Teaching Resources for AMT (Rocketry)

The following resources are to support the new Advanced Manufacturing Technologies qualification. The site will be updated as the resources are developed. We welcome any feedback on these materials and any additional materials will be placed here or on our Moodle site. The SmartEvidence template for this course is also available on our ePortfolio system. Please contact the office for details.

Teaching Guide

This teaching guide [1] will be regularly updated. The teaching guide has the key information, long term planning and the scheme of work for **all 4 units** and the example exam paper. *Resources will follow.*

- ***Unit 1 -*** Coursework evidence booklet ***[2]available to use as a starting point***
- ***Unit 2 -*** Coursework evidence booklet ***[3] available to use as a starting point***
- ***Unit 3 -*** Coursework evidence booklet ***[4] available to use as a starting point***
- ***Unit 4 -*** Coursework evidence booklet ***[5] available to use as a starting point***

Unit 1 - The Understanding and Appreciation of Rocket Science

Title	Link 1	Link 2	Link 3	Link 4	Notes
Theory	Acceleration [6]	Forces [7]	Into Space [8]	Lift Off [9]	Various documents looking at some of the basic theory
	Rocket Engines	Rocket aerodynamics	History of rockets	Kerbal Discussion [10]	
Extra Curricular Opportunities	UK Rocket Company [11] (school visits)	Cosford RAF Museum [12]			Looking to a well known rocket organisation
Lesson 1 to Lesson 2 - Introduction and NASA	Intro (ppt)	NASA facts worksheet	NASA (peer assess worksheet)	History of Rockets (hwk)	Space X and game [13]
Lesson 3 - Forces	Overview (ppt) [14]	PPT worksheet [15]	How to fly worksheet [16]	Rocket bits (hwk) [17]	Atlas V launch [18] (video embedded in ppt)
Lesson 4 - Water Bottle Rockets	Water bottle rockets (ppt) [19]	Water bottle handout [20]	Video demo [21]		
Lesson 5 - Flights	Flights (ppt) [22]	Apollo 13 video link [23]			
Lesson 6 - Simulations	Simulations (ppt) [24]	Worksheet [25]	Wordsearch (hwk) [26]		
Lesson 7 - Flying	Paper Planes (ppt) [27]	Test Plan [28]	Plane Plans (zip) [29]	Astronaut Journal (hwk) [30]	
Lesson 8 - Launching	Launching (ppt) [31]	World Map Worksheet [32]			

Title	Link 1	Link 2	Link 3	Link 4	Notes
Lesson 9 - Success vs Failure	Success vs Failure (ppt) [33]	Top 10 missions (worksheet) [34]	V2 video [35]	Materials (hwk) [36]	
Lesson 10 and 11 - Rocket Shape and Designs	Rocket shape and design (ppt) [37]	Rocket parts (worksheet) [38]	What shape is a rocket (worksheet) [39]	Robert H Goddard (hmk) [40]	
Lesson 12 - Intro to Kerbal	Intro to Kerbal (ppt) [41]	Kerbal Lets Launch worksheet [42]	Label the toolbar worksheet [43]	Newton's 3 Laws (hwk) [44]	
Lesson 13 - Kerbal Mission	Kerbal Missions (ppt) [45]	Kerbal Missions worksheet [46]	NavBall markers worksheet [47]	Space Race template (hwk) [48]	
Lesson 14 - Kerbal and own simulations	Kerbal Simulations (ppt) [49]				
Lesson 15 - 16 Coursework Tasks	Coursework checklist (ppt) [50]				
Lesson 17 - Materials in Rockets	Materials in Rockets (ppt) [51]	Matching worksheet [52]	Matching answers [53]		
Lesson 18 - Pencil Rockets	Pencil Rockets (ppt) [54]	Simpler Pencil Rockets [55]	Complex Pencil Rockets [56]	Fins design [57]	
Lesson 19 - Coursework	Coursework (ppt) [58]	What is an orbit worksheet (hwk) [59]	What is an orbit answers [60]		
Lesson 20 - Rocket Mice	Rocket Mice (ppt) [61]	Testing Worksheet [62]	Rocket Mice Guide [63]	Mouse template [64]	
Lesson 21 - The atmosphere	The Atmosphere (ppt) [65]	Atmosphere Fact Sheet [66]			Video of students talking to the International Space Station [67]
Lesson 22 - coursework	Coursework (ppt) [68]	Own Blueprint template worksheet [69]			
Lesson 23 - Space Race	Space Race (ppt) [70]				
Lesson 24 - coursework	Coursework (ppt) [71]				
Lesson 25 - Setting up a rocket	Materials in my rocket (ppt) [72]	Shopping List worksheet [73]			
Lesson 26 - Simulations Rocket	Design Simulations (ppt) [74]	Simulations of design worksheet [75]	Composite Materials (hwk) [76]		

Useful Weblinks and Downloads

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Focus	Link	Comments
Unit 1 - Rockets	Starchaser [11]	Only UK company with space launch capability. Visit schools with rockets and are currently planning to get an astronaut into space.
Unit 1 - Rockets	Jodrell Bank [77]	Great for some history and hands on stuff.
Unit 1 - Rockets	Falcon Heavy [78]	Launch a car towards Mars!
Unit 2 - Robotics	Consequential Robotics [79]	Makers of MiRo the sensitive robot. Can be programmed with Scratch and Python and also has simulation software
Unit 2 - Robotics	CB Information Systems [80]	Makers of BinaryBots kits, which are simple to make and control robots. Also make robot controlled all terrain cars.
Unit 2 - Robotics	Report [81]	report on how AI can be used for bad purposes
Unit 2 - Robotics	Openbionic [82]	Company that uses open source technologies and robotics to replace lost limbs
Unit 2 - Robotics	Ubuntu webinar [83]	Webinar showing how to build robots from Ubuntu
Unit 2 - Robotics	ROS [84]	White paper on Robotic Operating System choice
Unit 2 - Robotics	DIY [85]	NASA and JBL tutorial site to build your own "Mars Rover".
Unit 3 -Micro-satellites	Satellites 4 Everyone [86]	Organisation that has plans and guides to build micro-satellites using 3D printing and small form PC boards. Also involved with Satellite Catapult which funds research into Satellites.
Unit 3 - Satellite tracking	Goonhilly Earth Station [87]	Earth Station - hold work-shops, experience days etc as well as teacher CPD in all things space.
Unit 3 - Satellite	Space junk [88]	How to remove some of the junk from space that now affects satellites
Unit 3 - Satellite	Hacking [89]	Article about the threat to satlllites from hacking
Unit 3/4 -	Mars rover [90]	This fits almost all units as it is an unmanned device which will be sent to Mars.
Unit 4 - Unmanned Vehicles	Cobots [91]	Articles about robot drones that help in jobs like construction
Unit 4 - Unmanned Vehicles	Parrot [92]	Offer advice and guidance on how to use drones
Unit 4 - Unmanned Vehicles	Projects [93]	8 Open Source projects (hardware and software) for drones
Unit 4 - Unmanned Vehicles	Drones [94]	Useful flyer explaining different unmanned vehicles.

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Focus	Link	Comments
Unit 4 - Unmanned Vehicles	Car projects [95]	Self-driving car kits for students to build and race.
Unit 4 - Unmanned Vehicles	Drone OS [96]	Innovating toward safety: computer controlled aerial robotic systems

Attachment	Size
Example Exam Questions.pdf [97]	698.43 KB
Teachers Guide V1.pdf [98]	1.26 MB
Unit 1 - lesson plans (1-26).pdf [99]	1.26 MB
The Drone Code [100]	131 KB
UK Government's Space Industry Bill 2017-2019 [101]	572.27 KB
Robot Case Study - Service Industries [102]	298.37 KB
Case study of Open Source OS and drone development [103]	176.46 KB

Source URL: https://theingots.org/community/rocket_resources

Links
[1] https://theingots.org/community/sites/default/files/uploads/user250456/Teachers%20Guide%20V1.pdf
[2] https://theingots.org/community/sites/default/files/uploads/user250456/Coursework%20Evidence%201.docx
[3] https://theingots.org/community/sites/default/files/uploads/user250456/Coursework%20Evidence%202.docx
[4] https://theingots.org/community/sites/default/files/uploads/user250456/Coursework%20Evidence%203.docx
[5] https://theingots.org/community/sites/default/files/uploads/user250456/Coursework%20Evidence%204.docx
[6] https://theingots.org/community/sites/default/files/uploads/user4107/Calculating%20Rocket%20Acceleration.docx
[7] https://theingots.org/community/sites/default/files/uploads/user4107/Forces.docx
[8] https://theingots.org/community/sites/default/files/uploads/user4107/Getting%20Rockets%20into%20space.docx
[9] https://theingots.org/community/sites/default/files/uploads/user4107/Lift%20off.docx
[10] https://youtu.be/lx1PAA5Q2HY
[11] https://starchaser.co.uk/
[12] https://www.rafmuseum.org.uk/cosford/
[13] https://www.producthunt.com/posts/spacex-falcon-9-lander-2
[14] https://theingots.org/community/sites/default/files/uploads/user4107/L3%20FORCES.pptx
[15] https://theingots.org/community/sites/default/files/uploads/user4107/Forces%20and%20Flight%20powerpoint%20worksheet.docx
[16] https://theingots.org/community/sites/default/files/uploads/user4107/How%20is%20flight%20achieved.docx
[17] https://theingots.org/community/sites/default/files/uploads/user4107/rocket%20parts.docx
[18] https://youtu.be/EiV2fiFhmf4
[19] https://theingots.org/community/sites/default/files/uploads/user4107/L4%20WATER%20BOTTLES

.pptx
[20] https://theingots.org/community/sites/default/files/uploads/user4107/Water_bottle_rockets.docx
[21] https://www.sciencelearn.org.nz/resources/406-water-bottle-rockets
[22] https://theingots.org/community/sites/default/files/uploads/user4107/L5%20FLIGHTS.pptx
[23] https://www.youtube.com/watch?v=C3J1AO9z0tA
[24] https://theingots.org/community/sites/default/files/uploads/user4107/L6%20-%20simultions.pptx
[25] https://theingots.org/community/sites/default/files/uploads/user4107/simulation1.docx
[26]
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[27] https://theingots.org/community/sites/default/files/uploads/user4107/L7%20-%20paper%20aeroplanes.pptx
[28] https://theingots.org/community/sites/default/files/uploads/user4107/paper%20aeroplanes%20test%20plan.docx
[29] https://theingots.org/community/sites/default/files/uploads/user4107/paper%20aeroplanes.zip
[30] https://theingots.org/community/sites/default/files/uploads/user4107/Astronaut%20journal%20Homework.docx
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[32] https://theingots.org/community/sites/default/files/uploads/user4107/world-map.pdf
[33] https://theingots.org/community/sites/default/files/uploads/user4107/L9%20SUCCESS%20OR%20FAILURE.pptx
[34] https://theingots.org/community/sites/default/files/uploads/user4107/top%2010%20science%20missions.docx
[35] https://www.youtube.com/watch?v=WjFTN-YdK_M
[36] https://theingots.org/community/sites/default/files/uploads/user4107/Rocket%20materials%20homework.docx
[37] https://theingots.org/community/sites/default/files/uploads/user250456/L10%20and%20L11%20-%20rocket%20shape%20and%20designs.pptx
[38] https://theingots.org/community/sites/default/files/uploads/user250456/Rocket%20parts.docx
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[40] https://theingots.org/community/sites/default/files/uploads/user250456/Robert%20H%20Goddard%20Profile%20Homework.docx
[41] https://theingots.org/community/sites/default/files/uploads/user250456/L12%20-%20intro%20to%20kerbal.pptx
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[48] https://theingots.org/community/sites/default/files/uploads/user250456/Homework.docx
[49] https://theingots.org/community/sites/default/files/uploads/user250456/L14%20-%20Kerbal%20simulations.pptx
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[51] https://theingots.org/community/sites/default/files/uploads/user250456/L17%20-%20Materials%20in%20Rockets.pptx
[52] https://theingots.org/community/sites/default/files/uploads/user250456/starter%20-%20Matching%20Activity.docx
[53] https://theingots.org/community/sites/default/files/uploads/user250456/starter%20-%20Matching%20Activity%20%28answers%29.docx
[54] https://theingots.org/community/sites/default/files/uploads/user250456/L18%20-%20Pencil%20Rockets.pptx
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[60] https://theingots.org/community/sites/default/files/uploads/user250456/What%20Is%20an%20Orbit%20HWK%20answers.docx
[61] https://theingots.org/community/sites/default/files/uploads/user250456/L20%20-%20Rocket%20Mice.pptx
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[66] https://theingots.org/community/sites/default/files/uploads/user250456/The%20atmosphere%20fact%20sheet.docx
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[69] https://theingots.org/community/sites/default/files/uploads/user250456/design%20template%20-%20blueprint.docx
[70] https://theingots.org/community/sites/default/files/uploads/user250456/L23%20-%20space%20race.pptx
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[72] https://theingots.org/community/sites/default/files/uploads/user250456/L25%20-%20Materials%20in%20my%20rocket.pptx
[73] https://theingots.org/community/sites/default/files/uploads/user250456/L25%20-%20Shopping%20List.docx
[74] https://theingots.org/community/sites/default/files/uploads/user250456/L26%20-%20Materials%20in%20my%20rocket%20simulations.pptx
[75] https://theingots.org/community/sites/default/files/uploads/user250456/L26%20-%20simulations.docx
[76] https://theingots.org/community/sites/default/files/uploads/user250456/Composite%20Materials%20homework.docx
[77] http://www.jodrellbank.net/
[78] http://www.bbc.co.uk/news/science-environment-42969020
[79] http://consequentialrobotics.com/
[80] http://www.cbinfosystems.com/
[81] https://theingots.org/community/sites/default/files/uploads/user4107/1c6q2kc4v_50335.pdf
[82] https://openbionics.com
[83] https://www.brighttalk.com/webcast/6793/327835?utm_source=twitter_social&utm_medium=social&utm_campaign=FY19_IOT_WBN_BuildingARobot#
[84] https://theingots.org/community/sites/default/files/uploads/user4107/Robotics_WP_Canonical_Final.pdf
[85] https://opensourcerover.jpl.nasa.gov/#!/explore
[86] http://satellites4everyone.co.uk
[87] http://www.goonhilly.org/
[88] https://www.bbc.co.uk/news/science-environment-44603780
[89] https://www.thetimes.co.uk/article/mod-boosts-space-defence-as-threat-to-satellites-grows-wslqhlkht
[90] https://www.bbc.co.uk/news/science-environment-44728947
[91] https://blog.ubuntu.com/2018/12/03/collaborative-robots-cobots-and-the-changing-nature-of-work
[92] http://edu.parrot.com/
[93] https://opensource.com/article/18/2/drone-projects?

[94] https://theingots.org/community/sites/default/files/uploads/user4107/what-is-a-drone.pdf
[95] https://diyrobocars.com/2017/10/01/a-minimum-viable-racer-for-openmv/
[96] https://blog.ubuntu.com/2018/11/14/innovating-toward-safety-computer-controlled-aerial-robotic-systems
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[103] https://theingots.org/community/sites/default/files/uploads/CaseStudy_Aerotenna.pdf