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| **Minor Award Name** | Mathematics |
| **Minor Award Code** | 5N1833 |
| **Level** | 5 |

**Suggested resources to support delivery:**

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| **Theme/Topic** | **Type** | **Relevance** | **Author/Source** | **Web Link** |
| All Maths | Web Tutorial | Khan academy – series of web videos on all topics of maths. Useful for students to catch up on material.  Funded by Bill Gates and allows students to register and gain points by watching videos and completing activities.  There are so many videos that it may overwhelm some learners – linking students to certain videos provides a more focused experience. | Khan Academy – US website | <https://www.khanacademy.org/math> |
| Intermediate algebra | Web tutorial | Videos focused on areas of algebra at the equivalent of level 5. Not as broad as Khan academy but videos are produced using text as opposed to on screen writing.  This series of web tutorials is free. Videos are also available on You Tube. | Karl Fisch – High school teacher in US | <http://karlfisch.wikispaces.com/algebra+videos>  Alternatively found on You Tube  <https://www.youtube.com/user/karlfisch> |
| Most topics (exception statistics and probability) | Web tutorial | Short videos by different presenters on a wide array of topics from beginner to intermediate level. Videos are basic in format and methodical in nature but clear and concise. | Charles McKeague – textbook author | <http://www.mathtv.com/> |
| Basic maths (introductory) | Website | Worksheet works – allows teacher to create quick worksheets on basic topics e.g. probability and pre-algebra – useful for induction to level 5 maths.  Can be downloaded as pdf file and the website is free. | Worksheet works – free website for generating basic maths worksheets. | <http://www.worksheetworks.com/math.html> |
| All Maths topics | Website | Mathworksheet4kids – allows teacher to create intermediate worksheets on all topics.  Can be downloaded as pdf files and the website is free. | Mathsworksheet4kids – free website for generating intermediate worksheets. | <http://www.mathworksheets4kids.com/> |
| Topics – probability, geometry, functions (co-ordinate geometry) and trigonometry | Website | National library of virtual manipulatives – Utah State University – has a wide variety of simulations especially useful in the teaching of some concepts in;   * Probability (spinner simulation and coin toss simulation) * Algebra (function machine, linear equation balancing and graphing packages (very intuitive)). * Statistic section has simulations of bar charts, histograms and pie charts. * Trigonometry – problem solving for triangles, Pythagoras theorem.   There are many simulations to be explored but the extra links in web link column will help as a starting position. Requires Java. | The National Library of Virtual Manipulatives (NLVM) is an NSF (National Science Foundation - US science promotion agency) supported project that began in 1999 to develop a library of uniquely interactive, web-based simulations mostly in the form of Java applets, for mathematics instruction (K-12 emphasis). | <http://nlvm.usu.edu/en/nav/vlibrary.html>  Links below bring user to specific games as a sample of what is available in the virtual library.  Scatter Plot  <http://nlvm.usu.edu/en/nav/frames_asid_144_g_4_t_5.html?open=activities&from=category_g_4_t_5.html>  Coin toss  <http://nlvm.usu.edu/en/nav/frames_asid_305_g_4_t_5.html?from=category_g_4_t_5.html> |
| Topics – mathematical modelling | Website | Steps.ie – contains maths video relating to project maths however the maths section also contains information on mathematical modelling and real world maths which is useful when dealing with the modelling section in level 5 maths. | STEPS is managed by Engineers Ireland and supported by Science Foundation Ireland, the Department of Education and Skills, and a number of major engineering employers. | <http://steps.ie/> |
| Topics – problem solving | Website | Aplusclick - The website features a graduated set of 5000 challenging problems for students in grades one through twelve, starting from the very simple to the extremely difficult. | A+ Click helps students become problem solvers. No fees, no ads, no calculators, and no sign in. | <http://www.aplusclick.com/> |
| Motivational Maths | You Tube video | Nova – The math mystery: Mathematics in nature and universe – documentary.  Well produced documentary about math – could be viewed in class or link given to learners to allow for viewing at home. | Nova – US organisation promoting science and math literacy. | <https://www.youtube.com/watch?v=8gd-gUlBv_s> |
| All Maths topics | Website | Better Explained helps you truly understand new concepts. Broken down by topic the website tries to explain maths concepts. | Kalid Azad | <http://betterexplained.com/> |
| Real World algebra | Website – with video links | Get the Math is about algebra in the real world.  See how professionals use math in music, fashion, videogames, restaurants, basketball, and special effects.  Useful for exploring examples of algebra either by tutor or as a class group. | Get the Math premiered in 2011 and has been distributed to public television stations nationwide by American Public Television. | <http://www.thirteen.org/get-the-math/> |
| All maths topics | Website – graphics package | GeoGebra can be used to illustrate difficult concepts but it can also be used to make professional looking images for assessment.  Can be difficult to get used to but is a powerful tool that is well supported by developers. | GeoGebra is a multi-platform mathematics software that gives everyone the chance to experience the extraordinary insights that math makes possible. | <https://www.geogebra.org/> |
| All Math topics | Website | Screen casting allows the user to record a short video – records what is on the screen and what is said. Screen casting has many uses but for difficult concepts which require use of GeoGebra or other simulation software can be useful to record the “perfect” explanation. Free to use but limitations apply (can only save one movie at a time unless you purchase a premium account – this can be bypassed by downloading each video after production). | Screencast-o-matic.com - Open source tool. | <http://www.screencast-o-matic.com/> |
| All Maths topics | Website | mathisfun.com – excellent website with topics ranging from numbers, algebra, geometry, trigonometry and data (statistics and probability. Great resource for students to upskill to level 5 and for tutors for examples and simulators.   * Function grapher: Excellent resource for demonstrating different types of models and for showing linear and quadratic equations. (<https://www.mathsisfun.com/data/function-grapher.php>) * Equation grapher: Similar to above but can graph a wider variety of models. <https://www.mathsisfun.com/data/grapher-equation.html> * Linear equation: Easy to use and shows changes to slope and y-intercept and effect on linear equation. <https://www.mathsisfun.com/data/straight_line_graph.html> * Interactive Cartesian co-ordinates – shows quadrants and allows easy visuals of Cartesian plane. <https://www.mathsisfun.com/data/cartesian-coordinates-interactive.html> * Interactive unit circle: Fantastic resource to illustrate unit circle and explain the origins on SOHCAHTOA. <https://www.mathsisfun.com/sine-cosine-tangent.html> | MathsIsFun.com is maintained by Rod Pierce | <https://www.mathsisfun.com/> |
| All Maths topics | Website | mathstutor.ie – free for teachers – collection of maths videos but targeted to project maths.  Some of the resources may be of use at level 5. | Eamon Toland – founder and managing director. | <http://www.themathstutor.ie/> |
| All Maths topics | Website | studyclix.ie – free for teachers – collection of resources for a variety of subjects including maths.  Maths section is focussed on project maths but linking to certain videos suitable for level 5 is probably the best solution. | Studyclix is an innovative education company based at the Innovation Centre at Sligo Institute of technology.  Created by Luke Saunders and Keith Wright. | <https://www.studyclix.ie/> |
| All Maths topics | Website | Content based on class or topics – ranging from junior infants to sixth year. Fifth and sixth year align closely to level 5 and can be used for practice quizzes and for identifying concept maps for maths.  NOTE – This site is not free but gives a daily allowance of quiz questions. | IXL Learning was founded in 1998 | <https://ie.ixl.com/math/year-5> |
| Leaving Cert and Junior Cert maths topics | Website | Project maths website – has sections organised by level (LC or JC) and further by topic with a variety of materials – many align closely to level 5 maths.  Digital versions of materials from project maths workshops.  Website has student area with some interesting resources, in particular the section on how to use CASIO or SHARP calculators. | Project maths is a new initiative to teaching maths at secondary level in Ireland. | <http://www.projectmaths.ie/> |
| All Maths topics | Website | The Harcourt School Publishers World Wide Web pages ("The Learning Site") are intended primarily to provide high quality online learning resources to students, teachers, and parents of students.  These resources will extend, enrich, enhance, and diversify learning.  Very basic but have some good simulations in areas from statistics, probability and algebra – some simulations may be more useful for level 4 maths or for very weak groups. | Harcourt school publishers | <http://www.harcourtschool.com/hspmath/na/grade_6_na.html>  Home Page with links to subjects and other maths websites.  <http://www.harcourtschool.com/index.html> |
| All Maths topics | Website | Glossary of maths terms with link to definition and examples.  Useful for introducing new maths vocabulary – not specific to any learning outcomes but to all maths. | Harcourt school publishers | <http://www.harcourtschool.com/glossary/fast_forward_ca/index6.html> |
| Arithmetic | Online pdf | Covers Whole Numbers, Fractions and Mixed Numbers, Decimals and percentages, Ratio and Proportion, Signed Numbers | Anthony Weaver Department of Mathematics and Computer Science Bronx Community College | <http://fsw01.bcc.cuny.edu/mathdepartment/Courses/Math/MTH01/allmath01.pdf> |
| Arithmetic | Website – online pdf index | A variety of pdf files which cover algebra, factorisation and quadratic functions. | The Regional Centre for Excellence in Mathematics Teaching and Learning (CEMTL) | <http://www3.ul.ie/cemtl/headstart.htm> |
| Trigonometry | Online pdf | Detailed notes on trigonometry | This is the homepage for the free book Trigonometry, by Michael Corral (Schoolcraft College) | <http://www.mecmath.net/trig/trigbook.pdf> |

**Useful Organisations:**

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| **Name** | **Contact Information** |
| The Irish Mathematical Society or IMS is the main professional organization for mathematicians in Ireland. | <http://www.maths.tcd.ie/pub/ims/> |
| Irish Maths Teachers Association (IMTA) - The aim of the IMTA (founded in 1964) is to promote and assist the teaching of mathematics at all levels | <http://www.imta.ie/> |
| Maths Week - Maths Week is Co-ordinated by CALMAST, Waterford Institute of Technology.  Can be approached to offer guest speaker for maths week. Maths week is in early October. | Email: [mathsweek@wit.ie](mailto:mathsweek@wit.ie) Website: <http://www.mathsweek.ie/> |
| Quality and Qualifications Ireland (QQI) – details on component specifications for minors and major awards. | <http://www.qqi.ie/> |
| Further Education Support Service (FESS) | <http://www.fess.ie/> |
| National Council for Curriculum and Assessment (NCCA) – section on project maths. | <http://www.ncca.ie/> |
| State Examinations Commission (SEC) home page - Previous exam papers at Junior and Leaving certificate | <http://www.examinations.ie/> |
| Project maths development team | <http://www.projectmaths.ie/> |

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| **MOOCs (Massive Online Open Courses)** | |
| Free access to online courses  Search regularly for new courses and new start dates | <https://www.mooc-list.com/> |
| CourseTalk is the largest source for student-powered reviews of online courses and MOOCs. We partner with high-quality course providers, resulting in us bringing you more than 38,000 courses to explore.  Many different subject areas but there are many free maths courses – some are too advanced for level 5 but some are general e.g. mathematical thinking that will prepare learners for maths in the future. | <https://www.coursetalk.com/> |