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| **Subject** | **Year 8 Physics content Autumn Term** | **How to support students’ learning** |
| Forces and Motion 2  Waves 2 | Forces and Springs   * State why objects would stretch from an original position * Calculate the extension of a spring * Draw a scatter graph of force against extension * Describe the link between the extension of a spring and the force applied to it * Explain the mathematical relationship between force and extension   Pressure in Solids and Fluids   * Recall the units for pressure * Recall the formula for pressure * Calculate the pressure of an object on a solid surface * Rearrange the formula to find the force or area of an object. * Explain the effects of pressure in some everyday situations * Understand what a fluid is (in physics) * Define density and the formula * Describe how pressure changes in water * Use density to determine if an object will float or sink * Describe how pressure changes with altitude   Forces and Moments   * Understand what a lever is used for * Recall the parts of a lever * State the principle of moments * Calculate the moment of a force * Explain the advantages of a lever * Rearrange the equation to find force or distance * Explain how levers work using scientific language   Newton’s Second Law   * Recall the equation linking force, mass and acceleration * Know the units of acceleration * Plot a graph of force against acceleration * Identify common pieces of equipment and understand their scientific purpose * Round numbers to a specified number of decimal places * Rearrange F=ma to find mass or acceleration. * Calculate mass using the gradient of the force / acceleration graph   Sounds and the Ear   * Recall the main parts of the human ear and a microphone * Describe the parts of the ear involved in hearing * Explain simply the function of different parts of the microphone * Compare the ear and microphone   Ultrasound   * Define ultrasound using frequency and hearing ranges * State the human hearing range in Hertz * Describe the uses of ultrasound * Explain how ultrasound is used for specific examples (cleaning / physio) * Use ultrasound (echoes) in calculations of speed   Images and Lenses   * Know that light travels in straight lines * Construct basic ray diagrams of reflection and refraction * Understand the role of lenses in forming images (not in eye) (e.g. focal point is where the image is formed) * Use a pinhole camera to form an image * State and describe the main structures in the eye * Recall that convex lenses are found in the eye * Describe what happens to light when it hits the retina (photochemical effects) * Compare the eye to a telescope (lenses) and camera (CCD chip for photochemical effects)   Colour   * Know that white light is made up of different colours – name the colours * Understand that the colour light appears is related to frequency * Describe what happens to light as it passes through a prism * Explain that objects appear the colour of light they reflect, and all other colours are absorbed | This video is an excellent resource that summarises all the lessons in this topic.  [BBC bitesize forces - KS3 - YouTube](https://www.youtube.com/watch?v=9kMNtZvYmqQ)  Think of all the places springs are uses – they are essential for our everyday life. How they behave when stretched and compressed is summarised here. There is also a video and game to play [Hooke's law - Forces and movement - KS3 Physics - BBC Bitesize - BBC Bitesize](https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/zv4jdp3)  There are some independent learning booklet available online <https://thepolesworthschool.com/wp-content/uploads/2020/06/KS3-Year-8-Science-Independent-Learning-Booklets-Pressure.pdf>  You can carry out your own experiment at home to investigate water pressure. Here are some instructions:  [Water Pressure Experiment - YouTube](https://www.youtube.com/watch?v=ix7LWWjiaek)  This video is a summary of how moments can be useful for everyday objects  [GCSE Science Revision - Moments and Levers - YouTube](https://www.youtube.com/watch?v=gbzQ8lZcraY)  Encourage students to watch this video which will remind them how to calculate resultant forces and understand the motion of the object  [Resultant Force - GCSE Physics - YouTube](https://www.youtube.com/watch?v=4yf_EgUyJdk)  You can try some of your own experiments at home to investigate Newton’s 2nd Law. Here is a guide to several experiments.  [Science Project on Gravity and Motion for Third Graders (sciencing.com)](https://sciencing.com/science-gravity-motion-third-graders-6868027.html)  Find out how the ear works by watching this video: <https://www.bbc.co.uk/bitesize/topics/zgdmsbk/articles/zkdkmfr>  Learn how microphones work – some tricky words but the concept is actually not too difficult! <https://studyrocket.co.uk/revision/gcse-physics-edexcel/triple-electromagnetic-induction/applications>  This webpage covers what ultrasound is, uses and how to use it in speed calculations. [Ultrasound and Echoes (evolvingsciences.com)](https://www.evolvingsciences.com/Ultrasound%20and%20Echoes%20.html)  Follow the instructions on this website to carry out your own refraction experiment at home.  [Light Refraction Science Experiment (coolscienceexperimentshq.com)](https://coolscienceexperimentshq.com/light-refraction/)  If you want to go further this booklet contains GCSE level information on lenses: [Notes - 6.3 Lenses - WJEC (Eduqas) Physics GCSE (physicsandmathstutor.com)](https://pmt.physicsandmathstutor.com/download/Physics/GCSE/Notes/WJEC-England/6-Light-and-Electromagnetic-Waves/Detailed-Notes/6.3%20Lenses.pdf)  Video explaining how pinhole cameras work and how to dray ray diagrams: <https://www.youtube.com/watch?v=hhWVJ4SmkF0>  Experiments with colour available as worksheets of instructions to download: [| STEM](https://www.stem.org.uk/resources/elibrary/resource/34400/colour-chaos)  Introduction to colours in light: <https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/zryrkhv>  Understand why your red t-shirt looks red! Use this website: <https://www.sciencelearn.org.nz/resources/47-colours-of-light> |