National Cipher Challenge

Once again the University of Southampton, in association with Education.Guardian.co.uk, is challenging young people across the UK to try their hand at cracking codes. The competition is sponsored by the EPSRC, IBM and Bletchley Park. Prizes include posters, CD's badges and cash, and the overall winners will be invited to a public Prizegiving at Bletchley Park in the Spring.

What is the Cipher Challenge?

The second University of Southampton National Cipher Challenge is a cipher cracking competition which consists of a sequence of 8 enciphered messages to be published simultaneously on this website and at the EducationGuardian.co.uk between October 2003 and January 2004. For each challenge we will select a number of winners drawn at random from among the correct entries submitted. If your first submission contains a mistake don't worry, you can try again, however you will get a score for your first submission to each challenge which will be totalled throughout the competition. At the end the individual or team with the highest score will be declared the National Cipher Challenge Champions for 2004 and they and their school will share in the Championship prize of £1,500.

The schedule for the publication of messages, the solution deadlines and a list of the prizes can be found below; note that all challenges will be published at 4pm on a Thursday, here and at **EducationGuardian.co.uk**.
The enciphered messages correspond to a fictitious diary written by Agatha Highfield, our heroine, and describe her adventures as she tries to obtain the Babylon Stone to establish her reputation as the finest archaeologist of her generation. You can read more about Aggie's adventures in Harry's Notebook. Harry will act as your guide. He has been hired by Aunt Aggie's niece to attempt to track down the missing (and highly valuable) Stone, apparently spirited away by the old lady. His notebook will contain hints about how to tackle the challenges as well as news about the challenge and links to the Hall of Fame where we will list all the correct entries. The reason for Aunt Aggie's secrecy will become apparent as the story unfolds, but what you will find is that the need for secrecy grows, and, accordingly the ciphers she uses to conceal the secret notes in her journal become more sophisticated as the challenge proceeds. The early challenges (1 to 3) are very straightforward, and you can find help with their decryption in the Teachers' Notes which you can **download** in PDF format.
Some of the messages give clues to the ciphers used in subsequent messages, but it is not necessary to solve all the messages. Solutions to messages will appear as the competition proceeds, and you will find links to the solutions on the pages of Aunt Aggie's diary.
The competition, which is only open to students attending fulltime education in schools in the UK (together with the Channel Islands), who will be 18 years or under on 31 August 2004. In order to take part you will need to register on our **registration page**. You will be asked for your age, the name of your school and an email address where you can be contacted. This email address will then be used as your login identity for submitting entries to the competition. You will receive a password by email which you will also need to keep and use for entries. If you do forget it, you can ask for it to be resent.

How do I enter?

Entries for each challenge, which may be from individuals or from teams, should be submitted using the competition **webform**
Be careful to follow the instructions on the form. Failure to adhere to all the instructions may result in the entry being deemed invalid.
The detailed rules are given below:

Acknowledgements

The competition is run by the **School of Mathematics** at the University of Southampton. The organisers gratefully acknowledge the support of the sponsors of the second National Cipher Challenge:

The Engineering and Physical Sciences Research Council (Public Awareness Group)
The EducationGuardian.co.uk
IBM
Bletchley Park

The organisers would also like to express their thanks for help from a number of people who have worked hard to make this competition a success; Hugh Evans, Catherine Warwick, Brian Holloway, Katherine Glover, Jimmy Leach, Liz Ford, Lord May President of the Royal Society, Helen Purdy, Jim Renshaw and Sarah Watts. We would also like to thank Simon Singh whose original Cipher Challenge inspired this one.

Message from Lord May of Oxford AC Kt PRS, President of the Royal Society

It is with pleasure that I invite you to take part in the second University of Southampton National Cipher Challenge, a competition designed to promote the enjoyment to be had in using mathematics, and I hope that you and your teachers will share that enjoyment together.
Since 1660 the Royal Society has actively promoted Science and Engineering in the UK, and along the Cipher Challenge trail you may learn a little of the fine scientific and cultural heritage we all share. You will also sharpen the problem solving and analytical skills crucial to you in future careers, as well as win a prize from amongst the total of £5,000 of prizes available for you and your school.
I wish you all success in this exciting challenge. Professor Lord Robert May.

The story so far ...

In 1911 Agatha Highfield has just graduated from Oxford with a degree in Archaeology and a passion to prove that she is the equal of any man in the field. Rejected by the establishment she sets out to find the legendary Babylon Stone, which she believes may be found in the Valley of the Kings. Frustrated by rivals and pursued by mysterious foreign agents she follows the only clue she has, recording her adventures in her (encrypted) diary. Her disappearance was a great shock to her friends and family and now, in 1937, her niece has hired Harry Schulz Vandiver, a mathematician with a difference, to help her trace her Aunt and the missing Babylon Stone. Harry will be your guide and mentor as you learn to crack Aunt Aggie's diary - The Journal.

Information For Teachers

The competition is designed so that participants on the Cipher Challenge trail will learn not only about ciphers but also some mathematics, science and engineering and the social and cultural context of the time. However to colour the story there are a few anachronisms and historical inconsistencies, so watch out! Our teachers pack includes an introduction to substitution ciphers together with three lesson plans which may be useful in helping you to explore the understanding of simple encipherment and decryption techniques with interested pupils. We have set the release time for each challenge to 4pm on a Thursday in the hope that pupils will be able to use School IT resources at that time. If you have a Maths Club already perhaps they could be organised into teams to tackle the challenges, and if not this might be a good project for a short term Cipher Club. Bruce Schneier and Niels Ferguson, two of the world's top cryptographers have described cryptography as "Just about the most fun you can have with mathematics" and we are inclined to agree with them. We hope that this competition will help you in the task of enthusing students. If it does let us know, and if it doesn't let us know that too. We are always looking for ways to improve the competition.
DOWNLOAD TEACHERS' PACK

Competition Schedule

At any stage you can view the current challenge by clicking on the numeral on the central pyramid on the homepage. Clicking on the text of the challenge will allow you to download it to your computer. Past challenges can be viewed by navigating the links at the top of the page in Aggie's diary (The Journal) You will be able to view the challenge and its solution there, and again clicking on the text will download the solution as a PDF file. Further commentary on the solution may be found in Harry's notebook, which should be viewed as a general purpose news and info page for the competition. The solution deadline in each case is 12.01 am, i.e., **right at the beginning of the given day**. The next challenge will be issued later that same day.

Challenge No.	Publication Date	Solution deadline
1	2 October	9 October
2	9 October	16 October
3	16 October	23 October
4	23 October	6 November
5	6 November	20 November
6	20 November	4 December
7	4 December	18 December
8	18 December	8 January

How to contact us:

mailto:%20cipherchallenge@maths.soton.ac.uk.
While the organisers will make every effort to deal with your enquiries we cannot guarantee to reply to every email. Please keep checking the News page for updates and the latest information concerning the Challenge.

What are the rules?

1. The competition is only open to persons who are in full time school education in the United Kingdom*.
2. The competition is only open to persons aged 18 or under on 31 August 2004.
3. Members of the families of employees of the University of Southampton, the EPSRC, EducationGuardian.co.uk, Bletchley Park and IBM may not enter.
4. Entries may be received from individuals or from teams. The teams may be of any size, but we can only list details of four members of the team whose names may be entered on the registration form. Teams must nominate a captain.
5. The schedule of messages to be deciphered and the prizes associated with each is given **here**
6. For each messages 1 to 8 inclusive there will be a collection of first prizes, which will be awarded to a team or individual randomly selected from those submitting one of the first 50 correct solutions.
7. For each of the challenges for which you submit an entry you will receive a score, based on the accuracy of your FIRST submission for that challenge, which will be sent to you by email. These scores will be used to determine the overall winner of the competition, who will be chosen from among those achieving the highest total score. It will also be used to award runners up prizes.
8. A solution will only be deemed to be correct if, disregarding the punctuation [and spacing], the deciphered plaintext (only involving the Roman characters A to Z [UPPER or lower case is fine]) is letter perfect.
9. A message will only be deemed to be valid if it is submitted on the entry **webform** and all the instructions on the entry form are adhered to.
10. The Challenge Committee may publish clues on the competition website if it considers it appropriate.
11. If a correct solution of a message is not received before the deadline given on the **schedule** the Challenge Committee will have the discretion to not award the prize or award some of all of it to the entrant or entrants which it judges to represent the best solution or solutions.
12. The competition will be judged by the Challenge Committee, whose decision will be final in all matters regarding the competition including the award of prizes.
13. In order to qualify for any of the prizes all entrants, whether solo or part of a team agree to their names being used in publicity associated with the competition including publication on the competition's websites.
14. In submitting an entry solo entrants vouch that it is solely their own work and teams warrant that it is solely their own collective work.
15. Entrants who do not abide by the rules will be disqualified from the competition and will not qualify for any of the prizes.
16. In submitting an entry to the competition, all entrants, be they individuals or members of a team agree to be bound by all the rules of the competition.
17. Winners and their schools will be notified as soon as possible after the solution deadline for each message.
18. The organisers reserve the right to change any aspect of the competition at short notice and to split prizes where it is deemed appropriate. Such changes will be announced on the competition website as soon as practical.

* Schools in the Channel Islands and the Isle of Man also qualify.

What are the prizes?

The team or entrants to achieve the highest total score as described in rule 7 above will be eligible to be considered for the National Cipher Challenge prize. The winner will be chosen from among the eligible candidates on the basis of the speed of their entries throughout the competition. The Challenge Committee reserve the right to split the prize if that is deemed appropriate.