Teacher Training SEEN Video

Transcript

## University of Oxford – Secondary Education around Early Neurodevelopment

Video - 00:01

Hello, my name is Louise Auckland and I'm the project lead for SEEN Oxford, a project that's looking to pilot curriculum materials in schools around early neuro development of children. So, thank you for joining this it must mean that you're about to deliver the lessons or are interested in delivering them and so I'm going to share my screen and take you through the lessons, the rationale behind them and so on so that you're prepared to deliver them.

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So, the project is funded by kindred squared which is a charity that's working to improve early education and early child development in conjunction with Oxford University the department of psychiatry and I'm part of the child and adolescent team there. So, a lot of our work really focuses much more on adverse childhood experiences and difficulties that children may encounter whereas this is a very different type of project.

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And so, what we're going to take you through is first of all a bit of a background of the project and its rationale and then I will cover the science background to the project, go through the lessons including some ways  in which you may want to differentiate it and I've included in here some of the knowledge check points, so it's multiple choice questions that you may want to try out and pause your screen and have a go, and these are the ones that the students will be doing as part of their pre and post surveys. We will touch then on safeguarding and I'll tell you where also you can find further information in the teacher pack.

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So, if we first of all look at the project itself, it's rational and its background.  So, it's only a one year project. So, it's quite a quick research project and the aim is to pilot some curriculum materials around early neurodevelopment in secondary schools, so targeting particularly at this stage at the key stage three age. However, you will be asked in your feedback after the lessons to consider where which age group it is most appropriate for.  We do have an academic and an education expert group that have helped us to…

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…develop the materials and so here we have our academic group who have helped us to determine which content ought to be included in the lessons and they've guided us through that and we have an education group who have commented on the lesson structure, again the content and how to approach schools being involved in this.

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So, why this content? Why is it important that we teach young people this? Well, it's pretty well established the first 1001 days, that's pregnancy through to the end of two years of child's life around there, is really critically important for development. And that period, those first five years, impact on long-term health, on well-being, so mental health in particular, but also on learning and earnings potential if we look at the data, so it's a really crucial period. We also know that the way in which caregiver infant relationships are developed are pivotal really to a child's development during this period and therefore can have quite a significant impact on that long-term health outcome. So, the project aims itself to target the next generation of caregivers so parents, relatives, key workers, neighbours, siblings whatever - anyone that's in contact with the naught to five-year-old and to so to equip them for their future interactions with young people, so age naught to five. Now obviously it may also have an impact on the young people immediately if they are around young people at the time and I encourage you to get them to make that connection if they've got younger siblings or friends with younger children and so on.

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And so just briefly, let's step back and have a look at the evidence. How do we know these first five years is so important? Why do we feel therefore that it ought to be something that comes into school and is taught partly as a public health message in the same way that heart disease may be taught, obesity and good nutrition and so on? Well first of all, there's a great deal of evidence around longitudinal studies, so that's monitoring people over time throughout their life and taking regular outcome measures, around what has happened in the first five years. So, otherwise known as adverse childhood experiences, these difficult experiences that young people may have encountered early in their life or trauma and toxic stress. So, toxic stress is this idea of stress that is long-term and persistent, and this is something that our team in Oxford focuses on a lot and there's a lot of evidence to suggest that those experiences can have long-term impacts. We also know from longitudinal studies around early years interventions and one of those studies the ABC study we will be talking about a bit later on and is included in the lessons as evidence for how we can change long-term outcomes based on the early years. There's also a lot of research around neurodevelopment in the early years so this nature of the plasticity of the brain in the first five years and I'll be covering that in a bit more detail shortly. And then cognitive research so things like learning language, language development, we know that it's the first year or so that's crucial really for maintaining that understanding and the interpretation of the sounds and so on around language development. But also, research into things like executive function, so this the ability of someone to do things like planning and organizing and impulse control, a lot of this we know from cognitive research is developed very early in life. And obviously throughout this research we've got the use of technology, so recent technologies that enable us to make the links between the brain and its function so functional MRI scans and you may have covered these with young people MRI scanning, so it's a nice link to make with them but also EEG studies so where the young child or the baby might be wearing a cap and we can monitor neural activity.

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Finally, there are health economists that have been working in this area and in particular the Heckman Curve, which suggests that really interventions in the first five years is the most efficient and cost-effective way in order to make changes for long-term public health and so this really all these reasons are why we've decided to focus on trying to see the feasibility of introducing some curriculum content around this area.

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And we've in we're introducing three lessons. We felt that that was possibly an appropriate amount that we might be able to pilot it in schools but not to too much to be onerous and our first lesson is very much about what is brain development. So how what is the brain and how does it work at quite a simple level. The second lesson we look at the experiences caregivers can give and how they can influence that brain development and then the third lesson looks really at some of the data to support it in the evidence but also recognizing that long-term changes can be made at made at other periods of life in particular things like adolescence.  What we're not covering is adverse childhood experiences and trauma for a very good reason in that we don't want to trigger young people in the classroom context and to reflect too much on those experiences if they are very relevant to them.

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And so, what is your commitment as a school that has offered to deliver these lessons? Well, we do ask you to get the students to fill in a questionnaire beforehand. And this is an online questionnaire so you may want to set it as homework and it can be set at home. Don't worry too much if a few of them don't manage to do it and it can some teachers in the pre-pilot found that they did do it at the beginning of the first lesson, however, it is quite long to be able to do that and often then quite rushed so you might prefer to do it at the end of a previous lesson if you're doing it in school.

The second questionnaire happens at the end of the third lesson and there is time in the lesson to do that if you want that time. Alternatively, again you can set it for them to do at home if that's easier in terms of internet access and completing the questionnaire online.  We do then ask you to consider setting them a four to eight weeks later questionnaire, which again is an online one and can be done set at home as an independent task to do if you can't do it in lessons. There is then a teacher questionnaire and this is compulsory for every teacher that takes part in it, just to really give us that feedback on what your thoughts are on it and where it could go if it was rolled out in the future. Again, an online questionnaire for that and then we have a couple of optional activities that we'd really like to have some quality feedback from teachers and young people through focus group work and for this we will be paying through a voucher system for an hour's time from a teacher if you're willing to take part in that. And if you're willing to, you may want to send us a selection of student work if that's easy for you to do by email. We're always keen to see what it is that students have interpreted from the lesson content and that can be done emailed to the project and I'll share the email address with you later and I would suggest there to give us a range of abilities of students not just picking the top ones for instance.

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So, let's have a look at the scientific background what is it that we're actually covering?

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And I'm going to cover here more what you would need to know as a teacher, so just a little bit more than we're asking the young people to learn and then later I'll cover what we're covering with the young people. So, we start with the brain and you may want to  link this to your organizational structures in biology, so your cells, tissues, organs, organ systems and so on but we start with our brain and we talk about this is our first content point here the fact that it's made up of hundreds of billions of neurons and those neurons will connect together to send messages and this is the first part where our experiences come in because our experiences will determine which neurons connect to make neural circuits or neural pathways in the brain.

And then we have a series of photographs here that shows what's actually happening in the brain during the first two years of life. So, you'll see how many connections are being made really these first two years is a massive period of growth for the brain. It's the most imp important or fastest period of growth there is for the brain and it's starting during pregnancy and ending at about two years. And we call this period or this this growth proliferation. So, proliferation of neural cells in the brain. And after that period, but still within our five-year period that we're looking at for the early years, we have a pruning going on and so therefore synapses or connections between nerves are being cut out if they're not being used so much and so really both these processes are going to be determined by the environment in which a child is developing and the experiences that they are having because those that aren't being experiences that aren't happening and therefore neural pathways that aren't being used are more likely to be pruned away. And we call this sort of ability of the brain to change over like lifetime neuroplasticity and this is one of the key words that young people will learn as well.

So, this idea that really the brain is plastic it can be changed based on experiences that the young person may encounter in their life. And so really what you've got here is the old sort of genes and environment arguments. You may have covered this elsewhere in biology. This idea that we have our genes that will determine the structure and functions of things but then our environment will influence that and I like to think of it a little bit like  when we were teaching it with plants so for instance you might have clonal plants that if you give them different levels of nutrition or co2 or light or so on they will grow in a different way and the same is true here for the brain. The brain will have a genetic basis to it that it'll start growing but then really especially in these first five years it's the experiences in the environment that will determine how that brain grows and what it grows into. And we can take it one step further and this is not something that you would necessarily do with the students unless you have a very high ability or maybe a top set year 9 group or something for instance and you may step into the more epigenetics area.  So, this idea that actually the experiences that a young person has and the environment in which it's growing may cause there to be changes in the expression of genes within that individual. So, it's a little bit more than the genes and the environment but it's an interaction between them with genes being expressed differently depending on their environment. And there is an extension activity in the first lesson that students could use to read about this and a scientific paper with research based in rats.

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So, what does this mean in terms of the caregiver? So, if you think about it the caregiver and we use that term collectively to talk about anyone that interacts with a young person, so it's a very generic term and but therefore doesn't have any judgments or specific groups that we're targeting. They're going to be the ones that create the environment for a young person as they grow and we might be thinking traditionally of good nutrition and a safe environment that are both very important and actually covered elsewhere in the in the science curriculum around nutrition and also that sort of early time in pregnancy in reproduction and development that you look at within biology. But what we're doing here is taking it one step further and saying that actually the caregiver through responsive and reciprocal interactions, something that we call serve and return and there is a short video to explain that further and but these interactions and conversations that start right from birth from when a baby is looking towards a caregiver or a parent, turning, picking things up, crying, that the caregiver can start a conversation if you like. Not necessarily with words but with gestures, with facial expressions that is a taking turns system and that should start very early to help the brain develop those neural networks associated with language for instance. We then talk a little bit about playful learning. Now play is incredibly important in the early years as a learning tool and to support that brain development and those networks associated with things like executive controls, of being able to take turns and impulse control.

We've also got baby to talk, so the way in  which you talk to a baby is actually quite important for language development and we'll  break that down a bit further later when we look at the lesson structure and how that might happen but essentially we're talking about using that sing-song voice, of repetition of words,  using very vivid facial expressions to do so right from birth again before a child is actually able to speak themselves. And finally, and this one isn't covered necessarily in the lessons again it could be a possible extension, the caregiver has quite an important role in supporting the development of executive function skills and so those are the skills that may be controlled by the front part of the brain here, the pre-frontal cortex, around organization, planning, impulse control, interactions and different skills there they're really quite crucial and good predictors of lifelong development and success. So, that's our bit about how the caregiver can support have a…

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… supportive environment. So, they're providing the environment and if that environment is optimal, then we say that we're building the foundations of the brain. So, those early neural networks that need to be laid down in order for stronger structures to be able to be built on top. So, we use the analogy of a house for instance, if you've got weak foundations to a house, the house is unlikely to be strong longer term.  So, the same with the brain. A child's brain in an ideal world we want that brain to be developing optimally in the first few years, so that it provides a launch pad, a foundation for future development.

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And we can see here from this graph we've got number of connections going up here. So, the most connections being made between neurons we know is actually from pregnancy here, so this is pre-birth and then we've got this first year divided down by months, so all of these three main areas of the brain these foundational pathways, the sensory ones, the ones around language and this higher cognitive function are all done by the second year. So, here we shift into years on the scale and if we think the second year is here, so the first two years is a rapid period of growth and we extend that out to five years, which is when we consider the early years to be preschool, then really the majority of that brain development is done preschool. So, it is a very sensitive period to growth.

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However, it isn't deterministic and if things go wrong in those first few years there are things that can be done but as you see from my graph here really the brain is most plastic, so we call that neuroplasticity, in the first few years here.  So, this is when it's most plastic okay, most able to be changed and that drops down as you get later in life. And in terms of the amount of effort required to make changes, so that's learning new things, for instance learning a language, it's a lot harder to learn a language at my sort of age in my mid 40s than it is if I was in the first few years of life. And so, there's this sort of crossover point where there's a trade-off between the amount of effort required compared with the plasticity of the brain to make changes in the brain. And we call the most sensitive times, the most plastic times, the sensitive periods and there's one from naught to five up to about here but then there's this other plastic period here in teenagers during the during adolescence and so you may want to connect with that with the young people this is a period they're about to go into. And so really, we also like to ensure that the young people go away with the message that whilst the early years are very important, it isn't deterministic. We can build resilience across a whole lifetime. And so again there may be links here with work that's been done in PSHA around the term resilience and here we're thinking about things like having good relationships support, learning those executive function skills that can support resilience building and being exposed to challenges along the way so that we're able to grow in the face of them.

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And really some of the evidence that I mentioned earlier I bought this one in here the ABC longitudinal study because it's one that's used in the lessons. And here we've got this study is quite well known based in the US where there was an intervention from eight weeks until preschool until the young people started school and then followed over a lifetime so it's a longitudinal study. And it's a good opportunity really to get young people thinking about those scientific skills or how science works and we can start looking at some of the data. So, taken at 35 years old for instance if we look at this high blood pressure down here, we've got for the control group that had no intervention in the early years a 44.4 percent chance compared with an intervention where they had daily classes around interactions that would support brain development, having a 10.5 percent chance. So, really quite a difference there in a risk of heart attack or stroke so this is high blood pressure here in males, the results are particularly pronounced in males. So, we'll come back to that again a bit later when we look in the lessons but that's just one example of piece of evidence that could be used to support the lessons.

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What I've done here is put a few videos and you may want to at this stage pause and watch a couple of these videos that go through some of the aspects I've talked about. These are all covered in the lessons so the young people will be watching these. One on that early neurodevelopment, one on neuroplasticity a short one there, then we've got one about  the serve and return and what we mean by it, baby talk, playful learning and then coming on to this is the extension one this executive function that isn't shown to the young people but you might find it interesting if you're you're interested in that particular area and then finally this this is covered in the lesson that's that sort of more  non-deterministic nature of the topic.

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So, let's take a closer look at the three lessons.

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We'll start with an overview, so lesson one trying to hook the young people into determining what can babies actually do? Get them thinking about babies, there are a couple of slides you can use if you want to be if you prefer you can go straight onto the UNICEF quiz. It's an online quiz and it's nice because it addresses some of the misconceptions and gives you a bit of text afterwards to summarise it. There are paper versions of that as well if you want. We then look at the brain development, watching a video, doing a worksheet, talk about neuroplasticity and there's a good definition video there it's only two minutes which explains using animation and then we have a summary at the end of what we've learned. So, there's some keyword and definitions and you can delete any of those if you think they're too hard or too easy to make them appropriate for your class.

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In terms of teaching points, so this is the content to be taught, again the idea that it's neurons, the genes in the environment both have a role to play. Neural circuits are strengthened and weakened by experiences and the brain can change through a lifetime. We may touch on the sensitive periods, but we come back to that in lesson three as well.

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And so, a little bit about differentiation with this one. You can have a look at the resources in the folder on the website but there are a couple of versions of the website of the worksheet so you'll see the higher version here includes the neural connections picture that I showed you, so two versions of that. Then you've got that full extension the epigenetics you see very much with a literacy focus there and a reading comprehension around a scientific paper. And then you've got a couple of options for your plenary on keywords muddled up anagrams so you can choose what you want there or you could simply go for a third option of using the answers to one of those and just matching it with the definition so do a keyword definition finish.

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And so what I'd like you to do now is just pause your screen and have a go at these four questions and these are four questions that the young people will also have in their pre and post questionnaires so it's quite nice for you to have a go to and so if you pause have a go at them just jot down which letters you think are the correct answers and then start again  and the answers will be on the next slide. And so now for your answers.

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So, we have neurons of the nerve cells in the brain that's quite easy nice one for young people to get them settled into the type of questions. A definition of neuroplasticity - the brain's ability to change throughout a lifetime and then this idea about experiences and there is a little bit of variation that could be on this question that we'll be looking at when we mark it so if you've got some other options in there as well that's okay. And the last one here which of the following is a combination of genes and environment. So, now let's take a look at lesson two.

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So, lesson two is very much looking at the experiences and the environment side of the genes and environment interaction and in this case obviously it's the caregivers providing that environment. So, we start by thinking what do caregivers actually do to promote healthy development? Don't get too hung up on the healthy development side of it, you could go down the route of what does a caregiver do to look after a baby and ensure they grow well. Okay so just some ideas there and then there are three videos to watch. There is a support notes page but then the young  people need to apply what they've learned from the three videos and I'll talk to you about  those options in a moment and then finish off the lesson by thinking well give us three things that you will do next time you're with a child, you could extend that to five things if you think the young people have got lots of ideas.

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So, our contents point here are very much around the fact that we're connecting right the way through to the environment being provided in the uterus, that babies are able to perceive and discriminate environmental stimuli in the uterus and really throughout the early years. So, they're very sensitive to environmental stimuli and then how the caregiver can support that. So, again this developing executive functions it is in italics because it's very much an extension error if you decide to go to that file depending on your group.

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So, I mentioned about applying knowledge and there's four different choices here. There's a lot of choice in this lesson.  We can use a child observation activity which I would put as your first choice if you have time to do that. Some 10 top tips, you could change that to five top tips depending on your group. A public health leaflet which is much longer and some of our pre-pilot schools set that as a homework and a more clinical observation form, so this is what scientists would use themselves if they were watching caregivers interacting with young people.

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So, our differentiation opportunities here, there's two of these activities that look at mentalising or mind-mindedness, so this ability of a caregiver to get into the mind of a young person is very important because if they follow that up with communicating what they think the other person is thinking and being able to predict that, then we know that that can impact on long-term health outcomes for an individual. So, that's quite a nice activity to do where they have to watch your video and then imagine what the young person is thinking at a particular time. We've then got the 10 top tips there's a worksheet on that and a worksheet on a public health level as well.

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So, lesson two time to check your understanding pause here and have a go at questions. There is a longer answer question here as well which we do ask young people to do and we'll see what the answers are in a moment. So, again just pause to have a go at these questions. And now let's have a look at some answers.

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So, here we go here's some answers to the three multiple choice, so again you can just pause here and take a look at some of those answers before going on and marking that open-ended question.

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And so, this is our open-ended question and you may want to take a little bit of time to look through that bullet list because these are some of the things that you might want to really congratulate young people on saying if they're talking about these kind of ideas in the lessons. So, these are some of the things where a caregiver can really influence that early brain development by doing these things.

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So, let's have a look at lesson three. So, this is the final one where we look at some of the evidence first off and then the young people watch a video about the non-deterministic nature so the fact that we can put measures in place later on in life, in particular during adolescence, to help development to longer term and change those outcomes. There's a little bit of discussion there if you want to open a more open-ended discussion and again there are going to be other activities that you may want to put in here.  And then there's some time in the lesson to do the quiz and evaluation and if you are setting that as a homework task instead so they can access it online, then you may want to just extend this discussion and findings and use one of the additional activities to do so.

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So, our content in this third lesson is very much thinking about the link, the evidence there between the early years and long-term health. We may want to be talking about the fact that it's not deterministic, so what happens in the early years doesn't mean that it's set for the rest of your life and this idea that we can develop resilience which can help change those longer term outcomes.  We may revisit those plastic periods, so naught to five and adolescence 11 to 25 those are revisited in the video.

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So, differentiation options, there's three differentiation options for that starter. So, this starter is very much about trying to get young people to analyse some of the evidence, so it really depends on your numeracy skills of the young people and there's an easier one here where they're literally looking at the difference between males, they have to find the data and know that 44 is more than 10 for instance in the questions. Right the way up to some more complicated data sets if you have a more able class. And then the video and discussion task is really it's more differentiation through outcome and through discussion.

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And so just pause your video now to have a go you check your understanding questions. And then let's go to the answers.

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Okay so just check your answers there.

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And I want to just mention the additional activities. Now at the time of recording this, these aren't currently in the folder on the website but they will be within the next week and they're likely to be there's the lesson two activities of which you've seen there are three or four different ones and so if you do decide you want to set some homework or an additional task or take an additional lesson there's plenty there to use. Just let us know in the feedback questionnaire if you do that. There's the epigenetics question that I mentioned already for the very high ability or extending your variable students. There'll be one there on attachment theory and also stress in the brain and there may be a broader one just thinking about well what have we learned what does this mean for society moving forwards. So those are all additional things that you should be able to find in the website within the next couple of weeks they won't be there just yet…

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…depending on when you listen to this. So, a quick point on safeguarding.

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Now obviously some of the students that you teach, in fact it's very likely that some of the students you teach, will have had difficult experiences themselves during their early years and what we are trying to avoid is really covering these topics so that there are possible triggers for students and so the way in which the curriculum has been designed is very much on the positive side in terms of what is the optimal environment for brain development during the early years rather than what happens if that environment is not optimal what are the potential problems that come from it okay.

So, if you do have a student that expresses difficulty around the lesson content or starts asking you questions about it there's just four points here to think about. First of all, just acknowledging their thoughts and feelings around the content rather than sort of entering into the conversation in terms of arguing against or discussing it, just acknowledge their thoughts and feelings that it's okay that they feel like that. Reassure them that the student will have many factors that influence their individual outcomes and actually they're entering a very plastic period of their life in terms of adolescence and so therefore things that they do in the next few years will also influence their life chances and life outcomes and so things can be supported in that and you can refer to lesson three if these ideas are coming up in lesson one or two perhaps say let's revisit this again in lesson three because that's where a lot of that is covered.

Obviously do refer to and follow your school safeguarding policies and procedures around things like confidentiality and not being able to be keep confidentiality and on reporting things to other people if you need to but more importantly possibly is ensuring that if a student does seem quite upset about it, knowing in advance who to sign posts for additional support in school if you don't already know, so somewhere that this young person could go to speak to someone if they felt they needed to around this topic. There is further information on safeguarding  in the teacher pack however, one thing we would ask we do ask you to let us know if there have  been any safeguarding issues when you fill in your questionnaire at the end of the lessons and if so please could you just email that through to us with or put in a brief nature without mentioning student names so that we're aware of this especially if it impacts on the design of the lessons.

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And so finally just come to what other information is available for you.

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There is quite a long teacher pack in the teacher folder on the website and in there you'll see things like the learning objectives, the content, some key vocabulary that is worth knowing beforehand, the full lesson plans with the different adaptations so you can see there your choices and what you might want to do with some background information on the science if you need it. There are video links and worksheets including some extension opportunities in there. There are pre-recorded lessons for all of these and these pre-recorded lessons come with a worksheet for young people so if you find that you've got students isolated or at home and they're needing to work through this themselves, there is a specific worksheet and a pre-recorded lesson for them to do this with.  There are also links to other curriculum areas so you can see where it might slot in or where you may want to cross-reference students to make those connections between curriculum areas and obviously there will be quite a bit of additional reading if you are interested in going that far and investigating it a bit further. You'll also find in in the teacher folder the questions for the evaluation for the student and the teacher feedback forms so that you can see those in advance. And obviously this training video and a slide deck will also be available in there and you can find those all on our website as you can see on the sign there.

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Or you can find it on here. And really if you have any other questions if you're listening to this as a pre-recording and suddenly now have quite a few questions that you wish you could ask and wish you joined signed up for one of the live sessions then please just pop them in an email to the SEEN email address they're  seen@psych.ox.ac.uk and I'm happy to give you a ring, have a call or talk through any of the areas that you may have more interest in but for the moment perhaps have a look at the teacher pack go back and maybe watch some of the videos that the young people will be watching if you haven't  watched them already and have a look through the lessons ready to plan them. We'd love to hear your feedback afterwards, best of luck with the teaching and for now I'm going to stop my screen sharing and say goodbye and good luck, thank you.