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Level 6

Bacteria-filled concrete to end holes in roads

5th December, 2014

<http://www.breakingnewsenglish.com/1412/141205-potholes.html>

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Please try Levels 4 and 5 (they are easier).

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THE ARTICLE

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Drivers the world over may soon have respite from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff have come up with a novel and innovative solution to plugging gaps and holes in roads and highways. They have created a bacteria-filled concrete to prevent cracks in a road from becoming larger. The concrete is full of bacteria that open when water seeps into a crack. The bacteria burst open and inject limestone into the crack, thus filling and repairing it to avert more serious damage. The scientists believe their discovery could considerably increase the lifespan of roads, reduce repairs, and lower roadwork costs by up to 50 per cent.

The new concrete could be good news for the environment. Scientists estimate that over seven per cent of the world's CO2 emissions come from the production of cement. If less cement is needed to repair roads, there will be fewer pollutants entering the atmosphere. Another benefit of the new cement is a reduction in accidents, injuries and deaths that result from potholes. Thousands of motorists and pedestrians worldwide are killed because drivers swerve to avoid holes in roads. There is also good news for local governments. In Britain alone, at least 40,000 drivers a year claim compensation for damages to their car caused by potholes. The concrete could be put to use in the next 20 years.

Sources: <http://www.telegraph.co.uk/news/uknews/road-and-rail-transport/11268310/The-end-of-potholes-UK-scientists-invent-self-healing-concrete.html>
<http://www.dailymail.co.uk/news/article-2858316/Potholes-fix-Engineers-say-self-healing-concrete-use-bacteria-stop-cracks-gaps-getting-bigger-used-future.html#ixzz3Kula2kCB>
<http://eandt.theiet.org/news/2014/dec/future-highways-arup.cfm>

WARM-UPS

1. ROADS: Students walk around the class and talk to other students about roads. 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?

drivers / respite / innovative / solution / bacteria / serious damage / lifespan / repairs / concrete / CO2 / emissions / pollutants / pedestrians / governments / compensation

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

3. HIGHWAYS: How can we make them better? Complete this table with your partner(s). Change partners often and share what you wrote.

	Problems now	Solutions
Safety		
Signs		
Internet		
Rest stops		
Pedestrians		
Road works		

4. PATHS: Students A **strongly** believe there should be more footpaths and cycle paths and fewer roads; Students B **strongly** believe the opposite. Change partners again and talk about your conversations.

5. ROAD DANGERS: Rank these with your partner. Put the biggest dangers at the top. Change partners often and share your rankings.

- holes
- pedestrians
- speeding
- cyclists
- poor signs
- speed limits
- animals
- trucks

6. SOLUTION: Spend one minute writing down all of the different words you associate with the word "solution". 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/1412/141205-potholes.html>

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

- | | |
|--|-------|
| a. Only drivers in British university cities will get the new roads. | T / F |
| b. Scientists have developed a bacteria that is sprayed on top of roads. | T / F |
| c. The bacteria open to release gap-plugging limestone. | T / F |
| d. Scientists estimate the new concrete will reduce repair costs by 20%. | T / F |
| e. Seven per cent of CO2 emissions is from the production of concrete. | T / F |
| f. The new concrete could lead to a reduction in levels of pollution. | T / F |
| g. Around 40,000 motorists in the UK die each year because of potholes. | T / F |
| h. The new concrete could be in use in the next two decades. | T / F |

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

- | | |
|-------------|---------------------|
| 1. drivers | a. leaks |
| 2. respite | b. change direction |
| 3. novel | c. reduce |
| 4. seeps | d. original |
| 5. lower | e. guess |
| 6. estimate | f. not less than |
| 7. benefit | g. motorists |
| 8. swerve | h. ask for |
| 9. at least | i. advantage |
| 10. claim | j. relief |

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

- | | |
|---------------------------------------|----------------------------|
| 1. a novel and innovative | a. entering the atmosphere |
| 2. when water seeps | b. to 50 per cent |
| 3. repairing it to avert | c. pedestrians |
| 4. considerably increase the lifespan | d. news |
| 5. lower roadwork costs by up | e. more serious damage |
| 6. The new concrete could be good | f. solution |
| 7. CO2 | g. put to use |
| 8. there will be fewer pollutants | h. of roads |
| 9. motorists and | i. into a crack |
| 10. The concrete could be | j. emissions |

GAP FILL

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Drivers the world over may soon have (1) _____ from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff have come up with a (2) _____ and innovative solution to plugging (3) _____ and holes in roads and highways. They have created a bacteria-filled concrete to (4) _____ cracks in a road from becoming larger. The concrete is full of bacteria that open when water (5) _____ into a crack. The bacteria burst open and (6) _____ limestone into the crack, thus filling and repairing it to avert more (7) _____ damage. The scientists believe their discovery could considerably increase the (8) _____ of roads, reduce repairs, and lower roadwork costs by up to 50 per cent.

inject
lifespan
novel
prevent
respite
serious
gaps
seeps

The new concrete could be good (9) _____ for the environment. Scientists estimate that over seven per cent of the world's CO2 (10) _____ come from the production of cement. If less cement is needed to repair roads, there will be fewer (11) _____ entering the atmosphere. Another benefit of the new cement is a reduction in accidents, injuries and deaths that (12) _____ from potholes. Thousands of motorists and pedestrians worldwide are killed because drivers (13) _____ to avoid holes in roads. There is also good news for local governments. In Britain (14) _____, at least 40,000 drivers a year (15) _____ compensation for damages to their car caused by potholes. The concrete could be put to (16) _____ in the next 20 years.

swerve
claim
emissions
result
news
use
pollutants
alone

LISTENING – Guess the answers. Listen to check.

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

- 1) Drivers the world over may soon _____ potholes
 - a. have rest from
 - b. have despite from
 - c. have respite from
 - d. have rest spite from
- 2) come up with a novel and innovative solution to plugging _____
 - a. gapes and holes
 - b. gaps and holes
 - c. caps and holes
 - d. capes and holes
- 3) The concrete is full of bacteria that open when _____ a crack
 - a. water seeps into
 - b. water sweeps into
 - c. water sleeps into
 - d. water steps into
- 4) The scientists believe their discovery could considerably increase _____
 - a. the lifespan for roads
 - b. the lifespan from roads
 - c. the lifespan of roads
 - d. the lifespan if roads
- 5) reduce repairs and lower roadwork costs _____ 50 per cent
 - a. buy up to
 - b. by upper to
 - c. by up too
 - d. by up to
- 6) over seven per cent of the world's _____
 - a. CO2 emissions
 - b. see O2 emissions
 - c. CO two emissions
 - d. see oh too emissions
- 7) Another benefit of the new cement is a reduction _____
 - a. in accidents
 - b. on accidents
 - c. an accidents
 - d. of accidents
- 8) There is also good news for _____
 - a. locals governments
 - b. local governments
 - c. locally governments
 - d. locale governments
- 9) claim compensation for damages to their car _____
 - a. cause by potholes
 - b. causal by potholes
 - c. causes by potholes
 - d. caused by potholes
- 10) The concrete could be put to use in _____
 - a. the next 20 years
 - b. a next 20 years
 - c. from next 20 years
 - d. this next 20 years

LISTENING – Listen and fill in the gaps

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Drivers the world over may (1) _____ from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff (2) _____ a novel and innovative solution to plugging gaps and holes in roads and highways. They have created a bacteria-filled concrete (3) _____ in a road from becoming larger. The concrete is full of bacteria that open when water seeps into a crack. The bacteria (4) _____ inject limestone into the crack, thus filling and repairing (5) _____ more serious damage. The scientists believe their discovery could considerably (6) _____ of roads, reduce repairs, and lower roadwork costs by up to 50 per cent.

The new concrete could be (7) _____ the environment. Scientists estimate that over seven per cent of the world's CO2 emissions come from the production of cement. If less (8) _____ to repair roads, there will be (9) _____ entering the atmosphere. Another benefit of the new cement is a reduction in accidents, injuries and deaths (10) _____ potholes. Thousands of motorists and pedestrians worldwide are killed because drivers swerve to avoid holes in roads. There is (11) _____ for local governments. In Britain alone, at least 40,000 drivers a year claim compensation for damages to their car caused by potholes. The concrete could (12) _____ the next 20 years.

COMPREHENSION QUESTIONS

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

1. Where are the drivers from who will have respite from cracks in roads?

2. What two adjectives described the solution to plugging gaps?

3. What seeps into a crack that activates the bursting of bacteria?

4. What gets injected by the bacteria into the cracks?

5. What could get reduced by up to 50 per cent?

6. What could the new concrete be good news for?

7. How much of the world's CO2 emissions come from cement production?

8. What will there be less of in the air if the new cement is used?

9. What do many drivers do to avoid holes in roads?

10. How many UK drivers claim compensation each year?

MULTIPLE CHOICE - QUIZ

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

1. Where are the drivers from who will have respite from cracks in roads?
 - a) China
 - b) the world over
 - c) three British universities
 - d) the USA
2. What two adjectives described the solution to plugging gaps?
 - a) hard and soft
 - b) ready and available
 - c) bookish and cutting-edge
 - d) novel and innovative
3. What seeps into a crack that activates the bursting of bacteria?
 - a) water
 - b) CO₂
 - c) tar
 - d) dirt
4. What gets injected by the bacteria into the cracks?
 - a) plastic
 - b) tar
 - c) limestone
 - d) CO₂
5. What could get reduced by up to 50 per cent?
 - a) the number of cars
 - b) roadwork repairs
 - c) traffic jams
 - d) CO₂ emissions
6. What could the new concrete be good news for?
 - a) the environment
 - b) cyclists
 - c) city planners
 - d) tar companies
7. How much of the world's CO₂ emissions come from cement production?
 - a) 5%
 - b) 6%
 - c) 7%
 - d) 8%
8. What will there be less of in the air if the new cement is used?
 - a) pollutants
 - b) light
 - c) dust
 - d) bees
9. What do many drivers do to avoid holes in roads?
 - a) swerve
 - b) stop
 - c) speed up
 - d) reverse
10. How many UK drivers claim compensation each year?
 - a) just under 40,000
 - b) between 14,000 and 40,000
 - c) around 14,000
 - d) over 40,000

ROLE PLAY

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Role A – Roads

You think the government needs to spend more money on roads. Tell the others three reasons why. Tell them why their things aren't so good. Also, tell the others which is the least important of these (and why): trains, airports or cycle paths.

Role B – Trains

You think the government needs to spend more money on trains. Tell the others three reasons why. Tell them why their things aren't so good. Also, tell the others which is the least important of these (and why): roads, airports or cycle paths.

Role C – Airports

You think the government needs to spend more money on airports. Tell the others three reasons why. Tell them why their things aren't so good. Also, tell the others which is the least important of these (and why): trains, roads or cycle paths.

Role D – Cycle paths

You think the government needs to spend more money on cycle paths. Tell the others three reasons why. Tell them why their things aren't so good. Also, tell the others which is the least important of these (and why): trains, airports or roads.

AFTER READING / LISTENING

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

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

crack	hole
--------------	-------------

- 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">• soon• novel• larger• full• serious• costs	<ul style="list-style-type: none">• news• less• benefit• because• least• 20
--	--

ROADS SURVEY

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Write five GOOD questions about roads 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.

ROADS DISCUSSION

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

- 11) Did you like reading this article? Why/not?
- 12) What good news have you heard about the environment?
- 13) How can we reduce CO2 emissions from roads and cars?
- 14) How can we reduce accidents on roads?
- 15) Should there be more space for pedestrians and less space for cars?
- 16) Do people in your country drive well?
- 17) What are the biggest causes of traffic accidents?
- 18) Have you ever been in a traffic accident?
- 19) How excited are you about this new concrete?
- 20) What questions would you like to ask the researchers?

Bacteria-filled concrete to end holes in roads – 5th December, 2014
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ROADS DISCUSSION

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

- 1) What did you think when you read the headline?
- 2) What springs to mind when you hear the word 'road'?
- 3) What is the condition of roads like in your country?
- 4) What do you think about what you read?
- 5) Should there be more roads or fewer roads?
- 6) How can city planners make roads better?
- 7) How serious a problem are potholes?
- 8) What do you think of the 'self-repairing' concrete?
- 9) What problems do potholes cause?
- 10) How great is this new innovation?

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/1412/141205-potholes.html>

Drivers the world over may soon have (1) _____ from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff have come (2) _____ with a novel and innovative solution to (3) _____ gaps and holes in roads and highways. They have created a bacteria-filled concrete to prevent cracks in a road from becoming larger. The concrete is full of bacteria that open when water (4) _____ into a crack. The bacteria burst open and inject limestone into the crack, (5) _____ filling and repairing it to avert more serious damage. The scientists believe their discovery could considerably increase the lifespan of roads, reduce repairs, and lower roadwork (6) _____ by up to 50 per cent.

The new concrete could be good news for the environment. Scientists (7) _____ that over seven per cent of the world's CO2 emissions come from the production of cement. If (8) _____ cement is needed to repair roads, there will be fewer pollutants entering the atmosphere. Another benefit of the new cement is a reduction (9) _____ accidents, injuries and deaths that result from potholes. Thousands of motorists and pedestrians worldwide are killed because drivers swerve (10) _____ avoid holes in roads. There is also good news for local governments. In Britain alone, at least 40,000 drivers a year (11) _____ compensation for damages to their car caused by potholes. The concrete could be put to (12) _____ in the next 20 years.

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

- | | | | | |
|-----|---------------|----------------|-----------------|--------------|
| 1. | (a) respite | (b) despite | (c) spite | (d) inspire |
| 2. | (a) down | (b) through | (c) up | (d) in |
| 3. | (a) smuggling | (b) struggling | (c) plugging | (d) mugging |
| 4. | (a) weeps | (b) beeps | (c) peeps | (d) seeps |
| 5. | (a) thus | (b) such | (c) for | (d) to |
| 6. | (a) costed | (b) costs | (c) costing | (d) accosts |
| 7. | (a) figuring | (b) guesses | (c) calculating | (d) estimate |
| 8. | (a) fewer | (b) less | (c) smaller | (d) tinier |
| 9. | (a) to | (b) on | (c) in | (d) for |
| 10. | (a) go | (b) do | (c) so | (d) to |
| 11. | (a) clan | (b) clam | (c) calm | (d) claim |
| 12. | (a) road | (b) use | (c) hole | (d) crack |

SPELLING

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Paragraph 1

1. have espeitr from potholes
2. a novel and ntaoivivne solution
3. vrtepen cracks in a road
4. njitec limestone into the crack
5. rtvae more serious damage
6. ryanslbcideo increase the lifespan of roads

Paragraph 2

7. good news for the tmvnenroine
8. CO2 siossneim
9. fewer tostalunpl entering the atmosphere
10. motorists and dsitaenrpse
11. drivers esewvr to avoid holes
12. claim esaopcinmt for damages

PUT THE TEXT BACK TOGETHER

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Number these lines in the correct order.

()	of the world's CO2 emissions come from the production of cement. If less cement is needed to repair
()	from the universities of Bath, Cambridge and Cardiff have come up with a novel and innovative
()	news for local governments. In Britain alone, at least 40,000 drivers a year claim compensation for
(1)	Drivers the world over may soon have respite from potholes and cracks in the road. Scientists
()	pedestrians worldwide are killed because drivers swerve to avoid holes in roads. There is also good
()	is a reduction in accidents, injuries and deaths that result from potholes. Thousands of motorists and
()	to prevent cracks in a road from becoming larger. The concrete is full of bacteria that open when water seeps
()	into a crack. The bacteria burst open and inject limestone into the crack, thus filling and repairing it to avert more
()	The new concrete could be good news for the environment. Scientists estimate that over seven per cent
()	serious damage. The scientists believe their discovery could considerably increase
()	solution to plugging gaps and holes in roads and highways. They have created a bacteria-filled concrete
()	damages to their car caused by potholes. The concrete could be put to use in the next 20 years.
()	the lifespan of roads, reduce repairs, and lower roadwork costs by up to 50 per cent.
()	roads, there will be fewer pollutants entering the atmosphere. Another benefit of the new cement

PUT THE WORDS IN THE RIGHT ORDER

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

1. world over may soon have respite from potholes Drivers the .

2. becoming in larger a road Prevent from cracks .

3. to it Repairing damage serious more avert .

4. of roads Increase and the reduce lifespan repairs .

5. costs to cent roadwork up per Lower by 50 .

6. be good news for the environment The new concrete could .

7. pollutants There entering will the be atmosphere fewer .

8. drivers avoid roads because to in Killed swerve holes .

9. least 40,000 drivers a year claim compensation At .

10. years the to could next use be The 20 in put concrete .

CIRCLE THE CORRECT WORD (20 PAIRS)

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

Drivers the world over may soon have *despite / respite* from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff have come *down / up* with a novel and *innovative / innovation* solution to *plugging / plugged* gaps and holes in roads and highways. They have created a bacteria-filled concrete *for / to* prevent cracks in a road from becoming larger. The concrete is full of bacteria that open *which / when* water seeps into a crack. The bacteria burst open and *injection / inject* limestone into the crack, *thus / these* filling and repairing it to avert more *serious / seriously* damage. The scientists believe their discovery could considerably increase the lifespan of roads, *reduce / reduction* repairs, and lower roadwork costs by up to 50 per cent.

The new concrete could be *well / good* news for the environment. Scientists estimate that over seven per cent *for / of* the world's CO2 emissions come from the production *of / by* cement. If less cement is needed to repair roads, there will be *fewer / less* pollutants entering the atmosphere. Another benefit of the new cement is a reduction *in / on* accidents, injuries and deaths that *result / results* from potholes. Thousands of motorists and pedestrians worldwide are *killed / died* because drivers swerve to avoid holes in roads. There is also good news for *locally / local* governments. In Britain alone, at least 40,000 drivers a year *claim / clam* compensation for damages to their car caused by potholes. The concrete could be put to *useful / use* in the next 20 years.

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/1412/141205-potholes.html>

Dr_v_rs th_ w_rld _v_r m_y s__n h_v_ r_sp_t_ fr_m
p_th_l_s _nd cr_cks _n th_ r__d. Sc__nt_sts fr_m th_
_n_v_rs_t__s _f B_th, C_mbr_dg_ _nd C_rd_ff h_v_
c_m_ _p_w_th_ _n_v_l_ _nd _nn_v_t_v_ s_l_t__n_t_
pl_gg_ng g_ps _nd h_l_s _n r__ds _nd h_ghw_ys. Th_y
h_v_ cr__t_d _ b_ct_r__-f_ll_d c_ncr_t_ t_ pr_v_nt
cr_cks _n _ r__d fr_m b_c_m_ng l_rg_r. Th_ c_ncr_t_
_s f_ll_f b_ct_r__ th_t _p_n wh_n w_t_r_s __ps _nt_
cr_ck. Th_ b_ct_r__ b_rst _p_n _nd _nj_ct l_m_st_n_
nt th_ cr_ck, th_s f_ll_ng _nd r_p__r_ng _t t_ _v_rt
m_r_ s_r__s d_m_g_. Th_ sc__nt_sts b_l_v_ th__r
d_sc_v_ry c__ld c_ns_d_r_bly _ncr_s_ th_ l_f_sp_n _f
r__ds, r_d_c_r_p__rs, _nd l_w_r_r__dw_rk c_sts by _p
t_ 50 p_r_c_nt.

Th_ n_w c_ncr_t_ c__ld b_ g__d n_ws f_r th_
_nv_r_nm_nt. Sc__nt_sts _st_m_t_ th_t _v_r_s_v_n_p_r
c_nt _f th_ w_rld's C_2 _m_ss__ns c_m_ fr_m th_
pr_d_ct__n _f c_m_nt. _f l_ss c_m_nt _s_n__d_d_t_
r_p__r_r__ds, th_r_ w_ll b_ f_w_r_p_ll_t_nts _nt_r_ng
th_ _tm_sph_r_. _n th_r b_n_f_t _f th_ n_w c_m_nt _s
_r_d_ct__n _n _cc_d_nts, _nj_r__s _nd d__ths th_t
r_s_l_t fr_m p_th_l_s. Th__s_nds _f m_t_r_sts _nd
p_d_str__ns w_rldw_d _r_k_ll_d b_c__s_ dr_v_rs
sw_rv_ t_ _v__d h_l_s _n r__ds. Th_r_ _s_ls_ g__d
n_ws f_r l_c_l_g_v_rnm_nts. _n Br_t__n_l_n_, _t_l__st
40,000 dr_v_rs _y__r cl__m c_m_p_ns_t__n_f_r
d_m_g_s t_ th__r c_r_c__s_d by p_th_l_s. Th_ c_ncr_t_
c__ld b_ p_t_t_ _s_ _n th_ n_xt 20 y__rs.

PUNCTUATE THE TEXT AND ADD CAPITALS

From <http://www.BreakingNewsEnglish.com/1412/141205-potholes.html>

drivers the world over may soon have respite from potholes and cracks in the road scientists from the universities of bath cambridge and cardiff have come up with a novel and innovative solution to plugging gaps and holes in roads and highways they have created a bacteria-filled concrete to prevent cracks in a road from becoming larger the concrete is full of bacteria that open when water seeps into a crack the bacteria burst open and inject limestone into the crack thus filling and repairing it to avert more serious damage the scientists believe their discovery could considerably increase the lifespan of roads reduce repairs and lower roadwork costs by up to 50 per cent

the new concrete could be good news for the environment scientists estimate that over seven per cent of the world's co2 emissions come from the production of cement if less cement is needed to repair roads there will be fewer pollutants entering the atmosphere another benefit of the new cement is a reduction in accidents injuries and deaths that result from potholes thousands of motorists and pedestrians worldwide are killed because drivers swerve to avoid holes in roads there is also good news for local governments in britain alone at least 40000 drivers a year claim compensation for damages to their car caused by potholes the concrete could be put to use in the next 20 years

PUT A SLASH (/) WHERE THE SPACES ARE

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Drivers the world over may soon have respite from potholes and cracks in the road. Scientists from the universities of Bath, Cambridge and Cardiff have come up with a novel and innovative solution to plugging gaps and holes in roads and highways. They have created a bacteria-filled concrete to prevent cracks in a road from becoming larger. The concrete is full of bacteria that open when water seeps into a crack. The bacteria burst open and inject limestone into the crack, thus filling and repairing it to avert more serious damage. The scientists believe their discovery could considerably increase the lifespan of roads, reduce repairs, and lower roadwork costs by up to 50 percent. The new concrete could be good news for the environment. Scientists estimate that over seven percent of the world's CO₂ emissions come from the production of cement. If less cement is needed to repair roads, there will be fewer pollutants entering the atmosphere. Another benefit of the new cement is a reduction in accidents, injuries and deaths that result from potholes. Thousands of motorists and pedestrians worldwide are killed because drivers swerve to avoid holes in roads. There is also good news for local governments. In Britain alone, at least 40,000 drivers a year claim compensation for damage to their car caused by potholes. The concrete could be put to use in the next 20 years.

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

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

4. CONCRETE: Write a magazine article about the new self-repairing concrete. Include imaginary interviews with motorists and the researchers.

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 roads. Ask him/her three questions about them. Give him/her three ideas on how to improve them. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

ANSWERS

TRUE / FALSE (p.4)

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

SYNONYM MATCH (p.4)

- | | |
|-------------|---------------------|
| 1. drivers | a. motorists |
| 2. respite | b. relief |
| 3. novel | c. original |
| 4. seeps | d. leaks |
| 5. lower | e. reduce |
| 6. estimate | f. guess |
| 7. benefit | g. advantage |
| 8. swerve | h. change direction |
| 9. at least | i. not less than |
| 10. claim | j. ask for |

COMPREHENSION QUESTIONS (p.8)

1. The world over
2. Novel and innovative
3. Water
4. Limestone
5. Roadwork costs
6. The environment
7. Seven per cent
8. Pollutants
9. Swerve
10. At least 40,000

MULTIPLE CHOICE - QUIZ (p.9)

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

ALL OTHER EXERCISES

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