The SEEN Programme.

**Teacher Pack for Key Stage 2**

## **Background:**

Thank you for showing an interest in taking part in the SEEN Programme with Kindred2. It aims to:

* Embed knowledge and understanding about why early child development is important through the delivery of curriculum materials around neuroscience and early child development in schools.
* Determine the feasibility and acceptability of teaching the materials.
* Make recommendations relating to the teaching of neuroscience around child development for policy makers.

The SEEN Programme ran as a research pilot project for 1-year in 2020/21 by the University of Oxford’s Psychiatry Department (Child and Adolescent Psychiatry Group). Kindred2 are now rolling out the programme and getting many more schools on board. The original lessons were written for Key Stage 3 Science lessons. This pack describes the new resources intended for Key stage 2 classes. These are very much at the pilot stage and so we would appreciate any feedback you are able to give us.

## **Project rationale:**

The first 1001 days (pregnancy and the first two years of a child's life) is a critically important period for development that significantly influences a child’s long-term health, well-being, learning and earnings potential. It provides the foundation for children’s nascent emotional wellbeing, resilience and adaptability.

Sensitive and responsive parent-infant relationships have been shown to be pivotal for the development of infants’ social, emotional, behavioural and cognitive outcomes. It is therefore essential to equip future parents with the knowledge and understanding of how their behaviour/parenting contributes to their child’s future outcomes.

In addition to the human level/cost, there is also a compelling economic argument for investing in early childhood: James Heckman’s Nobel prize winning work demonstrates that the earlier the intervention, the greater the benefit on children’s lives. Thus, if learners begin to be equipped for parenting *pre-conception* this has the potential for enormous benefit. Prioritising the opportunities for maximising children’s development during the first 1001 days is therefore beneficial to governments, businesses, communities, parents, caregivers and children alike.

## **Teacher training:**

The lessons have been designed for teachers to deliver in a facilitating role. Subject knowledge is not essential. However, feedback from teachers who participated in the pilot indicated that training would have been useful. This pack, in combination with a pre-recorded online training sessions, should be used by all staff to give background to the content and support lesson planning. Online training videos can be accessed via our community hub (join here: <https://kindredsquared.org.uk/seen-community/>). Alternatively, teachers can opt into some live online training. The SEEN Programme team are happy to run bespoke online teacher training or question and answer sessions for staff. Please contact [seen@kindredsquared.org.uk](mailto:seen@kindredsquared.org.uk) for more information.

## **Core content:**

In collaboration with an expert advisory group from the fields of child psychiatry, child development and the early years, a list of core curricular content was devised for our Key Stage 3 lessons. The team from the University of Oxford also worked with an expert advisory group from the field of education (teachers, school leaders, curriculum development specialists and education advisors) to devise teaching and learning resources around this content.

The following content has been adapted for Key Stage 2 students, with the intention that it will build foundational knowledge for those going on to study the content again in Key Stage 3. Italics are used to indicate extension materials for more able students or where more time is available.

1. The brain controls the body (*thoughts and memories, movement and internal processes*)
2. The brain is made up of interconnected neurons.
3. Neurons connect to make pathways through the brain
4. Pathways are strengthened or weakened by experiences.
5. *The ability of the brain to change throughout a person’s life is called neuroplasticity.*
6. Brain growth is fastest in the first few years of life.
7. The term ‘caregiver’ refers to anybody who meets the needs of another person, in this case a baby or young child.
8. The experiences that caregivers provide can shape the brain.
9. Healthy brains are grown through communication, reading, everyday learning, playful learning and a healthy home.
10. Healthy brain development early in life is the foundation of long-term health and wellbeing.

## **Assembly pack:**

There is a SEEN Assembly pack that can be used to introduce the topics covered in the SEEN Primary lessons. To download the pack, visit or website or join the community at: <https://kindredsquared.org.uk/seen-community/>

## **Lesson plans:**

The diagram below gives an overview of the lesson delivery. The delivery can be taught in 1, 2 or 3 separate sessions. The resources have been designed to be flexible, with choice and differentiation incorporated. As a class teacher, plan and use the materials that are most relevant to your group and style of teaching. We are always keen to learn from schools, so let us know if you adapt or change the materials so we can share these with other schools.

Lesson delivery overview:

Optional: online pre-lesson quiz

Concept cartoon “The brain is…”

Think, pair, share (class discussion) - short

Or represent your brain as a drawing - long

Time (mins)

10-60

Pre

What do we already know about the brain?

5

Teacher led consolidation. 1 slide.

The role of the brain

20-30

Experiences - role of caregiver

neuroscience

Class discussion

Caregiver concept cartoon.

Think, pair, share or similar technique for establishing current knowledge and understanding.

How will you grow a healthy brain? Activity

Why is healthy brain growth is important?

Growing healthy brains activity

5 ways to grow a healthy brain

What is a caregiver?

Review learning on the brain

Build a brain (pathways, networks and plasticity)

Make a model neuron activity

Teacher led activity to build a network of pathways using the neuron models. Teaching about plasticity and importance of experiences.

Teacher introduction followed by model making activity for students.

Option to add research for extension.

Optional: online post-lesson quiz

10-30

Plenary student activity – what are the takeaway messages? What will they do differently?

Growing healthy brains concept cartoon.

Alternatively the top tips activity can be used to reflect on student learning.

**A choice of activities:**

Top tips activity for students or diamond arrangement. Based on a series of statements (worksheet or card sets).

Experiences matter picture cards to be used in discussion and card sorting or worksheet activity.

Taught session using slide deck.

Optional use of talk and play concept cartoons.

5-10

10-40

10

5

5-10

Activity to review and consolidate learning if starting a new session.

15

### **Concept cartoons**

### A series of five concept cartoons have been designed specifically for the SEEN Programme as a visual representation of the ideas covered in the lessons. A number of viewpoints about different ideas are represented by the cartoon characters (illustrated by Shanie Svenson and named by students at Denefield School). These can be used as a prompt for thought and discussion with the students and also as a means to address misconceptions. The concept cartoons have been put into the slide deck in a suggested location (unhide the slide to use them). They are also available as a stand alone file and could be used to establish understanding before and after the teaching of the lessons. There are teacher notes with the slides to outline which character is correct, common misconceptions and where viewpoints are more nuanced.

### **Pre-session objectives:**

* + Describe what you already know about the brain
  + Complete a pre-lesson online quiz (optional)

### **Pre-session plan:**

*Option 1 (shorter session):* Review current understanding by asking students to think about what they know about the brain. This can be done as a ‘think’ for a minute, share with the person next to you, and then class discussion.

*Option 2 (longer session):* Review current understanding by asking students to think about what they know about the brain. Handout the “My brain” worksheet (or use blank paper) and ask the students to draw their brains. There aren’t any rules or guidelines to this activity – students can be as creative as they like! This activity could always be repeated again after the SEEN lessons to show changes in understanding.

You could use the concept cartoon “The brain is…” to illicit current understanding. A common misconception is that the brain is a muscle (as people often refer to its ability to be ‘trained or exercised’).

### **Neuroscience lesson plan:**

### **Learning objectives:**

* + Describe the structure of the brain and what it does.
  + Explain that the brain is a network of pathways.
  + Know that pathways are strengthened and weakened by experiences

### **Core content covered:**

1. The brain controls the body (*thoughts and memories, movement and internal processes*)
2. The brain is made up of interconnected neurons.
3. Neurons connect to make pathways through the brain
4. Pathways are strengthened or weakened by experiences.
5. *The ability of the brain to change throughout a person’s life is called neuroplasticity.*

### **Keywords:**

* **Core:** brain, control, skull, neuron, pathway, connection, network, experiences, plastic.
* **Additional:** myelin sheath, neuroplasticity, thoughts, memories, movement, internal processes.

1. Ask students to reflect on what they learnt in the pre-session plan (which you may have just completed depending on what you choose to do). Use the slide to consolidate learning and address misconceptions. Common misconceptions include:
   1. The brain is not a muscle or made of muscle.
   2. People are not ‘right’ or ‘left’ brained people, (nor any associated characteristics, learning, subject preferences).
   3. There is little evidence to support the idea that pupils have specific learning styles.
   4. It is a myth that we only use 10% of our brain – We use all of the brain, all of the time (although not all neurons are firing all the time).
2. Explain to the children that you are going to make a class model of a brain. Ask them what the brain is made of? What are the building blocks? Use the slides to show them pictures of neurons, the main cell that makes up the brain. There are about 100 billion neurons in the brain!
3. Introduce the model neuron activity. Refer to the teacher help sheet for more details on how to run this activity. There is an option to allow students to research neurons online before making their models.
4. Use the individual models to teach about pathways through the brain. Use the teacher help sheet for guidance.
5. Explain that the brain is plastic and changes in shape depending on experiences. If you teach about the stretch zone or growth mindset in your school, you can make cross-references to it here. Explain that repetition and persistence increases the strength of connections between neurons and of particular pathways. Not repeating an experience and a pathway will weaken over time.
6. There is an optional clip defining neuroplasticity that you can show. This is also included in the key stage 3 resources, but you may feel it is helpful to illustrate the concept. It may help to explain that the prefix ‘neuro’ means nerve, or nervous system, including the brain.
7. The concept cartoon “the brain is…” could be used following the neuroscience activity to check understanding.

### **Experiences and the caregiver lesson plan:**

### **Learning objectives:**

* + Give examples of ‘caregivers’ for young children.
  + Name 5 ways of growing healthy brains.
  + Give specific examples of what caregivers can do to grow healthy brains.
  + Explain why the first years of life are important.
  + Reflect on what you can do to grow a healthy brain in a child you know.

### **Core content covered:**

1. Brain growth is fastest in the first few years of life.
2. The term ‘caregiver’ refers to anybody who meets the needs of another person, in this case a baby or young child.
3. The experiences that caregivers provide can shape the brain.
4. Healthy brains are grown through communication, reading, everyday learning, playful learning and a healthy home.
5. Healthy brain development early in life is the foundation of long term health and wellbeing.

### **Keywords:**

* **Core:** caregiver, experiences, communication, reading, playful learning, everyday learning, healthy home.
* **Additional:** babytalk, exaggerated expressions, child-led activities, creative/imaginary/independent play.

1. (if doing this as a separate session) Ask students to recall what they learnt last lesson about the brain (think, pair, share or similar technique). Use the slides to recap and consolidate.
2. Explain that the brain grows quickest in the first few years of life. Make the link between the idea that experiences shape the brain (neuroplasticity)… and that for a baby or young child, experiences are determined by the person looking after them.
3. Use the concept cartoon “A caregiver…” to illicit the children’s understanding of what a caregiver is in the context of a baby or young child. The SEEN Programme supports the idea that a caregiver can be quite broad and includes anybody who ‘cares for’ a child (parents, siblings, extended family, child minder, nursery worker, babysitter).
4. Explain that scientists working in this area use the term ‘caregiver’. Listen to their ideas of who or what a caregiver is.
5. There is an option to watch a video (also in the Key Stage 3 lessons) about brain development in the first years of life and role of caregiver, made by Harvard University’s Centre on the Developing Child. It is 1.57 mins long.
6. Hands up activity – the aim is to get everybody in the class with their hand up, to recognise that this is relevant to them – they interact often with babies or young children.
7. Teach the students about the 5 ways of growing healthy brains, using the slides.
8. Activities – there is choice here on how you set these activities up (groups/pairs, written/discussion, tips/diamond prioritising/card sorts). Have a look at the resources and choose depending on your students and context.

***Growing healthy brains statements:***

There are a series of statements, describing interactions or activities a caregiver can do with a baby or child. The students can discuss these in groups (display on the board, or print a worksheet or turn into cards). They are asked to decide which they think are the most likely to lead to healthy brain growth, or that they would give as advice to a caregiver. It is important to note that *there is no right or wrong answer to this activity*. There are times when sitting a child in front of the TV, or checking the phone in the presence of a baby or child, or simply taking a break at a distance is needed. These statements are a snapshot and most carers will do most of them at some point. However, the activity encourages the children to recognise that some interactions are more likely to support the strengthening of healthy neural networks.

In terms of the science, it is action or lack of action at the extreme end (adverse childhood experiences such as neglect and abuse) that will impact brain development, as opposed to any of the scenarios discussed in this lesson. But this should **not** need to be covered with the class.

***Experiences matter picture cards:***

There are a series of paired picture cards you can print out and cut to make card sets. These are available on plain background or with a coloured border to help with pairing (choose your option before printing them all!). The pictures describe interactions or activities a caregiver can do with a baby or child – one of the pair is more positive than the other. The cards can be used individually, in pairs or groups. Some of the images have been presented in a worksheet format if you prefer (*please give us feedback on whether or not you like this format – whilst the worksheet prints ok in black and white, we can improve this if teachers feel it is a helpful resource*).

Instructions for the activities are available on the slides to show to students – choose the appropriate slide depending on how you use the resource.

Note that these activities might be triggering for some children who have not, or feel they have not, had a good early start to life. Please refer to the safeguarding section below for advice on how to manage this. See the slide deck and worksheets for additional support with this activity. You may want to complete this activity with a class discussion, listening to ideas from the children about what they discussed in their groups or pairs.

1. The two concept cartoons: “Should we talk to a baby?” and “Supporting brain development through play” could be used to promote discussion or as an alternative to the diamond sorting activity.
2. Class discussion – Ask the children to think about why the early years are so important. Listen to their ideas.
3. Finish the session by asking them 5 things they will do to grow healthy brains in the babies and young children they interact with (refer to earlier ‘hands up’ activity). They can draw around their own hand on plain paper and annotate, or use the worksheet. These can be displayed in the room. Alternatively, you could use the top tips worksheet for pupils to reflect on what they have learnt about the role of the caregiver and their links to brain development.
4. The concept cartoons could be used at this stage to check the children’s understanding. Depending on whether or not you have used the cartoons before, this could be done as small group work to discuss more than one cartoon.

## **Pupil quizzes**

There are online quizzes available for students to complete and check their understanding before and after the lessons. The information is collected via Qualtrics (online survey platform) and the SEEN Programme can share these results with you (please email and request this). There are 5 multiple choice knowledge recall questions and additional lesson evaluation questions in the post-lesson quiz. Links and QR codes are available on the slide deck and in the primary resource pack.

## **Teacher questionnaire**

After completing the last lesson, we are asking teachers to complete a short online survey. This is how the team will get feedback on the lesson content, design, engagement level of students and acceptability of the curriculum content for a primary school setting. We are keen to be guided by the teachers. Feel free to be a critical friend on the appropriateness of the materials, and any changes you feel should be made. If you decide not to complete this questionnaire, we would really appreciate a quick email to let us know you have taught the lessons as we try to gather school, pupil and teacher number as an indication of interest in the content from schools. Please let us know: [seen@kindredsquared.org.uk](mailto:seen@kindredsquared.org.uk)

## **Safeguarding young people**

In the design of these lessons, every effort has been made to ensure that the materials are suitable for a universal audience. The content focuses on the science behind brain development and the positive things that caregivers can do to support child development. However, you may have young people in your class who have had difficult experiences during their early life. Or young people who simply reflect on their own personal experiences in an overly critical way. Below are some suggestions for teachers in dealing with this if it arises in a lesson.

* If students would like to talk to somebody then they should be signposted to relevant support in school; initially likely to be you as their teacher.
* Keep the focus of the lesson on what can be done to support development. The brain is very plastic during childhood and right the way through to about 25 years. Whilst those negative early experiences won’t “go away” we can shift the balance and increase the likelihood of a healthier future by increasing the number of positive experiences an individual has. Encourage them to think about what they can do now to stay healthy in the future (supportive relationships, practise skills, reaching out for adult support during difficult times).
* Tell them that what happens in the first years of life does not determine everything about their future (it is non-deterministic). What happens in the early years is not the only factor affecting long term health outcomes.
* If necessary, be clear about confidentiality and your responsibility to pass on information to the safeguarding lead if you feel the young person or someone they know is at risk.
* It can be powerful for students to feel their concerns are being heard and difficulties not dismissed. Sadly, difficult early experiences are remarkably common, but reassure students that many factors influence individual outcomes and remind them about how development can be supported.

If you have had students who struggle with the lesson content, we would appreciate you feeding this back to us in the staff survey or by email on [seen@kindredaquared.org.uk](mailto:seen@kindredaquared.org.uk) . Our preference would be by email, so that we can confirm the details with you rather than via an anonymous teacher questionnaire.

## **Additional information sources for teachers.**

### **Brain development and the early years**

* **The Oxford Brain Story –** The University of Oxford team that developed the SEEN Project is working in partnership with the Alberta Family Wellness Initiative to share knowledge about the science of brain development for families and professionals. You will recognise some of the clips from the lessons, but this page links to more information and films. <https://www.oxfordbrainstory.org>
* **Brain matters –** various short videos on brain development from conception. These are good additional videos that students may want to watch (or teachers for additional background information) Scroll to the bottom of the page. (Note - there is a full documentary covering all aspects of neuroscience and child development. <https://brainmattersfilm.com/category/resources/brain-science/>
* **What is epigenetics and how does it relate to child development? -** a leaflet that describes what epigenetics is and why it is important for the early years. <https://developingchild.harvard.edu/resources/what-is-epigenetics-and-how-does-it-relate-to-child-development/>

### **The caregiver’s role**

* **BBC Education’s Tiny Happy People –** an initiative providing a range of free digital resources designed to support parents and carers in developing children’s language from pregnancy to the age of four. <https://www.bbc.co.uk/tiny-happy-people>
* **The Royal Foundation early years programme** – the Duke and Duchess of Cambridge support a programme of activities around the early years. A couple of their ‘5 big questions’ have been used in the student evaluation questionnaire for this project. We can then see if young people think the same as the adults who completed the survey. <https://royalfoundation.com/programme/early-years/>
* **The NHS’s *Healthier Together* –** a website providing advice for parents, young people and pregnant women developed by the Royal College of Paediatrics and Child Health. <https://what0-18.nhs.uk/>
* **Brain architecture –** (includes adversity and toxic stress) (2.35) <https://www.albertafamilywellness.org/resources/video/brain-story-concepts-brain-architecture>
* **Brain matters –** A short video (4:40 mins) called ‘5 things parents should do everyday’. <https://www.youtube.com/watch?v=k1hNZhH9bRg>
* **UNICEF brain development –** UNICEF’s page for parents about child development. <https://www.unicef.org/parenting/child-development>

### **Early years are not deterministic**

* BBC article on new brain cells being made throughout life. <https://www.bbc.co.uk/news/health-47692495>

### **Research Articles (with open access links)**

* ‘Epigenetics programming by maternal behavior’ by Weaver et al. (2004) - [https://www.researchgate.net/publication/8487300\_Epigenetic\_Programming\_by\_Maternal\_Behavior](https://www.researchgate.net/publication/8487300_Epigenetic_Programming_by_Maternal_Behavior )

*Study demonstrating epigenetic effects of maternal stress on offspring in rats: this is the research used in the epigenetics lesson extension activity.*

* ‘Caring relationships: the heart of early brain development’ by Lally & Mangione (2017) - [https://www.naeyc.org/resources/pubs/yc/may2017/caring-relationships-heart-early-brain-development](https://www.naeyc.org/resources/pubs/yc/may2017/caring-relationships-heart-early-brain-development )

*Short review article summarising the impact of day-to-day interactions between caregivers and young children on early brain development.*

* ‘Early childhood investments substantially boost adult health’ by Campbell et al. (2014) - [https://www.researchgate.net/publication/261186767\_Early\_Childhood\_Investments\_Substantially\_Boost\_Adult\_Health/link/00b7d53658a1a257ed000000/download](https://www.researchgate.net/publication/261186767_Early_Childhood_Investments_Substantially_Boost_Adult_Health/link/00b7d53658a1a257ed000000/download )

*Longitudinal study demonstrating the impact of an early childhood intervention on long-term health outcomes: this is the research used in the data interpretation activity in lesson 3.*

* ‘Supportive relationships and active skill-building strengthen the foundations of resilience’ by the National Scientific Council on the Developing Child (2015) - [https://developingchild.harvard.edu/resources/supportive-relationships-and-active-skill-building-strengthen-the-foundations-of-resilience/](https://developingchild.harvard.edu/resources/supportive-relationships-and-active-skill-building-strengthen-the-foundations-of-resilience/ )

*Review article summarising some of the factors impacting on a child’s resilience, including supportive caregiver-infant relationships.*

* ‘Connecting the brain to the rest of the body: early childhood development and lifelong health are deeply intertwined’ by the National Scientific Council on the Developing Child (2020) - [https://developingchild.harvard.edu/resources/connecting-the-brain-to-the-rest-of-the-body-early-childhood-development-and-lifelong-health-are-deeply-intertwined/](https://developingchild.harvard.edu/resources/connecting-the-brain-to-the-rest-of-the-body-early-childhood-development-and-lifelong-health-are-deeply-intertwined/ )

*Review article emphasising the importance of early years experiences on lifelong health, touching on the impacts of Early Childhood Adversity.*