# My Physics Journey



# Aim

To introduce the Physics Mentoring Project and explore the physics journeys of mentor and mentees.

# Learning outcomes

By the end of the session, each mentee will be able to…

* …recall the ground rules applicable to the mentoring sessions,
* …identify one link between a chosen hobby/interest of theirs and physics,
* …describe their physics journey using prompt questions, and
* …reflect on their participation in the session.

## Prepare in advance

* Post to the Teams/Google Classroom channel for the mentees:
  + Introduce selves
  + Date/time of the session
  + A list of things they may need access to:
    - Sound when watching videos,
    - Pen and paper
  + Processes for certain things:
    - Asking Qs
    - Using the Teams channel
    - Raising issues with mentor or teacher
* Create Mentimeter for ground rules submissions
* Upload the “My Physics Journey” video to the Teams/Google Classroom space

## Timings

|  |  |  |
| --- | --- | --- |
| 5 - 10 min |  | Introduction |
| 10 min |  | Ground rules |
| 15 min |  | Physics and hobbies |
| 10 min |  | My Physics Journey |
| 5 - 10 min |  | Reflection and Summary |

## Equipment needed

*What do you need to run this session smoothly? Where will you get this?*

* PowerPoint presentation
* My Physics Journey video
* Mentee reflection form
* Mentor reflection form

## Introduction

*How will you introduce the aims, learning outcomes and activities to the students?*

### Icebreaker

* Lead mentor and co-mentor introduce selves (name, pronouns, course, university) and explain that you are a physics mentors and that they will discuss a bit more about that later.
* Ask the mentees to write in the chat, without pressing send, the following (or at least the parts they are comfortable sharing). Give them ~2-3min to do so:
  + What they like to be called, and
  + A boring fact about themselves.
* At the end of the time, ask all the mentees to press send. Then, lead and co-mentor tell the group their boring fact and spend some time interacting with the answers.
* Do the above again, but this time ask: “how do you define physics?”
* Read out loud/comment on answers given and use some of the comments to segue into the introduction of the project.

### Introduction to project

* Introduce the project in the context of the ethos:
  + Physics is all around us and believe that everyone should be able to enjoy physics,
  + Want to show them that physics is a valuable and fun thing to study which could give them skills, and
  + Want them to have fun.
* Explain briefly why each of you are physics mentors.
* Ask if there are any questions before moving on.

## Activities

### Ground Rules

* Explain that, first, the group will need to create ground rules. Explain that these rules must be adhered to in every session and on the Teams/Google Classroom channel.
* Give students the link to the Menti and ask them to submit rules that they would like to see everyone sticking to during the sessions.
* Once you have between 5-10 different rules, start to draft a list on screen using a PowerPoint slide.
* Once you have a list, ask everyone to signify if they agree, using their favourite emoji in the chat.
* Explain that these rules are to be adhered to in all sessions and on the Teams/Google Classroom channel to ensure that everyone feels included and supported.

This is also a good opportunity to ensure that everyone is aware of the post made before the session on the channel (most of them will not have read it) so explain the processes for asking Qs, raising issues, using the Teams channel etc.

### Physics and My Hobbies

* Show/ask the mentees to watch the video (posting an emoji in the chat when their done) the Tiktok part of the “My Physics Journey” video (i.e. pausing at the logo on the black background). Ask them to note down the different hobbies/interests each of the physics mentors in the video have.
* When they’re back together, ask them to post these hobbies in the chat. Start a conversation in the chat, or ask the mentees to reflect on their own, using Qs like “does anyone have the same hobbies?”, “was anyone surprised or confused by any of the hobbies/interests?”
* Illustrate that, why it may seem that the hobbies are unrelated to physics, they all rely on physics or include physics. Choose up to three examples to illustrate and explain in some detail with examples, e.g.:
  + Anastasija: Yoga – centre of mass
  + Nkosi: Optometry – optics, light.
  + Adam: Flying his drone – optics/photography, fluid dynamics (for flight).
* Ask the mentees to think of a hobby or interest they have and think about where physics might play a part in their hobby/interest. This could be physics concepts and theories, or skills they they use in their hobby/interest that might be useful in physics. They can research if they would like to (but they don’t have very long)
* Ask them to share their hobby and their aspect of physics on the post created in the channel (co-pilot to make while lead mentor is talking).
* Lead mentor to bring group back together by picking some examples and explaining what you like about it and elaborating on it. Explain that the group used the following skills in this activity which are all useful skills in physics and many careers in the world (more info in “skills used and possible careers, below)
  + creativity (in considering their ideas),
  + communication (when presenting back to the group), and possibly
  + researching skills
* (You could explain that one of these examples will form the basis of a session later on in their mentoring series…)

### My Physics Journey

* Explain again that physics is relevant to everyone’s lives, regardless of our different backgrounds and experiences. Both mentors **briefly** talk about their journey.
* Show the mentees, or as them to watch, the interview section of the video, noting down the following:
  + One thing that surprised them
  + One thing they have in common with one of the mentors, and
  + Their own answers to one or two of the questions (they can pick).
* Give some time for students to finish their answers once the video has ended.
* Ask if anyone is willing to share anything but do not press them. Both mentors share their answers to the above.
* Explain that they may also want to think about their own answers to the questions (co-pilot to post them to Teams/Google Classroom channel). They may see their answers change while they take part in the project.

## Reflection

Introduce Reflection and give the students the link to the form, explaining that:

* they will do it every week,
* you will use it to improve sessions and make sure that you include content that is fun and relevant to the mentees, and
* they should use it as an opportunity to think about what they have learnt in the session and discuss it with themselves.

The form is brief but encourage the mentees to think about what they learnt in the session, what they learnt about themselves, what they were surprised about, if they were confused about anything and what they did/didn’t enjoy.

Share this week’s prompt questions:

* “Why do you think we set the ground rules together? Do you think any of the rules are more important than the others?”
* “Did you enjoy talking about your hobbies? Was it easy to think of a physics aspect to your hobbies/interests?”
* “Did you enjoy today’s session? What would you have changed if you were the mentor?”

## Extension ideas

Physics and my hobbies: if mentees appear to finish their activity sooner than others, invite them to either elaborate on their examples or provide the connection to physics in an everyday mundane task (watching tv, chores/cleaning, cooking, even walking!)

My physics journey: if mentees appear to finish before others, encourage them to think about their answers to more of the provided questions.

## Skills used and possible relevant careers

Skills used in the session activities:

* Creativity is common in almost every career, like architecture (getting funky buildings to still work), journalism (thinking on your feet and seeing things in different ways, such as seeing physics in the everyday), and manufacture (understanding what properties of a product make it good quality, how to improve it).
* Problem Solving could realistically be relevant to any career. The ability to take a problem and explore options and solutions is present also in our day to day lives.
* Communication through ideas sharing and being able to articulate, explaining your own thought process. This is critical in any job, but particularly ones where you have to justify your actions (like healthcare, or business models) or have to show your train of thought to others (like law, or scientific research), or just have to be really good, like retail/sales! Justification through verbal reasoning is very important and can cause big decisions to be made in many, *many* fields of work.
* Researching Skills relevant to careers in academia, but could also be relevant in marketing, PR, communications. This skill essentially goes hand in hand with problem solving as finding the solution to problems will usually involve some degree of fact-finding, and problems arise in almost any career.

Some examples of skills used in some hobbies which translate well to the subject of physics at school:

* Time management/Organisation, e.g. most hobbies!
* Creativity, e.g. arts and crafts, cookery, social media.
* Attention to detail, e.g. arts and crafts, baking, playing an instrument.
* IT, e.g. gaming.
* Discipline, e.g. dance, gymnastics.
* Analysis, e.g. video/board games.

Some examples of skills used in some hobbies which translate well to physics careers:

* Teamworking, e.g. team sports.
* Communication, e.g. acting/theatre, radio, blogging, vlogging.
* Leadership, e.g. team sports.

*The above is by no means exhaustive but for inspiration!*

## Catering for inclusion

### Ethos

This planned session engages with the skills part of the Physics Mentoring ethos and communicates the inclusivity part of the ethos. We ensure that everyone in the session is encouraged to take part so that their hobbies and thoughts are explained in the context of science and they understand the ethos as valid in the context of their lives.

### Physical Environment

Access to devices – Some students may not be accessing the session on a laptop/desktop, possibly accessing on a phone or tablet. This may cause difficulties with viewing videos. Communication around this is encouraged. Students may also not be able to watch the live broadcast and will need to watch a recording and contribute later so this should be considered when broadcasting and posting.

### Expectations and Opportunities

Confidence in a group/opportunity to ask questions –A virtual mentor means that every interaction from the mentees is intentional, relatively public and recorded (to ask a question, they need to say it in front of everyone or put it into a permanent group chat, which they may not like if they think it’s a silly question…) and they can’t message you privately, so maybe ask the teacher about group dynamics beforehand and see if you’re likely to have a natural leader and deference. The process for asking questions should be considered and there should be many opportunities to ask questions and make contributions through different mediums.

### Learners’ skills and abilities

Understanding certain hobbies – some hobbies are less accessible than others and so it is important to be clear with explanations and consider students understanding of hobbies.

### Sensory attitudes

Utilising different mediums (discussion, video reading, reflecting) in this session will hopefully encompass all learning preferences – are there situations where more can be used, perhaps we can encourage drawing during the activities.

*The above is by no means exhaustive but a starting point for consideration!*

## Measuring success

* Did the mentees provide ground rules, engaging with the discussion to write them (and showing their interest / willingness to participate)?
* Did all mentees provide an example of a physics link to their hobby/interest on the post? Were the students disengaged or confused?
* How rich is the reflection? Does it illustrate an understanding of the benefits of reflecting? Did they use opinions, or just state what happened?
* Did they provide any gauge of their interest/excitement/surprise in the reflection sheets?

## Increasing Science Capital Dimensions

Post some follow up thoughts in the channel which reflects on the session and possibly elaborates on some of the below/take homes for the students in an accessible way – using examples from the session where possible. Some of these examples can be alluded to in the session too.

### Science related attitudes, values, and dispositions

This session discusses the application/occurrences of science in everyday life. The mentees are encouraged to consider physics with an open mind and realise that it is more than the questions and examples covered in school, and that we use it subconsciously all of the time – when we put things down, walk, see etc. We should also encourage the mentees to consider their place in physics related to their skills. They cannot be “bad at physics” as they do it all the time – but they may be more or less comfortable with exercising their skills in certain aspects of physics.

### Talking about science in everyday life

Science is everywhere! They can think about how they unknowingly use science in their everyday lives. Encourage them to recognise the science in the more mundane aspects of their lives too (water pressure in their shower, heating the house, cooking food, watching the tv etc.)

### Knowing people in science-related roles

Now that they have a new perception of physics in their world, how can they apply this to the lives of the people close to them? Do they have jobs where you can identify the physics? Maybe they’re doctors, working with x-rays? Or cleaners who use vacuum cleaners? Do they work in supermarket – they would have to consider safe ways to stack products on shelves!