld t__t__lly ch__ng__ th__w__y m__ny
th__ngs _n__ _r__l__v__s__ _r__ _s__d__ _nd m__d__. S__-thr__gh
w__d c__ld _n__d__y r__pl__c__ gl__ss _nd b__ _s__d__ _n
w__nd__ws _nd t__bl__s, f__r__ Ph__n__scr__ns, _nd _n__
wh__l__ _ss__rtm__nt _f__ th__r b__ld__ng m__t__r__ls. Th__
_nn__v__t__n h__s c__m__ fr__m r__s__rch__rs _t th__
_n__v__rs__ty _f M__ryl__nd _n th__ _S__. Th__y
_xp__r__m__nt__d w__th d__ff__r__nt w__ys t__ _xtr__ct th__
ch__m__c__ls fr__m w__d th__t g__v__ _t c__l__r. R__s__rch__r
L__ngb__ng H__s__d: "W__w__r__v__ry s__rpr__s__d by h__w
tr__nsp__r__nt _t c__ld g__. Th__s c__n r__lly _p__n
_ppl__c__t__ns th__t c__n p__t__nt__lly r__pl__c__ gl__ss _nd
s__m__pt__c__l m__t__r__ls."

Th__r__s__rch__rs w__rk__d w__th _ sm__ll bl__ck _f l__nd__n
w__d. Th__y b__ld__t__n w__t__r, s__d__m hydr__x__d__ _nd
_th__r ch__m__c__ls f__r _b__t tw__ h__rs. _ m__l__c__l
c__ll__d l__gn__n, wh__ch g__v__s w__d _ts c__l__r,
d__spp__r__d d__r__ng th__ b__ld__ng pr__c__ss. Th__s l__ft
b__h__nd c__l__rl__ss c__lls, wh__ch _ff__ct__v__ly m__d__ th__
w__d tr__nsp__r__nt. Th__s__-thr__gh w__d _s__ l__t
str__ng__r _nd l__ss d__ng__r__s th__n gl__ss. _t__s b__tt__r _t
_ns l__t__ng _g__nst th__ c__ld _nd _t__s b__d__gr__d__bl__.
R__s__rch__s st__ll _n__ts _nf__ncy _nd th__ pr__c__ss c__n
c__rr__ntly _nly b__d__n__ _n 10cm by 10cm bl__cks _f w__d
th__t r__ng__ _n th__ckn__ss b__tw__n p__p__r-th__n _nd _
c__nt__m__t__r th__ck. Th__r__s__rch__rs w__ll n__w f__c__s__ _n
_ppl__y__ng th__ pr__c__ss _n _m__ch l__rg__r sc__l__.

PUNCTUATE THE TEXT AND ADD CAPITALS

From <http://www.BreakingNewsEnglish.com/1605/160519-transparent-wood.html>

scientists have come up with a revolutionary new use for wood they have devised a way to make it transparent this could totally change the way many things in our lives are used and made see-through wood could one day replace glass and be used in windows and tables for iphone screens and in a whole assortment of other building materials the innovation has come from researchers at the university of maryland in the usa they experimented with different ways to extract the chemicals from wood that give it colour researcher liangbing hu said "we were very surprised by how transparent it could go this can really open applications that can potentially replace glass and some optical materials"

the researchers worked with a small block of linden wood they boiled it in water sodium hydroxide and other chemicals for about two hours a molecule called lignin which gives wood its colour disappeared during the boiling process this left behind colourless cells which effectively made the wood transparent the see-through wood is a lot stronger and less dangerous than glass it is better at insulating against the cold and it is biodegradable research is still in its infancy and the process can currently only be done on 10cm by 10cm blocks of wood that range in thickness between paper-thin and a centimeter thick the researchers will now focus on applying the process on a much larger scale

PUT A SLASH (/) WHERE THE SPACES ARE

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Scientists have come up with a revolutionary new use for wood. They have devised a way to make it transparent. This could totally change the way many things in our lives are used and made. See-through wood could one day replace glass and be used in windows and tables, for iPhone screens, and in a whole assortment of other building materials. The innovation has come from researchers at the University of Maryland in the USA. They experimented with different ways to extract the chemicals from wood that give it colour. Researcher Liangbing Hu said: "We were very surprised by how transparent it could go. This can really open applications that can potentially replace glass and some optical materials." The researchers worked with a small block of linden wood. They boiled it in water, sodium hydroxide and other chemicals for about two hours. A molecule called lignin, which gives wood its colour, disappeared during the boiling process. This left behind colourless cells, which effectively made the wood transparent. The see-through wood is a lot stronger and less dangerous than glass. It is better at insulating against the cold and it is biodegradable. Research is still in its infancy and the process can currently only be done on 10cm by 10cm blocks of wood that range in thickness between paper-thin and a centimetre thick. The researchers will now focus on applying the process on a much larger scale.

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 the research on transparent wood. Share what you discover with your partner(s) in the next lesson.

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

4. TRANSPARENT WOOD: Write a magazine article about transparent wood replacing glass. Include imaginary interviews with people who are for and against this.

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. WHAT HAPPENED NEXT? Write a newspaper article about the next stage in this news story. Read what you wrote to your classmates in the next lesson. Give each other feedback on your articles.

6. LETTER: Write a letter to an expert on trees. Ask him/her three questions about transparent. Give him/her three of your concerns about how transparent wood might be bad for the environment. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

ANSWERS

TRUE / FALSE (p.4)

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

SYNONYM MATCH (p.4)

- | | |
|------------------|-----------------|
| 1. come up with | a. create |
| 2. revolutionary | b. innovative |
| 3. totally | c. completely |
| 4. extract | d. remove |
| 5. replace | e. substitute |
| 6. block | f. chunk |
| 7. transparent | g. clear |
| 8. insulating | h. protecting |
| 9. infancy | i. early stages |
| 10. applying | j. carrying out |

COMPREHENSION QUESTIONS (p.8)

1. Scientists
2. iPhone screens
3. The University of Maryland
4. Colour
5. Optical materials
6. Linden wood
7. Around 2 hours
8. Colourless cells
9. Insulating
10. Paper thin

MULTIPLE CHOICE - QUIZ (p.9)

1. b 2. c 3. d 4. b 5. a 6. a 7. d 8. c 9. d 10. b

ALL OTHER EXERCISES

Please check for yourself by looking at the Article on page 2.
(It's good for your English ;-)