The Royal Institution of Great Britain

Resources on Mathematical Enrichment

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Stories, applications, anecdotes, puzzles, interaction, animations, games, ... can help bring alive mathematics. The Royal Institution mathematics masterclasses aim to do precisely that. To learn more about our programme, please visit www.rigb.org/rimain/events/programmeformaths.jsp .

CAVEAT LECTOR! On the references below, much has been omitted - due to ignorance, bias and in the interest of brevity. Please email vinay@ri.ac.uk for further/fuller references.

I. Random recommended reading

1. *Number: the language of science*, T Dantzig (1947 and later editions).
2. *The Pleasures of Counting*, TW Körner, Cambridge Univ Press (1996).
3. *The World of Mathematics*, JR Newman (4 volumes, 1956 and later editions).
4. *The Mathematical Experience*, PJ Davis & R Hersh (1981 and later editions).
5. Books by Brian Bolt, Tony Gardiner, Martin Gardner, George Polya, ...

II. Books on UK mathematics masterclasses

1. *Mathematics Masterclasses: Stretching the Imagination*, M Sewell, Oxford Univ Press (1997).
2. *Mathematics Galore!*, CJ Budd and CJ Sangwin, Oxford Univ Press (2001).

III. Team/Challenging activities

1. www.ukmt.org.uk/ Team Maths Challenge and other Challenges.
2. www.mathschallenge.co.uk The Jaguar Cars Maths in Motion Challenge.
3. www.cipher.maths.soton.ac.uk The National Cipher Challenge.
4. http://sodarace.net Sodaplay: design robots for online olympics (human vs machine learning).

IV. Hands-on activities

1. www.maths.liv.ac.uk/lms/funmaths/ The Liverpool FunMaths Roadshow.
2. http://magicmathworks.org/ The Magic Mathworks Travelling Circus.
3. http://mmp.maths.org/projects/roadshow.html The Millennium Mathematics Project (MMP) Hands On Maths Roadshow.

V. UK-based providers of enrichment materials

1. www.arbelos.co.uk/ Arbelos.
2. http://www.beam.co.uk/resources.asp BEAM Education.
3. http://tarquinbooks.com/ Tarquin Publications.

VI. Related organisations of interest

- http://fmnetwork.org.uk/ The Further Mathematics Network – enabling students in England to study Further Mathematics A/AS qualifications. Managed by MEI www.mei.org.uk/ .
- www.mathsinspiration.com Mathematically inspirational events for Sixth Form students.
- http://mmp.maths.org The Millennium Mathematics Project (MMP) at Cambridge University. The MMP has many excellent projects – AskNrich, Enigma, Motivate, Nrich, Plus, Stimulus, ...
- www.ncetm.org.uk/ The National Centre for Excellence in Teaching Mathematics – 'virtual centre' to support professional development in the teaching of mathematics.
- www.ukmt.org.uk/ The United Kingdom Mathematics Trust – responsible for UK-wide maths challenges, mentoring programmes, training the UK Maths Olympiad Team and related activities.
- A number of mathematics subject and professional organisations – ACME, ATM, BSHM, BSRLM, IMA, JMC, LMS (Holgate Lecturers, Popular Lectures) , MA, NANAMIC, RSS (Guy Lecturer), . . .
- www.setnet.org.uk/ SETNET and the SETPOINT network.

VII. Sampling of online resources that use animation/interactivity

www.cut-the-knot.org Excellent interactive mathematical miscellany (700+ java applets).

www.shodor.org/interactivate/ Interactive courseware for exploration in maths with supporting resources for instructors.

http://schools.ednet.ns.ca/avrsb/732/hainstoc/briefcase/techintegpage_math_all.htm Links to many resources, including MySkoool (has an interactive number line), the NCTM Illuminations, NUMB3RS, ...

www.nrich.maths.org/ Problems, games, discussion boards and more via the MMP at Cambridge.

www.rigb.org/christmaslectures2006/ Activities building on the 2006 Christmas Lectures by professor Marcus du Sautoy, The NUM8ER MY5TERIES.

http://www.fi.uu.nl/wisweb/en/ Wisweb, mathematical applets from the Freudenthal Institute.

http://mcs.open.ac.uk/jhm3/ Professor John Mason's Structured Variation Grids.

http://nlvm.usu.edu Virtual Manipulatives, including algebra tiles.

www.counton.org/ A UK based website with a variety of resources that originated around Year 2000.

http://www.pims.math.ca/knotplot/ KnotPlot is a fabulous resource for playing with knots. A good introduction to knots is available at http://www.popmath.org.uk/exhib/knotexhib.html .

www.sunsite.ubc.ca/DigitalMathArchive/Euclid/java/html/pythagoras.html Pythagoras animated.

www.geogebra.at/ GeoGebra is a free dynamic maths software package for geometry, algebra and calculus (comparable with Geometer's Sketchpad).

www.analyzemath.com/ Functions and Graphing related tutorials and applets.

VIII. Further online resources

For mathematical topics, search http://mathworld.com/ or www.wikipedia.org

http://mathforum.org/
One of the most comprehensive resources on mathematics education.

http://www-history.mcs.st-andrews.ac.uk/
The extensive and multiply-indexed MacTutor history of mathematics archive.

www.galileo.org/math/
A collection of problems and investigations from Canada.

http://plus.maths.org/
An online magazine relating mathematics to a diversity of topics, including art, medicine and sport.

http://www.c3.lanl.gov/mega-math/
Some structured activities for open-ended work (could need a fair amount of time!).