Eight notes to physics newbies.

1. Don't believe that a special educational background is required. You can read letters, form words and use words to make sense. Also the letters in equations can be explained step by step and they can be used to make sense.

2. Among the natural sciences physics tries to DERIVE the outcome from more general knowledge. To understand some process that occurs in nature physicists are not satisfied by just describing it. Instead they search for the REASON. Physics can predict the future. It is the art of soothsaying (at least in reasonable simple situations).

3. Nature is around you, i.e. in your every day life. Casually you find examples suggesting that nature has some inner machinery which it precisely follows. Why does it do this or that ? Can it be traced back to some more general wisdom already known ? Example : your pen falls down, but if you throw it to the left its path is rounded. Aaah, the moon flies around the earth since the rounding is just such that the path closes to a circle. You just got the answer to your question 'why' ! (However words are a poor kind of an answer.)

4. The question 'why' is dangerous. Answer, now 'why' to a detail of the answer, and so on, and so on. How can this why-process have an end ? The process must arrive at some final situation. Either there is a WORLD FORMULA or there is a couple of few (very few !) FIRST PRINCIPLES. They are the axioms of that special mathematics the nature always performs automatically. Let us call it nature−mathematics.

5. Physics is something to be done. It cannot be grasped by just talking about. Words are imprecise. Instead we have to work with nature−mathematics. Calculational details and notations are to be explained, that leads to an appropriate formulation of first principles (valid for a suitably restricted part of reality). And then (to get aquainted with the principles) consequences of them are to be worked out. By the way, physics cannot be 'learned'. 'Learning what ? Perhaps 'Laws' ?? At best 'laws' are the few first principles. Clearly you are eager for examples now. But a big SORRY for keeping track with words here.

6. Example Newton.
   The second of Newton's three axioms is the equation of motion : "mass times acceleration = force". When the bus is starting up the backrest presses on your back and accelerates your mass. Yes, this IS a first principle and it is the ONLY ONE of mechanics.[1] However it is incomplete. Given the force one can calculate the position(s) as function(s) of time. But given the positions of particles we need equations which allow to calculate the forces, see the next point.

7. Example Maxwell.
   The four equations of Maxwell determine all about electromagnetic fields (for given positions and charges of particles as functions of space and time). They may be called a UNIFICATION of electric with magnetic fields. By combining the discussion of points 6 and 7 we arrive at an exciting statement. Newton AND Maxwell together form a COMPLETE set of principles for the final situation of point 4. For a pure classical world (i.e. the part of the world in which phenomena of quantum mechanics and general relativity can be forgotten or neglected) we know the First Principles. Mathematically, they determine the future perfectly. The behaviour of such a reality can be forecast (!) by human calculation by pen on paper or by computers.

8. Dear newbie. After all these imprecise words you are now invited to do the hard work. Either you attend a suitable course which guides you through a step by step program (points 1 and 5), or you prefer the personal freedom of studying on your own. Why not. In this case you need a textbook. Let me simply recommend my own : H. Schulz: "A Theoretical Physics Primer, Analytical Tools" (see amazon.com). The workload of a one year course is divided there into weekly portions each ending with three exercises. The danger in self−study is obvious. Do never jump over pages, even not over lines, and solve ALL exercises. The success depends on your steadfastness, your self confidence and your fascination with nature.

[1] The first axiom is a trivial consequence of the second (hence unnecessary), and the third axiom (actio = reactio) is wrong because force needs time to bypass a distance (except statics). Nevertheless it can be a good approximation for the short distances in laboratory. For example a shift at one end of an ideal (!) spring is assumed to be remarked immediately ($\lightning$) at the other end. So let those nice exercises with ideal springs be allowed even furthermore.