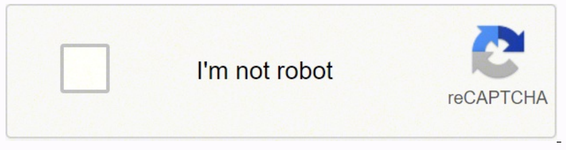

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Ib physics ia ideas

If you’re plagued by irritable bowel syndrome, you’ll likely be experiencing some uncomfortable symptoms. The good news is that it’s possible to manage your symptoms with some lifestyle changes.What Is IBS?IBS is a disorder that involves the large intestine. Other names for IBS include irritable colon and spastic colitis. This chronic condition may have mild symptoms that come and go, or they can be severe. Doctors estimate that somewhere between 3 and 20 percent of Americans have some symptoms of IBS, according to Healthline. It’s also more common for women to have IBS than men.What Are Symptoms of IBS?The signs of IBS tend to vary for everyone, states the Mayo Clinic. The most typical symptoms are abdominal pain and cramping. Bloating and excess gas are other signs of IBS. Some people also experience diarrhea or constipation, and it’s also possible to go back and forth between the two. Mucus in the stool is another sign of IBS.It’s typical for people with IBS to experience symptoms that go from mild to severe and then back again.Causes of IBSDoctors aren’t sure exactly why IBS happens, but the disorder is tied to a few common factors, explains the Mayo Clinic.If you have any issues with digestive system nerves, you might be more likely to experience IBS symptoms.A severe bout of gastroenteritis may also lead to IBS, because this disorder could be connected with extra amounts of bacteria being present in the intestines.Sometimes extra immune-system cells located in the intestines can cause inflammation, which could lead to IBS symptoms.Common Triggers of IBSThe Mayo Clinic warns that after an IBS diagnosis, you’ll want to watch for triggers that might bring on symptoms.Certain foods might make symptoms worse for you. Watch what happens after you consume dairy products, citrus, wheat, beans, cabbage and carbonated drinks.Because women are more likely to have IBS, hormonal shifts that accompany menstruation could also bring on more digestive symptoms.If your stress level climbs, you might also find that your IBS symptoms become aggravated.IBS Treatment OptionsYour doctor will treat IBS according to the severity of your symptoms, explains the International Foundation for Gastrointestinal Disorders.Mild to moderate symptoms will often improve with monitoring the amount of dairy products you consume and trying to manage your stress more effectively.If your symptoms are severe, your doctor might recommend drug therapy to manage bowel symptoms and antidepressants to help with the pain. Cognitive-behavioral therapy is helpful for some people too. MORE FROM QUESTIONSANSWERED.NET Coming up with good IB Physics IA ideas can be a struggle. Typically, you would be looking for something that is relatively simple to do yet allows a thorough investigation that scores well on the IA criteria. Here at IB Better we are well aware of how difficult of a balance this can be to strike; therefore, we have here compiled a list of IA title examples to be used for inspiration. They are organised by topic below, so it is easier to find exactly what you are looking for. Each one also contains a few pointers on how to perform the experiment. Have a look!Before we start, make sure to download our physics IA guide, where we guide you through how to write an IA, step by step!.If you’re interested in getting additional support for your Physics IA, we have a team of expert IB Physics tutors that can help you plan, structure and execute your assignment. Click here to learn moreMECHANICS AND ENERGYHow does temperature affect the spring constant?The spring constant is the ratio of force applied to extension of a spring, so you would need a force sensor and a way of measuring extension accurately (e.g. a ruler)Create separate F-x graphs for each temperature and find the spring constant as the gradientThen compare gradients between graphs corresponding to different temperaturesFinding g by looking at the energy of a falling ballDrop a ball from various heights and find a way to record its energy as it bounces on the groundFor example, you could use a slow-motion camera to calculate its instantaneous speed near the ground and hence the kinetic energyOn an E-h graph, the gradient should be mgFinding the coefficient of static friction between two materials (you choose the materials!)The coefficient is the ratio of maximum frictional force to reaction forceRecord the maximum force you need to apply to get the two materials to move relative to each other when they are in contact – this is the maximum frictional forceThe reaction force is equal to the weight of the piece of material that is on topA F-R graph should have gradient μInvestigating Archimedes’ principle and finding gArchimedes’ principle says that the buoyant force on an object submerged in a liquid is equal to the weight of the liquid it replacesUse for example water which has a known density , and a force sensor to measure the buoyant forceSubmerge objects of different volumesOn a F-V graph the gradient should be ρgInvestigating how the horizontal distance travelled by a projectile depends on opening angleYou need to construct a simple projectile and a mechanism of firing it at different angles (consult your teacher on what materials are available for this)Wait for a wind-less day and record the distance travelled by the projectile when you fire it at different anglesThere is no given equation for this in the IB syllabus but you can use the SUVAT equations to work out what relationship you expectPlot your results on a linear graph and see if they agree with the theoretical predictionHow does air resistance depend on surface area of spherical balls?You need a steady source of moving air, e.g. a fanIf you place it in the horizontal direction and aim it at balls of different surface area on a slippery surface (or in the air), the force provided is equivalent to air resistanceYou can measure the force by a force sensor or by measuring kinematic variables, then applying SUVAT equations and Newton’s second lawTry to graph force against surface area and see what type of relationship you getHow does the terminal velocity of an object depend on the height it is dropped from?Drop objects from various heights and measure their terminal velocity using e.g. a slow-motion cameraPlot these variables on a graph and see if you get the relationship you expect using the SUVAT equationsHow does the power produced by a miniature pumped storage system depend on the height of the waterfall?The essence of pumped storage systems is a turbine that is driven by water flow from a higher pointIf you are handy you could try to recreate this on a small scale using basic materialYou can then vary the height of the “waterfall” (i.e. the height from which you pour water) and see how this affects the spin rate of the turbineThe spin rate is connected to power, and hence you can relate the height of the waterfall to the power producedIf you are able to show a nice relationship this could be a really interesting investigation!Finding the specific energy of different materials (you choose the materials)Specific energy is simply the energy contained in a material per unit massFind a material that you can burn in a safe environment in different quantitiesUse different mass sizes of the material to heat water, and use the temperature of the water to find the energy deposited by the burningPlotting energy against mass should give the specific energy as the gradientTHERMAL PHYSICSHow does the rate of vaporisation of water change with surface area?Get a series of containers that can withstand heat and that have different cross-sectional areasFill them all with the same volume of water and heat them to boiling temperatureRecord how fast the water vaporises in each container, and plot it against the cross-sectional area of each to see if you spot a relationshipFinding the specific heat capacity of a liquid material (you choose the material!)Use an electric heater to provide varying amounts of heat to the liquid material, and record its temperature using a thermometerEither record both the total amount of heat provided and the temperature as you go along, or do it in intervals where you cool down the material completely between each timePlotting the temperature recorded against the heat provided should give a gradient of 1/mcFinding the number of particles in a gas using the ideal gas lawThe ideal gas law is pV=NkT where N is the number of particlesHence if you have a gas in a container of constant volume, you can increase the temperature and record the changes in pressure as you do soPlotting P against T should give a gradient of Nk/V, from which you can calculate NSimulating a gas with a small number of particles and investigating the ideal gas law (computational)If you like computation, you can try creating a simulation of a number of particles moving around randomly within a fixed containerThe purpose would be to see whether the ideal gas law holds for a collection of particles much smaller than 10^23 (you could also vary your number of particles to see if this changes)You would need to construct the simulation such that you could change two variables out of P, V, and T, and see the effect on the third oneTo do this you would have to use the mathematics connecting these variables to the microscopic properties of the particles, such as E=3kT/2Once you do this you could graph P-V, P-T, and V-T separately to see how the relationship holds upOSCILLATIONS AND WAVESUsing a pendulum to find gA simple pendulum is governed by the equation Use different lengths of string and record the period of the pendulum swings for eachA good technique for this would be to record the time for 5 periods then divide it by 5If you plot T^2 against l, your gradient should be Looking at how the intensity of a light source varies with distanceYou need a light source of constant power, a photometer or similar device, and a long benchTake measurements of the intensity of the light source at various distances away from itGraphing I against r^-2 should give the gradient P/4π where is the power of the light sourceHow does the concentration of sucrose in a water solution affect the refractive index of the water?Fill a container with water in a bright room and shine a weak laser at it such that you can determine the angle of deflection due to the body of waterGradually fill the water container with sucrose, calculating the concentration each time, and measure how the deflection changesPlot these variables against each other to see if there is a relationshipInvestigating how the frequency of a simple pendulum varies with string lengthRecord the frequency of a simple pendulum, for example by counting how many oscillations it completes in 10 secondsDo this for pendulums of different string lengthPlot frequency against string length to see if there is a relationshipHow does the frequency of oscillation of an object on a spring depend on the mass of the object?Attach a block of known mass to a spring and extend it on a slippery horizontal surface such that it starts oscillatingRecord the frequency, for example by counting how many oscillations it completes in 10 secondsRepeat this for blocks of different massOn a graph of f^2 against 1/m the gradient should be where k is the spring constantInvestigating how the refractive index of a liquid varies with temperatureFill a container with a given liquid, e.g. waterUse a weak laser in a dark room to see how the angle of the light path changes as it passes through the liquidHence use Snell’s law to calculate the refractive indexNow use an electric heater to increase the temperature of the liquid – record this and repeat the measurement for different temperaturesPlot the refractive index against the temperature to see if there is a relationshipHow does the fundamental frequency of a standing wave on a string vary with string length?An example of this would be a guitar string, where “plucking” the string gives the fundamental frequencyUse equipment such as a slow-motion camera to record the period of the string oscillation, and hence find the frequencyDo this for strings of different lengths (always fixed at either end), and plot a graph to see if there is a relationship between frequency and lengthInvestigating the relation between temperature and speed of sound in a material (you choose the material!)Choose a material where sound can travel through, and which you a large enough sample of that sound diffracting around it will be negligibleIt also needs to be long enough for sound to take a measurable time to travel through itUse an oscilloscope or computer software that allows you to find the time taken for sound from a given source to travel between two microphonesPut the microphones on either side of the material, measure the separation and hence find the sound speedHeat up the material, record its temperature and repeat the experimentPlot speed against temperature to see if there is a relationshipInvestigating Snell’s law for more than one refraction at a timePut samples of two or more transparent materials (e.g. glass and water) next to each other and shine a weak laser through bothUse Snell’s law for multiple refractions to determine the expected relationship between the entering and exiting angles of the light beamRepeat the experiment for a variety of angles and plot the result to see if the relationship holdsWhat is the relationship between the width of interference maxima and the number of slits illuminated in a diffraction grating?Use a diffraction grating and a stationary flashlightMove the flashlight closer or further away from the grating such that different numbers of slits are illuminated – calculate the number by measuring the fraction of the grating that is covered by lightUse a piece of paper or a white wall to see the interference maxima, and measure their width using a rulerPlot maximum width against number of slits illuminated to see the relationshipELECTRICITY AND MAGNETISMTesting Ohm’s law for different electrical componentsUse components such as resistors, filament lamps, thermistors, and others that you would like to testBuild a circuit containing a voltmeter and ammeter, and where you can toggle the voltageRecord how the current changes as you change the voltagePlot the results for each component; if the V-I curve is linear, the component follows Ohms law and the gradient is RFor the components that don’t follow Ohm’s law, try to fit other relationshipsFinding the resistivity of a metal (you choose the material!)Choose a metal where you have access to several samples of similar shape but different lengths and/or cross-sectional areasBuild a circuit containing a voltmeter and ammeter, and where you can toggle the voltagePlace one sample in the circuit at a time and record how the current changes with voltage – when you plot these against each other the resistance is the gradient of the graphAfter having done this for every sample, plot their resistances as a function of length and/or cross-sectional area (one at a time, keeping the other one constant) and use the relationship R=ρL/A to find the resistivityHow does the efficiency of an electric motor depend on temperature?Use a small electric motor for a task where you can calculate the energy output, e.g. lifting something upFeed the motor with electric power and calculate the efficiency it has with completing the taskIf you repeat this many times the motor will heat up due to energy lost to inefficienciesRecord its temperature and see how its efficiency changes for a range of temperaturesPlot these variables against each other to see if there is a relationshipHow does the emf produced by rotating coils depend on the rotational speed of the coils?Do this only if your school has access to a permanent magnet large enough to create a constant and uniform magnetic fieldConnect a conducting coil to a voltmeter and a mechanism where you can rotate the coil at a desired speed (either by hand or electronically)Record how the peak readings of the voltmeter changes with rotational speed of the coilsPredict the relationship theoretically using Faraday’s law, then plot your data to see if you get the same resultFinding the work function of metalsYou need a thin metal plate connected to an ammeter and EM wave sources/lasers with a wide range of available frequenciesRecord the maximal current produced when light of different frequencies is shone onto the plate, and relate this to the kinetic energy of the electronsOn a graph of E against f, the y-intercept should be the negative of the metal’s work functionInvestigating the relation between temperature and the efficiency of a transformerCalculate the efficiency of a small transformer by feeding it with current and measuring the output current using an ammeterIf you repeat this many times the transformer will heat up due to energy lost to inefficienciesRecord its temperature and see how its efficiency changes for a range of temperaturesPlot these variables against each other to see if there is a relationshipHow does the power output of a solar cell vary with thickness of cellophane laid over it?Choose a sunny day and bring a small solar cell out in the openRecord the current or power output of the cell, and re-do the recordings while you continuously put thin layers of cellophane on top of the cellPlot the power output against thickness after you are done to see if there is a relationshipFinding out how the current magnetically induced in a solenoid depends on the number of coilsDo this only if your school has access to a permanent magnet large enough to create a constant and uniform magnetic fieldMove solenoids with different numbers of coils through the magnetic field at the same speed and record the current produced in them using an ammeterPlot peak current against number of coils to see if there is a relationshipInvestigating the efficiency of a diode rectifier as a function of temperatureBuild a diode rectifier circuit and investigate its efficiency by measuring the current ahead of and beyond the diode using ammetersIf you leave the circuit for a while the diode will heat up due to energy lost to inefficienciesRecord its temperature and see how its efficiency changes for a range of temperaturesPlot these variables against each other to see if there is a relationshipFinding the internal resistance of a batteryConstruct a simple circuit containing a battery and a variable resistorUse an ammeter to measure the current and a voltmeter to measure the terminal potential difference for different values of resistanceAccording to the relationship V=ε-Ir, if you plot V against I the gradient should be -r where r is the internal resistanceFinding the time constant of a capacitorFully charge a capacitor by connecting it to a cell or battery, then disconnect the cell or battery and let the capacitor discharge through a resistorMeasure either how the voltage changes with time using a voltmeter or how the current changes with time using an ammeterIn either case the relationship should follow an exponential relationship , or You can linearize these by using logarithms; for example, if you plot against then the gradient should be Not sure how to approach your IA as a whole?Check out our comprehensive Physics IA guide which gives you a step-by-step walkthrough!If you’re interested in 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