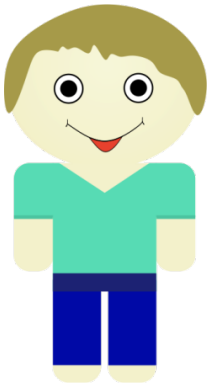
IPT Participants' Guidelines: a success recipe

Hi, all!

Let me introduce you Peter.



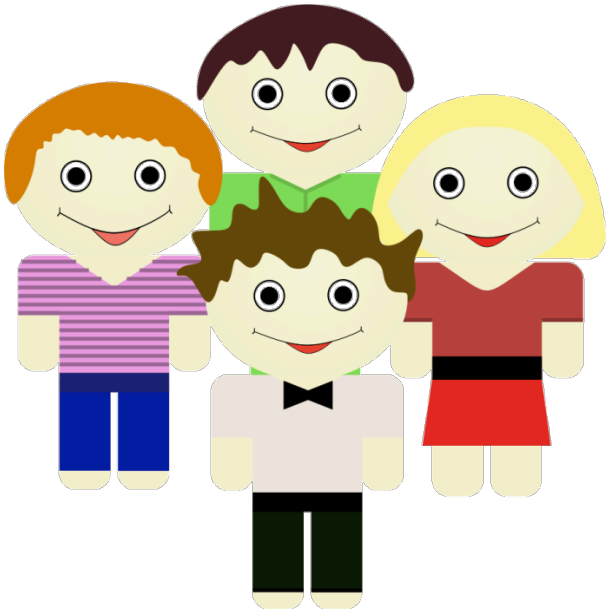
Peter is a tournament player.

Peter is smart.

Be like Peter!

Today Peter will tell you how to solve the tournament problems in the best way.

Here is Peter's team.



They are creative guys and they trust each other.

Now, Peter has a tournament problem to investigate.

Peter does not hesitate to ask questions, even absurd ones. Following these questions, he makes progress in his research.

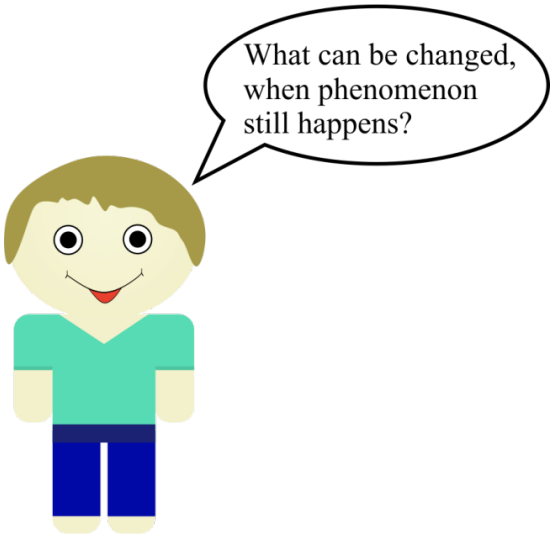
For this purpose Peter goes on-line or to the library and tries to find any relevant information. He also asks his professors and tutors, whether they had seen anything related to the problem. Him and his team members watch videos on youtube or elsewhere, where somebody else has managed to reproduce the phenomenon.

It is important not only to watch the video and read the books, but also to analyze the information. Not everything in the books and in the Internet is absolutely true. Be attentive and check the information on plausibility.

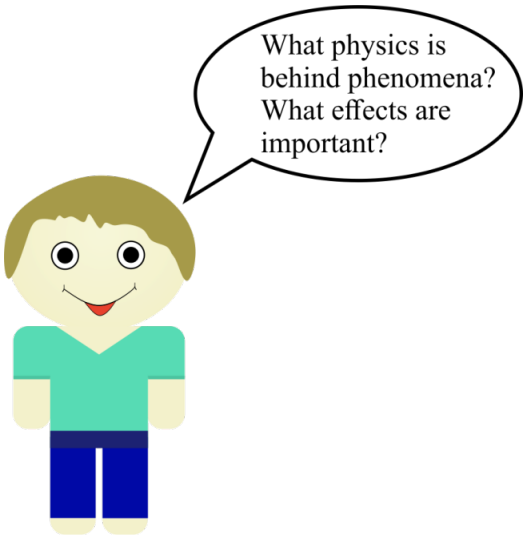
After a detailed analysis of the references Peter tries to repeat the phenomenon. Peter has in his team skillful in experiments guys, who help him.

These guys repeat the experimental setup or adopt it for the specific conditions of the lab. This setup can also be scaled. In this case another team member estimates the parameters of the setup to be sure that all

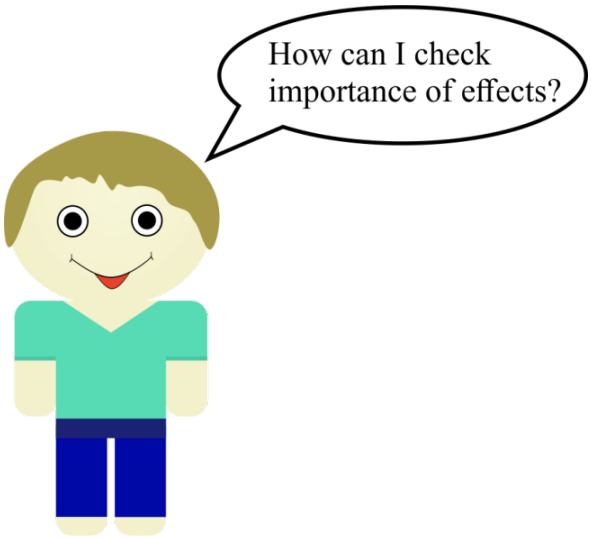
phenomena are scaled proportionally. Peter providently takes a video of the phenomenon, because it can be useful in future, for example, in the presentation (it is a good style to show your own videos, instead of the ones from the Internet). If the phenomenon is difficult to reproduce, your own video can be helpful for observing the phenomenon in detail once again.



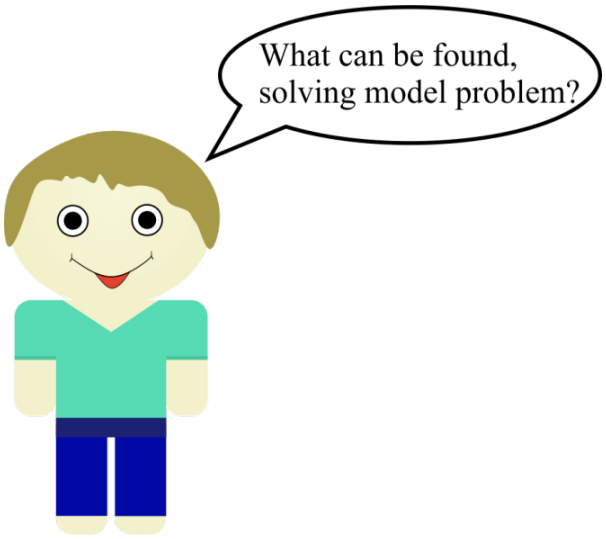
After gaining some experience, Peter can try something new. A few of his attempts might be successful, others might fail. Changing the setup parameters, Peter understands which of them are essential for the the phenomenon.



Playing with the parameters of the experiment, Peter got some important knowledge. Now he can apply it to understand why the phenomenon happens. There are a number of factors, which influence the experiment, but only a few of them are really important.



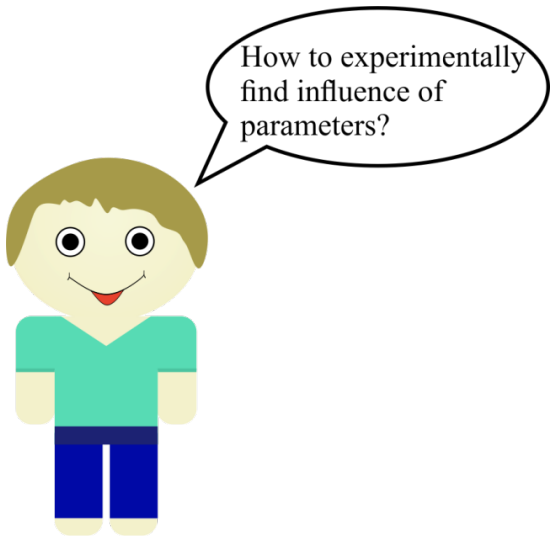
None of the proposed ideas can be accepted without a proof. They should be tested, either experimentally or theoretically. In the first case, a short experiment, controlling only the presence of the phenomenon, should be performed. For example, you can artificially eliminate a certain factor in the experimental setup and observe what happens. For a theoretical proof, a simple estimation is usually sufficient.



Having chosen one or several important factors, Peter (or a theorist in his team) creates a model for the theoretical investigation. Naturally, this model will not include all effects, but only the most essential ones. A serious theory usually takes a lot of time and efforts, but often produces results, which a simple theory gives too. At the same time, the theory should reveal something interesting, not the obvious facts.

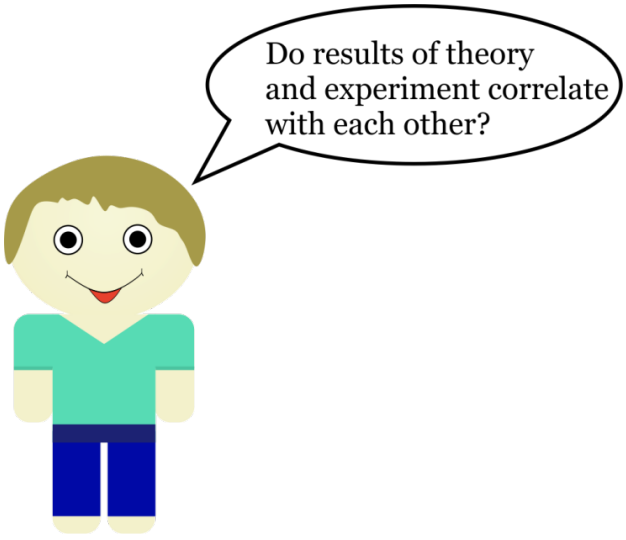
In addition, the theory should not be disconnected from the experiment. The final result of the theoretical investigation is usually a

dependence of the phenomenon output (e.g., wind velocity, angular momentum, etc.) on the relevant setup parameters.



At the same time, other team members are busy with experiment. Detailed experimental research usually includes the analysis of all relevant parameters and effects that influence the phenomenon. At this stage it is important to find not only qualitative, but also quantitative dependences.

Naturally, it is possible that the problem cannot be investigated experimentally. For example, it was the case for the third edition of IPT, when a problem about black holes was on the list.



At the final stage, a comparison between the theory and the experimental results should be performed.

Then comes an optional stage. If you dig deep into the phenomenon, it is natural to find something outside of the proposed task. It should not

take the biggest part of the research and the presentation, but can be a nice supplement.

After the research is finished, Peter prepares a presentation. Now it is time to structure all the data. Peter should not follow the sequence of his own thinking, but build a logic that makes the report most understandable.

You should realize that the jury members did not spend months to investigate the proposed effect. Do your best to make presentation clear for the people, who are not specialists in that very topic!

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