#  Collaboration, Teamwork and Communication

**Aim of session:** to explain the importance of collaboration, teamwork and communication in science

**Learning outcomes:**

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

* Define the terms collaboration, teamwork and communication
* Explain why these three skills are important
* Identify where these skills are used in their day-to-day life, or in STEM-related jobs
* Employ these skills in an interactive activity

## **Prepare in advance**

* Anything you have told your mentees to bring from previous sessions (e.g. activity results, follow-up questions).
* If your mentee group is large enough to split into teams, you need to contact the teacher beforehand to arrange access to computers for each team and to split them up.
* Post to the classroom channel:
	+ Reminder of the date/time of the session
	+ A list of things they may need access to:
		- Sound when watching videos
		- Pen/paper for working on activity
	+ Upload the “Collaboration, Teamwork and Communication” video.
	+ Share the link to the beginning of the session activity: <https://physicsmentoring.co.uk/ctc-start/>
		- You may want to check with your teacher ahead of time that the mentees will be able to access the link through the school’s filter!

## **Timings**

|  |  |  |
| --- | --- | --- |
| 5 - 10 min |  | Introduction to session and aims |
| 5 - 10 min |  | Watch CTC video |
| 15 - 20 min |  | Mentees complete CTC activity |
| 5 - 10 min |  | Answers and discussion of activity |
| 5 - 10 min |  | Summary and reflection |

## **Equipment needed**

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

* PowerPoint presentation (if created)
* CTC video
	+ You may want to have a back-up saved version of the video somewhere in case it doesn’t work on the day!
* Mentee and mentor reflection forms
* The teams will need access to computers, so contact your teacher to arrange this/discuss alternatives.

## **Introduction**

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

Icebreaker

* Lead and co-mentor re-introduce themselves (name, pronouns, university, course).
* Ask mentees to write in the chat, without pressing send, the following (allow ~3-4 mins):
	+ What do you think the words collaboration, teamwork and communication mean?
* At the end of the time, ask the mentees to press send. Then the mentors can read the answers aloud. You can have some discussion, but we will be returning to this at the end of the session so there’s no need for an in-depth discussion yet.

Reminder of Ground Rules

* Remind mentees the ground rules you have been working with in our sessions.
	+ If any have been particularly important/regularly broken then in particular draw attention to these. It can be useful to give examples of good behaviour you want to be seeing. If possible, you could illustrate with examples from previous sessions e.g. “Last week when we did X, you all did X – I’m excited to see that behaviour again this week!”
	+ You may also want to invite the option to provide new ground rules if there is anything the mentees want to add.

## **Activities**

CTC Video

* Watch the video with the mentees.
	+ You could incorporate a little game of “bingo” here and get the mentees to post an emoji/comment in the chat when they think they’ve seen a good example of each skill (collaboration, teamwork and communication).
	+ After the video, get the bingo winner to describe where they saw the three skills in the video.

CTC Activity

There are a few ways you can organise this activity, depending on the mentee group size and whether you are streaming to them individually or in a classroom. Some options:

* If the mentees are in a classroom, contact the teacher beforehand to organise splitting them into teams of 2/3 to complete the activity. Each team will need access to a computer, which again needs to be organised with the teacher. They could do this on their phones if allowed.
* If the mentee group is small enough (<4) or they don’t have access to computers, you could work as one team with the mentor completing the activity on the screen.
* If you are streaming to mentees individually, you could get them to work individually and discuss how it could have been easier in a team, or work as one team like above with a small enough group.

Once the mentees have watched the video, explain the activity:

* They will find the links to the activity and video in the virtual classroom.
* Each team will have to work together to find a series of 8 hidden passwords that will get them through the online puzzle.
* The rules:
	+ The mentees can re-watch the video as many times as they like.
	+ They can **communicate** with other members in their group.
	+ The mentees must use **teamwork** to ensure every member of the group gets to showcase their skills (up to them how they do this; could be delegating roles, or taking turns, etc.).
	+ The mentees can **collaborate** with their mentors for extra information if they want.
* The first team to complete the activity and return to the main room wins!

CTC Discussion

* Once all the mentees have returned to the main room and the winners have been announced, the mentors can lead a discussion on the activity.
* Ask your mentees to share their thoughts on the activity. Ask them to write in the chat, without pressing send, their answer to one of the following questions (allow ~1 min):
	+ What did you think of the challenge? Which password was the hardest one to figure out and why?
	+ How did your team work together? Is there anything that worked well, or something you improved on during the activity?
	+ Can you think of an example of when you’ve used collaboration, teamwork or communication in your daily life?
		- You could encourage mentees to answer with their most wacky examples!
* Discuss the answers the mentees provide and thank them for their responses.
* Return to the definitions the mentees gave at the beginning of the session. Ask the mentees if any of their definitions of collaboration, teamwork and communication changed? If so, how?

## **Reflection**

*What prompt questions will you use with the mentees to aid their reflection? What points are you trying to get the mentees to focus on? How will you get across to the mentees the skills they’ve been working on? Make sure both you and the mentees reflect and this is returned to the National Coordinator.*

Give the students the link to the Reflection form you have been using each week. You can remind them 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 each other.

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 or didn’t enjoy.

You should have already seen some reflection from these students. If there are comments the mentees have made previously which have been particularly rich, then encourage them to continue doing this.

Share this week’s prompt questions:

* “Did you enjoy the video challenge? What was your favourite/least favourite part?”
* “How did your team work together? What went well/could be improved?” (if working in teams)
* “Did you enjoy today’s session? What would you have changed if you were the mentor?”
* “Do you think doing physics will help you to improve your communication, collaboration and teamwork?”

## **Extension ideas**

*What will you do if the session ends sooner than you expected? What if some students finish before others?*

The time taken for the mentees to complete the online activity will vary, so the extension ideas are varied to allow for easy use in any scenario:

* Short activity/prompts:
	+ You could ask more of the example questions given in the Discussion activity above.
* Longer fillers:
	+ You could get the mentees to choose one of the 3 skills and tally how many times it comes up in the video (requires watching the whole video again). Then lead a discussion with the mentees on the most memorable example of their skill they saw, or whether they can link it to physics.
	+ You could give the mentees more background information on the science behind MRIs.

Video activity: if you have multiple teams working, some may finish before the others. You could get them to think about an example of when they used collaboration, teamwork or communication in the activity and discuss this with them.

The rest of the session is working in one group, so there should be no mentees finishing tasks before the others.

## **Skills used and possible relevant careers**

*Think about the skills the mentees have been using in this session – make the mentees aware of these somehow. Do they like using those skills? What are some careers that need people with these skills? Think outside of the box and try and relate to roles that the students do and don’t know already.*

The skills used in the video and the session include:

* Communication: Ryan communicates with his team and patients on a daily basis. The mentees then have to communicate with each other to work effectively as a team and solve the activity puzzles.
* Teamwork: Ryan works as part of a larger team at the University. The mentees have to work as a team to solve the clues and get the passwords before the other team(s).
* Collaboration: working the MRI requires different specialists to operate. Ryan works with people outside of his specialism, and people outside his department, to get his results and do his research. The mentees can get extra information from the mentors if they collaborate!
* Using specialist equipment and technology: MRI scanners
* Attention to detail: mentees have to pay attention to the video to complete the activity.
* Problem solving: mentees have to use their skills and knowledge outside of the video to get some of the passwords.
* Creativity: mentees have to figure out that the mentors have extra information.

The key point of this session is to get the mentees working together to solve a problem, and to show them that this is how physicists work together too.

## **Catering for inclusion**

*Have you made sure your session is fully inclusive? Make sure you are not disregarding mentees from certain backgrounds or genders. Make sure everyone has been involved – in a way that they are comfortable with. How will you make sure this happens in your session?*

Ethos

This planned session links to the second half of the Physics Mentoring ethos:

“*Physics is also key to unlocking transferrable skills, such as problem-solving, critical reasoning and numeracy, which can increase a person's enjoyment, safety and belonging in society and increase economic benefit. Physics skills can lead to an immeasurable number of careers and jobs, in a wide variety of fields.*”

Through the session, we are aiming to highlight that the skills learned through physics are transferable across all aspects of life. We want to help the mentees understand these skills and link them to physics in order to increase their science capital and begin to see themselves as scientists (if they don’t already). We also want the mentees to realise the benefits they can get from learning and using these skills in physics lessons, regardless of whether they move into a physics career or not.

Physical Environment

Access to devices - this is dependent upon the set-up of the sessions: if the sessions are being streamed into the classroom, all mentees will have the same access to the devices provided by their school. If the sessions are being streamed into homes, the mentor needs to remain mindful of the availability of devices in the mentees’ homes and that they may not be accessing the session on a computer/laptop. Communication around this is encouraged - be sure to check in every session as mentees may not be using the same device every time.

Expectations and Opportunities

Growing your group dynamic - You will have gained some knowledge about the group dynamics in your sessions so far but be aware not to make assumptions on how different mentees will act. Ensure you are not allowing the same students to dominate.

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 is a silly question…) and they can’t message you privately. The process for asking questions should be considered and there should be many opportunities to ask questions and make contributions through different mediums. If some students are consistently not interacting, think of ways you can encourage them to do so in a way which feels safe to them – this could include asking teachers for advice on encouraging interaction from particular mentees.

Learners’ skills and abilities

Understanding content and specialist equipment used - mentees may not be familiar with MRI scanners or how they work. This may require you to give some background information, although this is not necessarily needed for the majority of the activity. Ensure you link MRI scanners with hospitals and ask the mentees if anyone they know has been in one to keep science capital growing.

Sensory attitudes

Utilising different mediums (e.g. videos, online forms, discussion, research) in this session will hopefully encompass all learning preferences. If required, the discussion could be turned into a report-writing style activity.

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

## **Measuring success**

*What does success look like in this context? How will you measure the success against the aim/learning objectives? What will you do to make sure the session is successful? What will you do if it is not?*

* Did the mentees engage with the icebreaker activity? Are they comfortable giving their own definitions of the skills?
* Did the mentees watch the video and engage with the activity? Were the students disengaged or confused? If they were confused, did they ask for clarification?
* Can all mentees better define the 3 skills after the activity? Can they explain the importance of these skills, either in day-to-day life or in a science job?
* Did all mentees take part in the teamwork activity? Did anyone take over or get left out? Did they do anything about this?
* 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**

*What can the students take home from this session? Is there relevant extra reading they can do? Programmes they can watch? Events they can attend? Can they apply a concept to their lives?*

Science literacy

The CTC video explains MRI scanners, increasing the mentees’ scientific vocabulary. You could expand on this by giving more background knowledge on MRIs.

Science-related attitudes, values and dispositions

The skills being developed in this session are communication, teamwork and collaboration - used in a wide range of activities across all walks of life. Seeing that these are skills used in physics as well as elsewhere will increase the relevance that mentees see physics having to their day-to-day life.

Knowledge about the transferability of science

The mentees are learning more about the “soft” skills learned when doing physics, which will increase their perception that scientific skills are transferable to lots of other things.

Family science skills, knowledge and qualifications/Knowing people in science-related roles/Talking about science in everyday life

The CTC video shows someone working in a science setting related to a hospital - mentees might like to reflect on people that they know who might be in a science-related job e.g. do they know someone who works in a hospital, but had previously not connected that to science? Mentees could be encouraged to have conversations about communication, collaboration and teamwork with friends and family. Do they know whether their family members use these skills in their jobs?