

Physics: What?

The aim of the workshop is to convey these three central ideas about Physics:

1. Physics is knowledge of nature. It can describe anything.
2. Physics is problem solving through observation & measurement.
3. Physics isn't finished or complete, it evolves and there's so much left that is unknown.

Concept:

The workshop will drive the students to have a discussion on what their perceptions of Physics are. It should be a conversation between the students and the deliverer. So rather than it being a set presentation, we would like it to be fluid, i.e. no two sessions would be alike.

Our initial thoughts were to develop a sort of game of connections. A chain would be created starting with what the students already know or are learning in school and ending with the latest research being carried out at SEPnet universities and an answered question. Each chain would last about five minutes.

At each stage of the chain, the deliverer would show a picture / video, or do a short demo.

For example, a student can pick stars. The deliverer then chooses to talk about astrophysics and then cosmology. This is linked to the latest in Large Scale Structure research and the question: What is Dark Matter?

Next a student asks about the Higgs Boson. Here we can talk about Particle Physics. This can link to the latest news from CERN. This can lead to the question: What will the next sub-atomic particle we discover be? This could even be linked to the previous example of Cosmology.

The idea is to inspire and give a dynamic overview of Physics without being a set presentation where we simply run through a list of topics...

As the workshop is trialled, we should be able to see what students already know about Physics, giving the deliverer an advantage. Certain chains will be prepared beforehand, but the deliverer has to be able to be quick on their feet in case a random topic is mentioned. In case the class is having trouble getting going, the deliverer will have prompts.

At the end of the session, the deliverer will present a high-end, exciting, demonstration. It's up to the deliverer / university to pick the demonstration.

The important part of this workshop is to show the scope of Physics, rather than have set learning objectives.

Timings:

0 min Intro

5 min Connections in Physics

30 min Whizz Bang Demo

45min End

Notes:

The deliverer would need to be an Outreach Officer or an experienced UG ambassador as they would need to be experienced and quick thinkers. The better the deliverer is at making connections, the fewer resources will be needed.

The mechanism for the connections games needs developing, but we would need links between:

- Physics topics as studied in school.
- Actual experiment being carried out at SEPnet partners.
- Unknowns in Physics linked to these topics and experiments.

Challenge:

Having enough resources (slides, video clips, small demonstrations) to cover most eventualities. How would they be stored? How could the deliverer access them?

Potential Partners to help develop workshop & resources:

SEPnet Outreach Officers.

SEPnet Physicists.

Physics: Why?

The aim of the workshop is to carry out the following recommendations from the ASPIRES report:

1. Break the science = scientist link.
2. Help embed STEM careers awareness in science lessons.

Concept:

The workshop will match jobs and careers students are interested in, to those being carried out by Physics graduates. The workshop will use both verbs & adjectives to describe types of jobs. See [Not for People Like Me](#) and subsequent [workshop](#) for discussion on use of verbs and adjectives.

We will ask the students to think about careers they think Physicists do. This will help the deliverer figure out what level of science capital the class has, giving them a starting point to work from.

The next part will ask the students what sort of jobs they would like to do. Rather than asking them about specific careers the activity will look at what sort of things they would like to do in their job (verbs) and what sort of people go into them (adjectives). This could be similar to the main exercise found in the People Like Me workshop.

The idea is to then introduce some of the types of careers physicists do and match it to the choices the students have made. This way the workshop will show that their aspirations are similar to those careers done by Physics graduates.

The emphasis is on the range of possibilities rather than the idea of a single career inspiring a single student.

The end of the session is information on opportunities Physics can open up, along with information on how to get to University to study Physics.

Notes:

The above is only an initial idea and the least developed of the three workshops. New ideas would be welcome, but the main aim would be to break the science = scientist link.

Potential Partners to help develop workshop & resources:

SEPnet Employer Engagement Team.

IOP Careers resources.

Physics: How?

The aim of the workshop is to introduce the idea of problem solving and the scientific method.

Concept:

The workshop will introduce a problem that needs solving. The class will be divided into groups and each of them get complete freedom to investigate the problem using equipment found in their lab, plus additional equipment provided by SEPnet.

The biggest challenge is setting up the problem that is solvable in multiple ways and doable within a school lab. This session could be extended for two hours.

What the day will look like:

- Introduction
- Divide into groups
- Presentation: What is the scientific method?
- Presentation: Set-up the Problem.
- Each group could have pointers on the desk based on problem. Different hints suggesting different methods.
- Groups decide on method and carry it out.
- Deliverer goes round checking on method and helping with analysis. If a group is stuck the deliverer can hand-hold further.
- Presentation: Set up the idea of coming to conclusions, analysis and presenting findings.
- Groups come to conclusions and prepare a short presentation.
- Conference: Each group presents a short presentation.
- Recap and cover all the process
- Give a local research example / Industry example.
- Finish talking about routes into physics.

Requirement for problem:

- Real world context
- Important it shows the problem solving process
- Short
- Would have multiple approaches
- Portable
- Schools couldn't normally do
- Easy - it's about process not the science
- Report back one number (easy to compare between methods)
- Use of some Equations
- Not a GCSE practical
- Adapt for ability

Challenge:

Coming up with the problem. Staying within budget (£200 budget for workshop)

Potential Partners to help develop workshop & resources:

SEPnet Outreach Team.

Technicians at SEPnet Universities or SEPnet partner schools.