

Physics
Key Stage 3
Programme of Study

KS3 Calculation of fuel uses and cost in the domestic context

Ph1	To be able to compare energy values of different foods (from labels) (kJ)
Ph2	To be able to compare power ratings of appliances in watts (W, kW)
Ph3	To be able to compare amounts of energy transferred (J, kJ, KW hour)
Ph4	To understand domestic fuel bills and fuel use and costs
Ph5	To know about fuels and energy resources

KS3 Energy changes and transfers

Ph6	To know that simple machines have bigger force but at the expense of smaller movement (and vice versa):product of force and displacement unchanged
Ph7	To know about heating and thermal equilibrium; temperature difference between two objects leading to energy transfer from the hotter to the cooler one , through contact (conduction) or radiation; such transfers tending to reduce the temperature difference; use of insulators
Ph8	To know other processes that involve energy transfer; changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels

KS3 Changes in systems

Ph9	To know energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change
Ph10	To be able to compare the starting with the final conditions of a system and describe increases and decreases in the amounts of energy associated with movements, temperatures changes in positions in a field, in elastic distortions and in chemical compositions
Ph11	To understand the physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes

KS3 Describing Motion

Ph12	To know about speed and the quantitative relationship between average speed, distance and time. (Speed = distance / time)
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Ph13	To understand the representation of a journey on a distance-time graph
KS3 Forces	
Ph14	To understand forces as pushes and pulls, arising from the interaction between two objects
Ph15	To be able to use force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces
Ph16	To understand a moment as the turning effect of a force
Ph17	To know about forces; associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion air and water
Ph18	To know that force is measured in Newtons
Ph19	To know about changes of measurements of stretch or compression as force is changed
Ph20	To understand force-extension linear relation; Hookes Law as a special case
Ph21	To understand that work done and energy changes on deformation
Ph22	To know about not-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity
KS3 Pressure in fluids	
Ph23	To know about atmospheric pressure, that it decreases with increase of height as weight of air above decreases with height
Ph24	To know about pressure in liquids, increasing with depth, about up-thrust effects and floating and sinking
Ph25	To know that pressure is measured by ratio of force over area – acting normal to any surface
KS3 Balanced forces	
Ph26	To understand opposing forces and equilibrium; weight held by stretched spring or supported on a compressed surface
KS3 Forces and motion	
Ph27	To know about forces being needed to cause objects to stop or start moving , or to change their speed or direction of motion (qualitative only)

Ph28	To about change of motion as depending on direct of force and its size
KS3 Observed waves	
Ph29	To know that waves on water are undulations which travel through water with transverse motion; these waves can be reflected and add or cancel- superposition
KS3 Sound waves	
Ph30	To know that sound is measured in hertz (Hz); has different frequencies
Ph31	To be able to explain echoes, reflection and absorption of sound
Ph32	To know that sound needs a medium to travel and about the speed of sound in air, in water and in solids
Ph33	To know that sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum
Ph34	To know that sound waves are longitudinal
Ph35	To know about the auditory range of humans and animals
KS3 Energy and waves	
Ph36	To know about pressure waves transferring energy; use for cleaning and physiotherapy by ultrasound; waves transferring information for conversion to electrical signals by microphone
KS3 Light Waves	
Ph37	To know about the similarities and differences between light waves and waves in matter
Ph38	To know about the speed of light waves and that they can travel through a vacuum Know the term 'transmission' of light and that light can move through materials. To be able to explain the absorption, diffuse scattering and reflection at a surface of light
Ph39	Use the ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and the action of convex lens in focusing (qualitative)
Ph40	To explain how the structures of the eye help us to use light to be able to see
Ph41	To know that light can transfer energy from source to absorber and that this can lead to chemical and electrical effects i.e. as seen in photo-sensitive material in the retina and in cameras

<i>Ph42</i>	To understand colour and the different frequencies of light, white light and prisms (qualitative only)
<i>Ph43</i>	To know about differential colour effects in absorption and diffuse reflection
KS3 Current electricity	
<i>Ph44</i>	To know that electric current is measured in amperes
<i>Ph45</i>	To be able to construct two types of electric circuit; series and parallel and understand that currents add where branches meet
<i>Ph46</i>	To be able to describe what is a conductor and an insulator of electricity
<i>Ph47</i>	To be able to describe an electric current as the flow of charged particles called electrons
<i>Ph48</i>	To know about potential difference and that it is measured in volts and what this means for batteries and bulbs
<i>Ph49</i>	To be able to use a voltmeter
<i>Ph50</i>	To know about resistance and that it is measured in ohms and is as the ratio of potential difference (p.d.) to current (Ohms law)
<i>Ph51</i>	To be able to measure the differences in resistance between conducting and insulating components (quantitative)
KS3 Static Electricity	
<i>Ph52</i>	To know about separation of positive and negative charges when objects are rubbed together; transfer of electrons, forces between charged objects
<i>Ph53</i>	To know about the idea of electric fields, forces acting across the space between objects not in contact
KS3 Magnetism	
<i>Ph54</i>	To know about magnetic poles and use the terms attraction and repulsion
<i>Ph55</i>	To investigate magnetic fields using iron fillings and be able to use a compass to plot the shape of a magnetic field
<i>Ph56</i>	To be able explain the Earth's magnetism and how it influences a compass and is used in navigation
<i>Ph57</i>	To know the principles involved in the magnetic effect of a current, electromagnets and D.C. motors

KS3 Physical Changes	
Ph58	To know about conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation and dissolving
Ph59	To be describe Brownian motion in gases
Ph60	To know about diffusion in liquids and gases driven by differences in concentration
Ph61	To be able to explain the difference between chemical and physical changes
KS3 Particle Model	
Ph62	To be able to explain the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density and the anomaly of ice water transition
Ph63	To know about atoms and molecules as particles
KS3 Energy in matter	
Ph64	To know about changes with temperatures in motion and spacing of particles
Ph65	To know about internal energy stored in materials
KS3 Space physics	
Ph66	To know that gravity is a force
Ph67	To know the calculation – weight = mass x gravitational field strength (g) and that on earth $g = 10\text{N/kg}$ and that gravity has different measurements on other planets and stars
Ph68	To know that there are gravitational forces between Earth and Moon and between Earth and Sun (qualitative only)
Ph69	To know that our Sun is a star, that there are other stars in our galaxy and that there are other galaxies
Ph70	To understand the seasons and the Earth's tilt, day length at different times of the year, in different hemispheres
Ph71	To know that a light year is a unit of astronomical distance