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Science Opinion Paper

An Understanding of Physics

This paper will consist of an overview of the discussion I had with my wife and 2 other friends of mine. This discussion occurred on Saturday November 3, 2018 at my house and lasted approximately one hour and fifteen minutes. The topics discussed varied as I initially asked each participant to think of questions they may have regarding physics. I decided to ask each participant to think of questions in order to fully engage everyone rather than myself lecturing to the group.

While planning the event, I had to come up with ways to encourage my invitees to attend by ways of incentives. An hour long discussion on physics isn't the most attractive to most others. In order to motivate my invitees to attend, I presented refreshments and assured that this would be a more interactive and fun discussion. In addition to having each participant come prepared with questions, I included some interesting topics to discuss just in case the discussion would start to slow down.

As discussed before, the people attending included myself, my wife and two other friends. I choose my wife, whose name is Katie, because she is very curious in learning how things work as I am. I choose Andy because he will occasionally ask me questions about Physics and I enjoy teaching him. Finally, I choose James because me and him think alike and have interests in Physics and Engineering.

I would say the conversation followed my plan very well. We did end up going on tangents by talking about other things a couple of times, but we stayed on track for the most part. We started with Andy's question, (which we will list later) who had a question he just had to have an answer to. Then, we had Katie ask hers and talked about that for a while. Our final question was from James which ended up being a harder question to answer and involved bringing out the whiteboard. After all three asked their questions, we still had a lot of time left so we went into the topics that I prepared and will be addressed later in this paper.

Our first question and topic to discuss was from Andy. His question had to do with perpetual motion, specifically why are we limited to certain sources of energy such as coal, fossil fuels, solar, hydro, wind, and thermal? Why aren't we able to recycle our own energy considering that energy that leaves a battery gets returned back to it? James initially answered this question by informing Andy that a battery works because there is an imbalance of electrons trying to balance itself out and by creating a circuit, you allow the electrons to flow from one side of the battery to the other and once there is an equilibrium, the battery stops producing energy.

I then continued this topic by going through the reasons on why perpetual energy isn't possible. We discussed the basics of energy such as potential, kinetic, electrical, thermal, etc. and that when energy is moved through a system, it doesn't stay as one type of energy and not all of the energy is conserved. I explained that in most instances, energy flowing through a system is lost in one form or another. Katie pointed out that this is most commonly observed as heat. Most noticeably a halogen light bulb and the heat it generates is just one example.

Our second topic came from Katie's question which was about gravity and why objects tend to orbit other objects. We also went into detail of how some objects are actually falling

towards the earth but are moving forward fast enough to the point that it stays at the same height. Andy then asked why satellites don't ever hit the ground if perpetual motion isn't possible. I explained that these satellites do eventually fall out of orbit and hit the earth but because they are so high up and the air is so thin, there isn't much to slow them down to that point. We also briefly discussed that the existence of why objects tend to gravitate towards each other is still being discovered and that all we know now is how to calculate it.

The next topic ended up being our biggest and hardest discussion and was introduced by James' question. James asked why we can heat things faster than we can cool them. This question was initially difficult to answer because as Katie and Andy pointed out, there is no microwave for chilling food. To answer this question, I explained how thermal dynamics and heat transfer worked. I explained that energy can only transfer from hot to cold and never the other way. This started to make more sense on why it's faster and easier to heat objects than cool them down. A microwave is efficient at heating things because it is able to introduce a lot of energy into the object. Whereas a refrigerator must remove energy from within in order to cool the objects.

After we all had the chance to ask our questions, there were still fifteen minutes remaining in our hour long discussion. To keep the ball rolling, I introduced some of my favorite topics which included Newtons Laws of Motion, momentum, and how they apply to almost everything. These topics were filler topics in order to reach our goal of one hour but ended up exceeding that goal by fifteen minutes.

I introduced Newton's Laws because I think they're a fun subject and along with momentum, we experience these all the time. James contributed to this because of his love of trains. He explained the reason why it takes so long for trains to stop was due to their high mass

and speed. Depending on how many cars are attached to the train, it can take a lot of distance for the train to come to a complete stop. The train analogy was a perfect example for this final topic as there were a lot of attributes that were discussed among the group. We discussed conservation of momentum as when a train were to crash into either another train or a vehicle and inertia which ended our discussion.

At the conclusion of this conversation, I asked each participant for feedback on how they felt the discussion went. The consensus was that the discussion went by faster than they thought and actually enjoyed learning about what they learned. I too was surprised that the conversation went faster than I thought it would and that my invitees were more engaged in learning about physics than I initially thought. One thing I will say is that if I were to complete this discussion again, I would have a discussion with people who have a greater understanding of physics so that I wouldn't be left out of asking questions.