PHYSICS TRANSITION WORK

JLC JOHN LEGGOTT COLLEGE

SUMMER TASK FOR STUDENTS STARTING SEPTEMBER 2024
We look forward to seeing you in our Science Department this September!

PLEASE COMPLETE THE FOLLOWING TASKS:

A Level Physics Bridging Task

Answer the questions below on spare paper or in a booklet. Keep it safe, we will go through answers in the first week of lessons. Take a photo of your work in case you lose it or it gets damaged.

4762 is a four digit number, if we rounded this to 3 significant figures (s.f.) it would be 4760. To 2 s.f. it would be 4800. Round the following numbers:
5621 to 3s.f.
7180 to 2s.f.
90911 to 3s.f.
18.23 to 3s.f.
0.00146 to 2s.f.

The SI unit of length is the metre, scientists measure lengths in metres rather than feet or miles or any other unit. State the SI unit of the following:
Time
Energy
Speed
Electric current
Density

State a quantity which has the following as its SI unit, there may be more than one answer possible but only one answer is needed:
Newtons
Joules per second
Volts
Hertz

Kelvin

One of the most famous equations in GCSE and A Level Physics is F = ma, resultant force equals mass times acceleration. If a mass of 2.3kg has an acceleration of 6.2ms^{-2}, the resultant force is F = 2.3 x 6.2 = 14.26N. For each of the following, calculate the resultant force:
A mass of 1.7kg is accelerated at 3.4ms^{-2}.
A mass of 77.1kg is accelerated by 1.41ms^{-2}.
A mass of 5600kg is accelerated by 0.082ms^{-2}.

In the example in question 4, the numbers put into the calculation (2.3 and 6.2) are both to 2s.f., so we will round the answer to 2s.f. as well, so 14.26N becomes 14N. This is an appropriate number of significant figures. Round each of your answers to question 4 to an appropriate number of significant figures.

Rearrange F = ma so that m is the subject of the equation. It may help to visit https://www.youtube.com/watch?v=wA112YyHIOQ .

If a mass of 3kg has a resultant force of 19.5N on if, I can find the acceleration using a = F/m, a = 19.5/3 = 6.5ms-2. Find the acceleration in the following scenarios:
A 4 kg mass is accelerated by a 28N force.
An 80kg person is accelerated by a 200N force.
A resultant force of 65.52N accelerates a mass of 9.1kg.

8. Momentum is calculated by doing mass multiplied by velocity, p = mv, where p is used for momentum because m is already used for mass. Calculate the following:
The momentum of a 0.3kg ball travelling at 4.2ms^{-1}.
The velocity of a car of mass 1200kg with a momentum of 36000 kgms^{-1}.

9. Quantities in physics are either scalars or vectors. Scalars do not have a direction, an example is energy; vectors do have a direction, forces are vectors as they push or pull objects in certain directions. For each of the following, state whether it is a scalar or a vector:

Distance
Displacement
Speed
Velocity
Momentum
Density

10. For each of your answers to Q3, state if they are scalars or vectors.

Challenge: An athletics track is a loop which is 400m in length. I propose that a 200m runner goes further than a 100m runner, a 400m runner and an 800m runner. Explain why I am right.

It may help to draw it out and consider the finish point for each of them if they have the same start point.

Extension Course - This course covers a lot of the material that will be covered in Unit 1 of A Level Physics. If you can complete the course, or some of it, it will give you a good head start in this.

Introduction to Mechanics

Introduction to Engineering Mechanics Course by Georgia Institute of Technology | Coursera