בס״ד

תלמוד תורה פרדס
Pardes House Primary School

Moshe Bude House, Hendon Lane, London, N3 1SA, Tel: 020-8343-3568, E-mail: office@pardeshouse.com

Founding Principal:
Rabbi E Halpern זצ״ל

Menahel:
Rebbe S Roitenbarg שליט״א

Headteacher:
Mr J Sager MA B.Ed NPQH FCCT

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Topic Medium-Term Planning Document

Topic: Mechanics - How it all works		**Year group: 5**	**Term: Spring 2**
Key aims of topic	**Curiosity being stimulated**	**Big thinking question**	**Other key questions being investigated**
Using understanding of how wheels, cranks, axles and CAMS, to **create a moving toy.** Using knowledge of forces – gravity, air resistance, water resistance and friction to designing and **build a futuristic robot for entry in Robot competition.** **Design and build a Viking Longship** based on knowledge of the Viking period. To understand how the design of the Viking longships helped in the pursuit of Viking raids/invasions. **To draw Da Vinci inspired anatomical sketches of a hand** – how do the mechanisms of the human hand work? Bones, Joint, Ligaments, Tendons, Blood Vessels, Muscles, Nerves. Links in with friction: Bursae are small, fluid filled sacs that decrease friction between tendon and bone/skin. Using knowledge of drawing and measuring angles (with a	How to Mechanisms work – gears, levers, pulleys? How can Robots change our lives? Are they are force of good or a risk to the human species? What makes a good inventor? Why? Why is sleep so important to our health? How is the planet being 'plumbed' in light of the effect of climate change and pollution on the world's water supply?	What is a Mechanism? Cams, Gears, Levers, Rachets, Springs What do they all have in common? What do they each do? Can you name a piece of equipment which might consist of a lever? Hint: Playground	What different mechanism systems are there? How do each of them work? How are they purposeful? What is an Invention? Does an invention need to be a new idea or can it be about adapting or improving an existing design? What is a Prototype? Why is it important? What makes a good inventor? What qualities might you need? How have key event and individuals in design and technology helped shape the world? Which inventions/inventors have had the greatest significance? Why? What are Robots? What is their purpose? Can they pose a threat to us in the future? How? What is a CAM?

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protractor) to **make a Sun Compass.** https://www.youtube.com/watch?v=bnmZh82oz9Y **Write instructions** on how to fix an automaton			Why are they different shapes? How does that affect the line of motion of a moving toy?
A Key words defined/investigated	**Texts, Books and Stories**	**Topic-rich vocabulary**	**Writing skills and opportunities**
Levers Pulleys Gears Air Resistance Friction Robotics Citizenship	The Invention of Hugo Cabret by Brian Selznick	Moving Toys - Frame, CAM, Axle, Cam follower, Crank handle Force, push, pull, gravity, driving force, air resistance, water resistance, friction and surface friction, upthrust, buoyancy unsupported objects Mechanisms - including levers, pulleys and gears	Writing instructions – to support Hugo to mend the toys and ultimately to fix the automaton Keeping an ongoing journalistic scrapbook/journal in role as Hugo. A biographical report from scrap book journals about the history of film and Georges Méliès. about the history of film and Georges Méliès **SPAG** Use of the present perfect and progressive forms of verbs instead of the simple past [for

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			example, He has gone out to play contrasted with He went out to play] Relative clauses beginning with who, which, where, when, whose, that, or an omitted relative Pronoun Use of the passive to affect the presentation of information in a sentence [for example, I broke the window in the greenhouse versus The window in the greenhouse was broken (by me)] Layout devices [for example, headings, sub-headings, columns, bullets, or tables, to structure text] Use of the colon to introduce a list and use of semi-colons within lists
Maths skills	**Skills linked to Foundation subjects**	**Emotional Literacy, PSHE**	**Art and DT skills**
Make a graph of class measurements to determine if Da Vinci's Vitruvian man predictions were correct Using protractors and knowledge of angles to make a Sun compass. https://www.youtube.com/watch?v=bnmZh82oz9Y	Science – Understanding Levers, Gears and Pulleys Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces DT – Understand how different forces work by making your own CAM operated monster	Link with Mental Health Awareness Week – Theme 'Sleep' 18-24th May 2020 Sleep – A vital part of a healthy lifestyle The week will focus on the connections between our sleep - or lack of it - and mental health.	Leonardo Da Vinci – The Mechanics of man. Da Vinci wasn't just a great painter. He was also a sculptor, an architect, a poet, a composer, a scientist, a mathematician, an anatomist and an inventor.

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	https://www.youtube.com/watch?v=2vCLmxsIavo or build your own Trebuchet Art – Leonardo Da Vinci Mirror writing Why? Was he… ○ trying to make it harder for people to read his notes and steal his ideas. ○ hiding his scientific ideas from the powerful Roman Catholic Church, whose teachings sometimes disagreed with what Leonardo observed. ○ trying to prevent smudging: writing left handed from left to right was messy, the ink just put down would smear as his hand moved across it. Drawing Da Vinci's anatomical drawings of hand. https://www.ypo.education/orthopaedics/hand-wrist/hand-anatomy-t191/video/  Geography: Leonardo's Bridge - http://news.bbc.co.uk/1/hi/world/europe/1630792.stm Other important iconic bridges in UK: https://heritagecalling.com/2017/07/17/7-iconic-bridges-of-england/ Link with World Water Day What is the effect of climate change on the world's water supply. How can we solve it? Plumbing the Planet: The World's 5 Biggest Projects taking on the world's water supply. ○ Ashkelon Desalination Plant ○ North-South Water Transfer Project, Chin ○ G-Cans Tunnel System, Tokyo, Japan ○ Marina Reservoir, Singapore ○ Groundwater Replenishment System, Orange County, California	Create a poster for MH Awareness Week - 5 reasons to get a good night's sand leep!	Da Vinci was the brains behind the bicycle, the aeroplane, the helicopter and the parachute – amazingly he drew designs for all these machines about 500 years before their time 

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	https://www.popularmechanics.com/science/green-tech/a3993/4302532/ Explore the technologies and mechanics that are used to make drinking water, desalinate sea water, recycle toilet water (toilet to tap schemes https://www.bbc.com/future/article/20160105-why-we-will-all-one-day-drink-recycled-wastewater), etc. History Viking inventions: Battle Axe, Comb, Keel, Longship, Shield, Western style skis, Magnetic Compass, Sun Compass, Sunstone, Tent. Children to make a Sun compass using a slap of wood. https://listverse.com/2017/12/30/10-amazing-viking-inventions-and-innovations/ Whilst many of the Viking's technological marvels were related to battle, some of their inventions and innovations revolutionized sailing and navigation. Others were useful for personal and military travel through harsh environments or bivouacking in cold, rugged terrain. One of their inventions reflects their personal vanity and sense of self. Using the mineral magnetite (aka lodestone), which is abundant throughout Scandinavia, the Vikings invented one of the first magnetic compasses. Link: Most important inventions in the world – e.g. Wheel, Nail, Compass, Printing Press, Internal Combustion Engine, Telephone, Lightbulb, Penicillin, The Internet. Compare these historical inventions to the most important inventions of the last 20 years, e.g. Portable GPS, Cloning, Email and Text Messaging, Drones, Hybrid Cars, Self-Driving Cars, International Space Station, etc.		
Visitor and trip opportunities	**Active Learning opportunities**	**British Values link**	**Social responsibility**
Inning – Robotics Workshop TBC Inning - Viking Workshop in school. TBC	Cooking Viking Oak Cakes Making Viking Long-ship ROBOTICS Year 5 Dragons Den Lesson in hall – Children to present their inventions (competition entries) to panel of investors. UK-RAS (Robotics and Autonomous Systems) Network 	Study of Vikings and settlements in Britain. Cultural education – making Viking longboats/cooking oat cakes Developing Self-confidence: Giving students opportunities to discuss and share opinions about Art work and the meaning behind it with respect. Should Robots be citizens?	Roboethics (Ethical issues with robots) Debate – e.g. Do robots pose a threat to humans in the short/long-term? Problematic uses of robots – in healthcare or 'killer' robots in war, or ensuring robots are designed so they

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	Do you have what it takes to design a robot to explore exciting space terrains? Design a robot with your class in our robot-building competition for a chance to win big for your school. Prizes include a free trip to London to attend the International Robotics Showcase in June, and a MiRo-E Robot for your class! To enter school groups must create virtual robots that can move across challenging space environments and complete a range of tasks. You can enter using the Twinkl Robotics augmented reality app or online. The free augmented reality app is available to download on the Apple App Store and Google Play, and the web-based version is available online. The competition aims to help school children to boost their team building, science and coding skills whilst learning about the exciting world of robotics. Anybody can download and play with the Twinkl app, but the competition is open to school groups aged between 8 and 14 years.The competition opens for entries on Thursday 13th February 2020 and you will have until the Monday 8th May 2020 to design, test and submit your romabot.	 Meet Sophia, the first robot with her own passport. Developed by Hong Kong-based company Hanson Robotics, she is able to imitate 62 human expressions using artificial intelligence (AI), facial recognition and a connection to the World Wide Web. She is so advanced and lifelike that in 2017 the Saudi Arabian government made the unprecedented decision to grant her full citizenship of its country. https://www.britishcouncil.org/anyone-anywhere/explore/digital-identities/robots-citizens	act ethically and ensure the safety of the human race. Might teachers be replaced by robots in the future? – pros and cons.
National / International events links	**Other** (including any other skills being developed that can impact pupils in the short term and for their long-term future)		**What do the boys already know?**
World Water Day Sunday 22nd March 2020 Robotics Week June 2020 Mental Health Awareness Week – Theme 'Sleep' PSHE Link 18-24th May 2020	What makes a good inventor? Identifying a need - What needs to be solved? |Imagination and Creativity – having innovative ideas/designs of your own Inquisitive – Why does something happen? Teamwork – working in groups collaboratively to design a robot Drive, Determination and Perseverance – staying detached/loyal to your idea when needed – adapting/improving designs, staying focussed on the goal. Resilience – not being afraid to fail Evaluation – How well did I do? Can I make further improvements to my design? Understanding the need for confidentiality – to protect your ideas/invention.		To be assessed at beginning of Spring 2 – AFL Children already know about magnetic forces from year 5.