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Ready-to-Use English Lessons by Sean Banville

Level 6

Mathematicians work out the perfect cup of coffee

17th November, 2016

http://www.breakingnewsenglish.com/1611/161117-coffee-machine.html

Contents

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

THE ARTICLE

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Mathematicians are using their analytical skills to understand what makes the perfect cup of coffee. It might seem odd that a team of mathematicians is trying to establish what is behind the perfect cup of coffee until you realize that coffee consists of over 1,800 chemical components. If you combine these with the different ways of brewing coffee, it makes sense because there are a lot of numbers involved. Mathematicians from universities in Ireland and England used some complex calculations to determine how to make an ideal cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what happens to coffee as it passes through a variety of filter coffee machines.

The scientists hope their research will change the way coffee machines are made. Dr Lee told the BBC News: "Our overall idea is to have a complete mathematical model of coffee brewing that you could use to design coffee machines, rather like we use a theory of fluid and solid mechanics to design racing cars." In the near future, coffee lovers might be able to adjust many of the variables that affect the taste of the coffee as it is filtered and brewed. These include how hot the water is, how fast the water flows, the size coffee beans are ground into, the length of time it is brewed, and more. The research is published in the journal of the Society for Industrial and Applied Mathematics.

Sources: http://www.**bbc.com**/news/science-environment-37989169
http://**phys.org**/news/2016-11-mathematics-coffee-ideal-brew.html
http://**dailycoffeenews.com**/2016/11/15/extraction-in-drip-filter-machines-science-asks-whats-up-with-that/
http://**epubs.siam.org**/doi/pdf/10.1137/15M1036658

WARM-UPS

1. COFFEE: Students walk around the class and talk to other students about coffee. 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?

> analytical / skills / perfect / chemical / components / sense / complex / calculations / research / overall / idea / design / mechanics / lovers / brewed / brewed / published

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

3. THE BEST: Students A **strongly** believe coffee is the best drink and that tea is horrible; Students B **strongly** believe tea is the best drink and that coffee is horrible. Change partners again and talk about your conversations.

4. PERFECT: How can these foods and drinks be perfect? Complete this table with your partner(s). Change partners often and share what you wrote.

	How they can be perfect	Why?
Coffee		
Yoghurt		
French fries		
Cola		
Pizza		
Ice cream		

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

6. TASTE: Rank these with your partner. Put the things with the best taste at the top. Change partners often and share your rankings.

- coffee
- lemon
- garlic
- honey
- chocolate
- salt
- chilli
- banana

BEFORE READING / LISTENING

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

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

a. The article says it might seem odd for mathematicians to analyze coffee. **T / F**
b. The article says there are over 1,800 types of coffee in the world. **T / F**
c. The article says there are a lot of numbers involved in analyzing coffee. **T / F**
d. The calculations the mathematicians used were fairly straightforward. **T / F**
e. The scientists hope coffee machines will be made differently. **T / F**
f. The scientists want to analyze the perfect racing car next. **T / F**
g. The article says there will be more coffee lovers in the near future. **T / F**
h. The research has been published in a journal. **T / F**

2. SYNONYM MATCH:

Match the following synonyms. The words in **bold** are from the news article.

1. analytical	a. crushed
2. odd	b. prove
3. establish	c. assortment
4. combine	d. general
5. variety	e. logical
6. change	f. printed
7. overall	g. influence
8. affect	h. strange
9. ground	i. alter
10. published	j. mix

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

1. Mathematicians are using their	a. the perfect cup of coffee
2. It might seem	b. brewed
3. establish what is behind	c. calculations
4. complex	d. are made
5. what happens to coffee as it	e. odd
6. change the way coffee machines	f. lovers
7. have a complete mathematical	g. ground into
8. coffee	h. analytical skills
9. the size coffee beans are	i. model
10. the length of time it is	j. passes through

GAP FILL

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Mathematicians are using their (1) _____ skills to understand what makes the perfect cup of coffee. It might seem odd that a team of mathematicians is trying to (2) _____ what is behind the perfect cup of coffee until you realize that coffee (3) _____ of over 1,800 chemical components. If you (4) _____ these with the different ways of brewing coffee, it makes (5) _____ because there are a lot of numbers (6) _____. Mathematicians from universities in Ireland and England used some complex calculations to determine how to make an (7) _____ cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what happens to coffee as it passes through a (8) _____ of filter coffee machines.

establish

sense

ideal

analytical

combine

variety

consists

involved

The scientists hope their research will change the (9) _____ coffee machines are made. Dr Lee told the BBC News: "Our (10) _____ idea is to have a complete mathematical model of coffee brewing that you could use to design coffee machines, (11) _____ like we use a theory of fluid and solid mechanics to design racing cars." In the near future, coffee (12) _____ might be able to adjust many of the variables that (13) _____ the taste of the coffee as it is filtered and brewed. These include how hot the water is, how fast the water (14) _____, the size coffee beans are ground into, the length of time it is (15) _____, and more. The research is published in the (16) _____ of the Society for Industrial and Applied Mathematics.

rather

brewed

way

affect

journal

overall

flows

lovers

LISTENING – Guess the answers. Listen to check.

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

1) Mathematicians are using their _____ understand
   a. analytical skills too
   b. analytical skills to
   c. analytical skills two
   d. analytical skills thtough
2) a team of mathematicians is trying to establish what is _____ cup
   a. behind a perfect
   b. behind then perfect
   c. behind them perfect
   d. behind the perfect
3) until you realize that coffee consists of over 1,800 _____
   a. chemicals components
   b. chemical component
   c. chemical components
   d. chemicals component
4) it makes sense because there are a lot of _____
   a. numbers involve
   b. numbers involved
   c. numbers involvement
   d. numbers involves
5) some complex calculations to determine how to make _____
   a. an idea cuppa
   b. an ideal cuppa
   c. an ideas cuppa
   d. an eye deal cuppa
6) The scientists hope their research will change the way coffee _____
   a. machines be make
   b. machines are made
   c. machines are maid
   d. machines be made
7) Our overall idea is to have a complete mathematical model _____
   a. of coffee blow in
   b. of coffee brewed
   c. of coffee blowing
   d. of coffee brewing
8) coffee lovers might be able to adjust many of the variables that _____
   a. affect the taste
   b. affects the taste
   c. effect the taste
   d. effects the taste
9) how hot the water is, how fast the water flows, the size coffee beans _____
   a. are ground onto
   b. are grind onto
   c. are grained into
   d. are ground into
10) published in the journal of the Society for Industrial and _____
   a. App Mathematics
   b. Applied Mathematics
   c. Supplied Mathematics
   d. Replied Mathematics

LISTENING – Listen and fill in the gaps

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Mathematicians (1) _____ analytical skills to understand what makes the perfect cup of coffee. It might (2) _____ a team of mathematicians is trying to establish what is behind the perfect cup of coffee until (3) _____ coffee consists of over 1,800 chemical components. If you combine these with the different ways of brewing coffee, (4) _____ because there are a lot of numbers involved. Mathematicians from universities in Ireland and England used some complex calculations (5) _____ to make an ideal cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what happens to coffee as it passes through (6) _____ coffee machines.

The scientists hope their research will (7) _____ coffee machines are made. Dr Lee told the BBC News: "Our (8) _____ to have a complete mathematical model of coffee brewing that you could use to design coffee machines, (9) _____ use a theory of fluid and solid mechanics to design racing cars." In the near future, coffee lovers might be (10) _____ many of the variables that affect the taste of the coffee as it is filtered and brewed. These include how hot the water is, how fast (11) _____, the size coffee beans are ground into, the length of time (12) _____, and more. The research is published in the journal of the Society for Industrial and Applied Mathematics.

COMPREHENSION QUESTIONS

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

1. What kind of skills are mathematicians using?

2. How many chemical components are in coffee?

3. Where are the mathematicians from?

4. What kind of calculations did the mathematicians use?

5. What did coffee pass through that the mathematicians focused on?

6. What do the scientists hope will change?

7. What did a mathematician compare coffee machines with the design of?

8. When might coffee lovers be able to make their perfect cup of coffee?

9. What speed was mentioned as part of the brewing process?

10. What happens to coffee beans to make them smaller?

MULTIPLE CHOICE - QUIZ

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

1) What kind of skills are mathematicians using?
a) caffeinated skills
b) analytical skills
c) perfect skills
d) barista skills

2) How many chemical components are in coffee?
a) slightly fewer than 1,800
b) exactly 1,800
c) around 1,800
d) more than 1,800

3) Where are the mathematicians from?
a) England and Ireland
b) The United Kingdom
c) Northern Ireland and Scotland
d) England and N. Ireland

4) What kind of calculations did the mathematicians use?
a) algebraic ones
b) ones on calculators
c) complex ones
d) simple ones

5) What did coffee pass through that the mathematicians focused on?
a) hygiene tests
b) filter coffee machines
c) stomachs
d) tubes and pipes

6) What do the scientists hope will change?
a) coffee beans
b) the number of coffee lovers
c) how coffee machines are made
d) tea

7) What did a mathematician compare coffee machines with the design of?
a) perfection
b) tea
c) lovers
d) racing cars

8) When might coffee lovers be able to make their perfect cup of coffee?
a) in the near future
b) 8.50am
c) in the year 2031
d) in a moment or two

9) What speed was mentioned as part of the brewing process?
a) water flow
b) light
c) sound
d) taste

10) What happens to coffee beans to make them smaller?
a) they are sliced
b) they are ground
c) they are chopped up
d) they are smashed

ROLE PLAY

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Role A – Coffee

You think coffee has the best taste. Tell the others three reasons why. Tell them things that are wrong with the taste of their things. Also, tell the others which is the least tasty of these (and why): lemon, garlic or salt.

Role B – Lemon

You think lemon has the best taste. Tell the others three reasons why. Tell them things that are wrong with the taste of their things. Also, tell the others which is the least tasty of these (and why): coffee, garlic or salt.

Role C – Garlic

You think garlic has the best taste. Tell the others three reasons why. Tell them things that are wrong with the taste of their things. Also, tell the others which is the least tasty of these (and why): lemon, coffee or salt.

Role D – Salt

You think salt has the best taste. Tell the others three reasons why. Tell them things that are wrong with the taste of their things. Also, tell the others which is the least tasty of these (and why): lemon, garlic or coffee.

AFTER READING / LISTENING

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

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

perfect	**cup**

- 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:

• skills • team • over • ways • lot • passes	• hope • idea • rather • lovers • fast • length

COFFEE SURVEY

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Write five GOOD questions about coffee 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.

COFFEE 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 'coffee'?
3. What is the perfect cup of coffee?
4. What do you think of coffee?
5. How important is coffee in your culture?
6. Is coffee good or bad for you?
7. What do you think of mathematicians making the perfect cup of coffee?
8. What do you think of cafes and coffee shops?
9. What is your country's national drink?
10. Is filter coffee or instant coffee best?

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COFFEE DISCUSSION

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

11. Did you like reading this article? Why/not?
12. How useful are coffee machines?
13. What other drinks should scientists find the perfect version of?
14. Will all food and drink taste perfectly in the future?
15. What would you like to know about coffee?
16. At what age is it OK to start drinking coffee?
17. What different types of coffee are there?
18. What do you think of the price of coffee?
19. When is the best time to drink coffee?
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. _____

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/1611/161117-coffee-machine.html

Mathematicians are using their analytical skills to understand what makes the perfect cup of coffee. It might seem (1) _____ that a team of mathematicians is trying to establish what is (2) _____ the perfect cup of coffee until you realize that coffee consists (3) _____ over 1,800 chemical components. If you combine these with the different ways of brewing coffee, it (4) _____ sense because there are a lot of numbers involved. Mathematicians from universities in Ireland and England used some complex calculations to determine how to make an (5) _____ cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what happens to coffee as it passes through a (6) _____ of filter coffee machines.

The scientists hope their research will change the way coffee machines are made. Dr Lee told the BBC News: "Our (7) _____ idea is to have a complete mathematical model of coffee brewing that you could use to design coffee machines, (8) _____ like we use a theory of fluid and solid mechanics to design racing cars." In the (9) _____ future, coffee lovers might be able to adjust many of the variables that affect the taste of the coffee as it is filtered and brewed. These include how hot the water is, how fast the water (10) _____, the size coffee beans are (11) _____ into, the length of time it is brewed, and more. The research is published (12) _____ the journal of the Society for Industrial and Applied Mathematics.

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

1.	(a)	oddly	(b)	odder	(c)	odd	(d)	oddest
2.	(a)	behind	(b)	beneath	(c)	bemoan	(d)	behest
3.	(a)	of	(b)	by	(c)	on	(d)	at
4.	(a)	makes	(b)	does	(c)	be	(d)	gives
5.	(a)	ordeal	(b)	ideal	(c)	unideal	(d)	misdeal
6.	(a)	varies	(b)	varied	(c)	various	(d)	variety
7.	(a)	overalls	(b)	overt	(c)	overall	(d)	over-do
8.	(a)	choice	(b)	instead	(c)	prefer	(d)	rather
9.	(a)	near	(b)	nears	(c)	nearly	(d)	neared
10.	(a)	flew	(b)	flows	(c)	flue	(d)	flues
11.	(a)	grand	(b)	ground	(c)	grind	(d)	grunt
12.	(a)	to	(b)	at	(c)	in	(d)	of

SPELLING

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Paragraph 1

1. using their laytcaalin skills
2. over 1,800 chemical mosnnteocp
3. there are a lot of numbers vovneldi
4. used some pclxmoe calculations
5. rnideteme how to make an ideal cuppa
6. a yraitve of filter coffee machines

Paragraph 2

7. Our oarvlel idea
8. a eyroht of fluid and solid mechanics
9. adjust many of the arvlbiase
10. as it is filtered and rewedb
11. These uicdeln how hot the water is
12. The research is published in the njoualr

PUT THE TEXT BACK TOGETHER

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Number these lines in the correct order.

( ) published in the journal of the Society for Industrial and Applied Mathematics.

( ) The scientists hope their research will change the way coffee machines are made. Dr Lee told the BBC News: "Our overall

( ) taste of the coffee as it is filtered and brewed. These include how hot the water is, how fast the water

( ) ways of brewing coffee, it makes sense because there are a lot of numbers involved. Mathematicians from

( ) idea is to have a complete mathematical model of coffee brewing that you could use to

( ) realize that coffee consists of over 1,800 chemical components. If you combine these with the different

( ) design coffee machines, rather like we use a theory of fluid and solid mechanics to design racing cars." In the near

( ) future, coffee lovers might be able to adjust many of the variables that affect the

( ) odd that a team of mathematicians is trying to establish what is behind the perfect cup of coffee until you

( ) flows, the size coffee beans are ground into, the length of time it is brewed, and more. The research is

( ) to make an ideal cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what

( ) happens to coffee as it passes through a variety of filter coffee machines.

(***1***) Mathematicians are using their analytical skills to understand what makes the perfect cup of coffee. It might seem

( ) universities in Ireland and England used some complex calculations to determine how

PUT THE WORDS IN THE RIGHT ORDER

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

1. skills analytical their using are Mathematicians understand to .

2. coffee the Establish perfect what cup is of behind .

3. different Combine ways these of with brewing the coffee .

4. because there are a lot of numbers involved It makes sense .

5. it Focused happens as through what coffee passes on to .

6. change are the made way Research coffee will machines .

7. model mathematical complete a Have brewing coffee of .

8. future , coffee lovers might be able to In the near .

9. taste of the coffee Many of the variables that affect the .

10. the beans the and coffee fast flows size How water .

CIRCLE THE CORRECT WORD (20 PAIRS)

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Mathematicians are using their analytical *skillful / skills* to understand what makes the perfect cup of coffee. It might seem *oddly / odd* that a team of mathematicians is trying to establish what is *behind / beneath* the perfect cup of coffee until you realize that coffee *contrasts / consists* of over 1,800 chemical components. If you combine these *to / with* the different ways of brewing coffee, it makes *sense / sensible* because there are a lot of numbers *involved / involving*. Mathematicians from universities in Ireland and England used *some / them* complex calculations to determine how to make an *idea / ideal* cuppa. Researchers Dr William Lee and Dr Kevin Moroney focused on what happens to coffee as it passes through a *variety / various* of filter coffee machines.

The scientists hope their research will *exchange / change* the way coffee machines are made. Dr Lee told the BBC News: "Our *overall / overalls* idea is to have a complete mathematical *model / replica* of coffee brewing that you could use to design coffee machines, *rather / prefer* like we use a theory of fluid and solid mechanics to design racing cars." In the *nearly / near* future, coffee lovers might be able to *adjustment / adjust* many of the variables that *affect / effect* the taste of the coffee as it is filtered and brewed. These include *how / what* hot the water is, how fast the water flows, the size coffee beans are *ground / earthed* into, the length of time it is brewed, and more. The research is published in the *journal / journey* of the Society for Industrial and Applied Mathematics.

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/1611/161117-coffee-machine.html

M_th_m_t_c__ns _r_ _s_ng th__r _n_lyt_c_l sk_lls t_ _nd_rst_nd wh_t m_k_s th_ p_rf_ct c_p _f c_ff__. _t m_ght s__m _dd th_t _ t__m _f m_th_m_t_c__ns _s try_ng t_ _st_bl_sh wh_t _s b_h_nd th_ p_rf_ct c_p _f c_ff__ _nt_l y__ r__l_z_ th_t c_ff__ c_ns_sts _f _v_r 1,800 ch_m_c_l c_mp_n_nts. _f y__ c_mb_n_ th_s_ w_th th_ d_ff_r_nt w_ys _f br_w_ng c_ff__, _t m_k_s s_ns_ b_c__s_ th_r_ _r_ _ l_t _f n_mb_rs _nv_lv_d. M_th_m_t_c__ns fr_m _n_v_rs_t__s _n _r_l_nd _nd _ngl_nd _s_d s_m_ c_mpl_x c_lc_l_t__ns t_ d_t_rm_n_ h_w t_ m_k_ _n _d__l c_pp_. R_s__rch_rs Dr W_ll__m L__ _nd Dr K_v_n M_r_n_y f_c_s_d _n wh_t h_pp_ns t_ c_ff__ _s _t p_ss_s thr__gh _ v_r__ty _f f_lt_r c_ff__ m_ch_n_s.

Th_ sc__nt_sts h_p_ th__r r_s__rch w_ll ch_ng_ th_ w_y c_ff__ m_ch_n_s _r_ m_d_. Dr L__ t_ld th_ BBC N_ws: "__r _v_r_ll _d__ _s t_ h_v_ _ c_mpl_t_ m_th_m_t_c_l m_d_l _f c_ff__ br_w_ng th_t y__ c__ld _s_ t_ d_s_gn c_ff__ m_ch_n_s, r_th_r l_k_ w_ _s_ _ th__ry _f fl__d _nd s_l_d m_ch_n_cs t_ d_s_gn r_c_ng c_rs." _n th_ n__r f_t_r_, c_ff__ l_v_rs m_ght b_ _bl_ t_ _dj_st m_ny _f th_ v_r__bl_s th_t _ff_ct th_ t_st_ _f th_ c_ff__ _s _t _s f_lt_r_d _nd br_w_d. Th_s_ _ncl_d_ h_w h_t th_ w_t_r _s, h_w f_st th_ w_t_r fl_ws, th_ s_z_ c_ff__ b__ns _r_ gr__nd _nt_, th_ l_ngth _f t_m_ _t _s br_w_d, _nd m_r_. Th_ r_s__rch _s p_bl_sh_d _n th_ j__rn_l _f th_ S_c__ty f_r _nd_str__l _nd _ppl__d M_th_m_t_cs.

PUNCTUATE THE TEXT AND ADD CAPITALS

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

mathematicians are using their analytical skills to understand what makes the perfect cup of coffee it might seem odd that a team of mathematicians is trying to establish what is behind the perfect cup of coffee until you realize that coffee consists of over 1800 chemical components if you combine these with the different ways of brewing coffee it makes sense because there are a lot of numbers involved mathematicians from universities in ireland and england used some complex calculations to determine how to make an ideal cuppa researchers dr william lee and dr kevin moroney focused on what happens to coffee as it passes through a variety of filter coffee machines

the scientists hope their research will change the way coffee machines are made dr lee told the bbc news "our overall idea is to have a complete mathematical model of coffee brewing that you could use to design coffee machines rather like we use a theory of fluid and solid mechanics to design racing cars" in the near future coffee lovers might be able to adjust many of the variables that affect the taste of the coffee as it is filtered and brewed these include how hot the water is how fast the water flows the size coffee beans are ground into the length of time it is brewed and more the research is published in the journal of the society for industrial and applied mathematics

PUT A SLASH (/) WHERE THE SPACES ARE

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Mathematiciansareusingtheiranalyticalskillstounderstandwhatmakestheperfectcupofcoffee.Itmightseemoddthatateamofmathematiciansistryingtoestablishwhatisbehindtheperfectcupofcoffeeuntilyourealizethatcoffeeconsistsofover1,800chemicalcomponents.Ifyoucombinethesewiththedifferentwaysofbrewingcoffee,itmakessensebecausetherearealotofnumbersinvolved.Mathematiciansfromuniversitiesin IrelandandEnglandusedsomecomplexcalculationstodetermineh owtomakeanidealcuppa.ResearchersDrWilliamLeeandDrKevinMoroneyfocusedonwhathappenstocoffeeasitpassesthroughavarietyoffiltercoffeemachines.Thescientistshopetheirresearchwillchangethewaycoffeemachinesaremade.DrLeetoldtheBBCNews:"Ouroverallideais tohaveacompletemathematicalmodelofcoffeebrewingthatyoucould usetodesigncoffeemachines,ratherlikeweuseatheoryoffluidandsolid mechanicstodesignracingcars."Inthenearfuture,coffeeloversmightbeabletoadjustmanyofthevariablesthataffectthetasteofthecoffeeasitisfilteredandbrewed.Theseincludehowhotthewateris,howfastthewaterflows,thesizecoffeebeansaregroundinto,thelengthoftimeitisbrewed,andmore.Theresearchispublishedinthejournaloftheso cietyforIndustrialandAppliedMathematics.

FREE WRITING

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

Write about **coffee** for 10 minutes. Comment on your partner's paper.

ACADEMIC WRITING

From http://www.BreakingNewsEnglish.com/1611/161117-coffee-machine.html

There is no such thing as a perfect cup of coffee. Discuss.

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

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

4. PERFECT: Write a magazine article about the perfect cup of coffee. Include imaginary interviews with people who think it exists and with people who don't think so.

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 coffee. Ask him/her three questions about it. Give him/her three of your ideas on how to make the perfect cup of coffee. 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 F c T d F e T f F g F h T

SYNONYM MATCH (p.4)

1.	**analytical**	a. logical
2.	**odd**	b. strange
3.	**establish**	c. prove
4.	**combine**	d. mix
5.	**variety**	e. assortment
6.	**change**	f. alter
7.	**overall**	g. general
8.	**affect**	h. influence
9.	**ground**	i. crushed
10.	**published**	j. printed

COMPREHENSION QUESTIONS (p.8)

1. Analytical skills
2. Over 1,800
3. England and Ireland
4. Complex ones
5. Filter coffee machines
6. The way coffee machines are made
7. Racing cars
8. In the near future
9. The flow of water
10. They are ground

MULTIPLE CHOICE - QUIZ (p.9)

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

ALL OTHER EXERCISES

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