

# Spaced Learning

Making memories stick

MONKSEATON  
HIGH SCHOOL



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<http://get.adobe.com/reader/>

## What is Spaced Learning?

*“Spaced Learning is significant because it deploys neuroscientific research.”*

Spaced Learning, developed by Monkseaton High School, is a method of embedding information in our long-term memory through repetition.

Fundamentally, this is no different from how we learn all the time. When we hear, see or do something once, it can be stored in our short-term memory. If we hear, see, or do it repeatedly, it can enter our long-term memory.

Spaced Learning is significant because it deploys neuroscientific research, which enables this process to take place very quickly – quickly enough to cover and retain a whole subject module’s content in approximately an hour.

A Spaced Learning session consists of three ‘inputs’ divided by 10-minute breaks, which students spend doing a simple activity such as dribbling a basketball or playing with modelling clay.

The first input is a lecture in which the teacher presents a large body of information, usually supported by a PowerPoint presentation. The second input focuses on recall, so students might be presented with the same PowerPoint presentation, now missing many key words, or they might carry out simple maths problems using the formulae presented in the first input. The final input focuses on understanding, so students should carry out a task that applies the knowledge or skills they have just acquired.

This process of rapid structured repetition, separated by short breaks, embeds the information in the long-term memory.



# The science behind Spaced Learning

“Spaced Learning is a way of creating neural pathways at the start of a unit of work, which can then be revisited at various intervals over time.”

Have you ever needed to remember something but no matter how hard you try, you simply cannot locate it amongst everything else in your brain? You are having a problem with the retrieval of the information. There will be a neural pathway connected to your recalcitrant memory but it will not have been used frequently enough for its importance to be demonstrated and therefore strengthened.

Repeated stimulation of the same neural pathway demonstrates its importance to the brain and makes it easier to locate when you need to access the information stored within it.

Spaced Learning is a way of creating neural pathways at the start of a unit of work (memory acquisition), which can then be revisited at various intervals over time (memory retrieval). This will emphasise the pathway's importance and make it easier for you to 'locate' it when you need it.

Spaced Learning is based on a discovery about the brain that was published in 2005 by R. Douglas Fields in *Scientific American*.

Fields, of the National Institute for Child Health and Development in the US, led the team investigating the science behind how the brain actually creates a memory.

The team's research uncovered the process by which long-term memories are formed, and (more significantly for teachers) the process by which they can be created. The biological basis of a memory is a pathway of cells linked together within the brain. Fields' team focused on how each cell was 'switched on' and became linked to other cells. Their experiments demonstrated that it is the manner in which the brain's cells are stimulated that causes them to 'switch on' and link together.

Surprisingly, constant stimulation of the cell did not make the cells switch on. Stimulation had to be separated by gaps when the cell was not stimulated. The breakthrough came when the team 'began to realise that the important factor was time'. The length of stimulation was not vital, but the gap between stimulations was. This insight is the basis of Spaced Learning.

## FURTHER READING

- R. Douglas Fields, 'Making Memories Stick' in *Scientific American* (February 2005, Division America)
- Paul Kelley, *Making Minds: What's Wrong with Education and What Should We Do About It?* (2007, Routledge)

# The structure of a Spaced Learning lesson

*“We present Spaced Learning lessons using PowerPoint, but there’s no reason why it needs to be presented in this way.”*

A Spaced Learning lesson consists of three ‘inputs’ separated by two 10-minute gaps, as follows:

- Teacher input of key facts/information
- 10-minute break
- Student recall of key facts/information
- 10-minute break
- Student application of key facts/information.

## How the inputs fit together: presenting, recalling, understanding

The teacher input contains the information that the students are learning; usually a great deal more learning than one would normally put into a single lesson.

The first input is a fast-paced presentation of information by the teacher, but there should be more student interaction and less teacher-only delivery in the second and third inputs.

The easiest way to understand the three inputs is that the first focuses on presenting information, the second focuses on recalling information, and the third focuses on understanding information.

We present Spaced Learning lessons using PowerPoint, but there’s no reason why it needs to be presented in this way. What’s important is that you stick to the structure of ‘present, recall, understand’, make sure the ‘breaks’ last about 10 minutes, and make sure the students do an activity that is very different from what they’re doing during the inputs.

## What to do in the breaks

The inputs containing the lesson material are separated by two 10-minute ‘breaks’ during which students do ‘distractor’ activities.

During these breaks, it is important to avoid stimulating the memory pathways that are being formed. Thus, the activity must have nothing to do with what the students are learning. The most effective way of doing this is to carry out a physical activity requiring coordination, such as juggling. Activities like this use parts of the brain requiring balance and movement, which are not being used during the learning in the lesson. This improves the chances of the pathway being allowed to ‘rest’ and form stronger connections.

Other types of activities to try include:

- origami
- paper-cutting activities
- musical chairs
- play-dough modelling
- light aerobics
- ball-handling games (like dribbling a basketball).

As a rule of thumb, think about activities that students might do in primary school and use those.

Also, ask the students what they want to do! Their answers may surprise you.

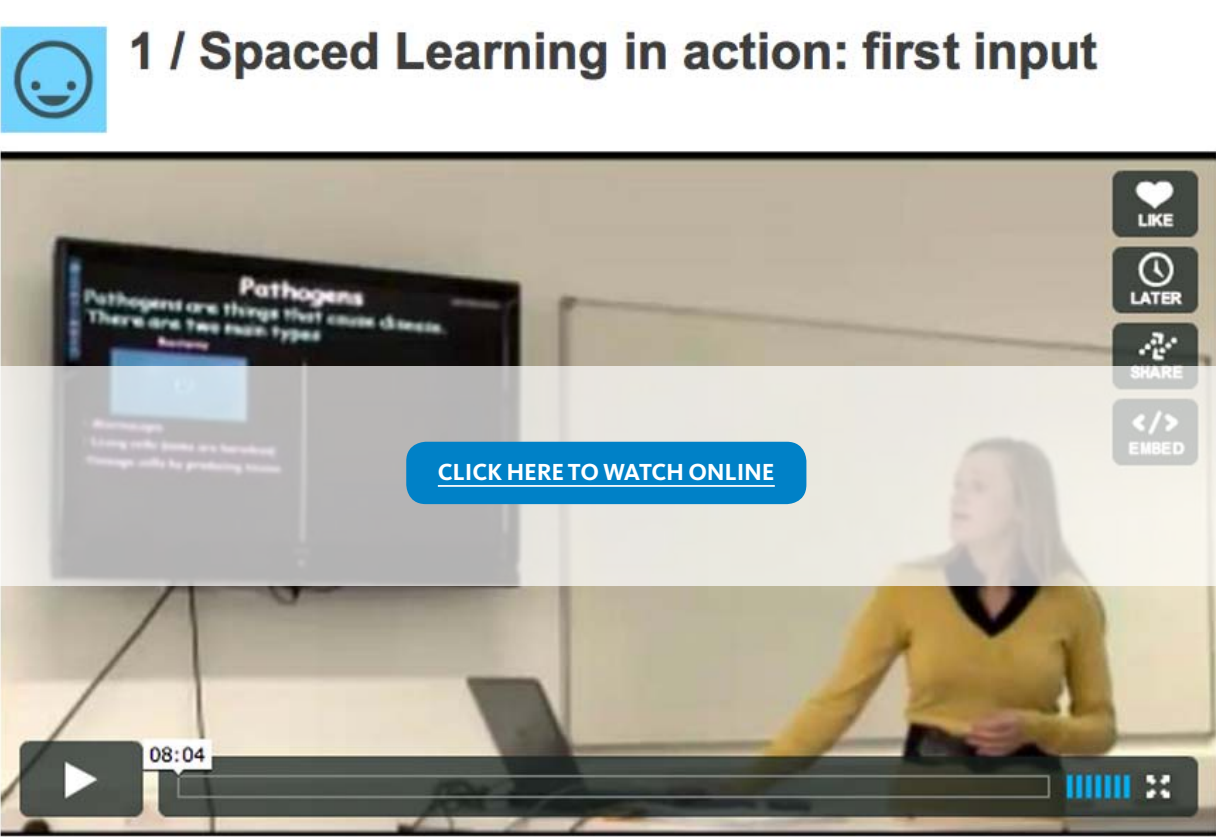
# Spaced Learning in action

## First input

In the first input, the teacher is delivering the information that she wants the students to gain from the session. The length of this input is not restricted but it becomes difficult to hold students' attention after 10–15 minutes. Neural pathways start the process of creating memories in this session.

In this clip, the students are being shown the key content of a Year 9 Biology unit on disease. They are being introduced to the key information that they will be required to demonstrate at the end of the unit of work. The presentation also contains the scientific keywords and vocabulary they will be using throughout the unit.

The teacher in these clips is Angela Bradley.



1 / Spaced Learning in action: first input

CLICK HERE TO WATCH ONLINE

08:04

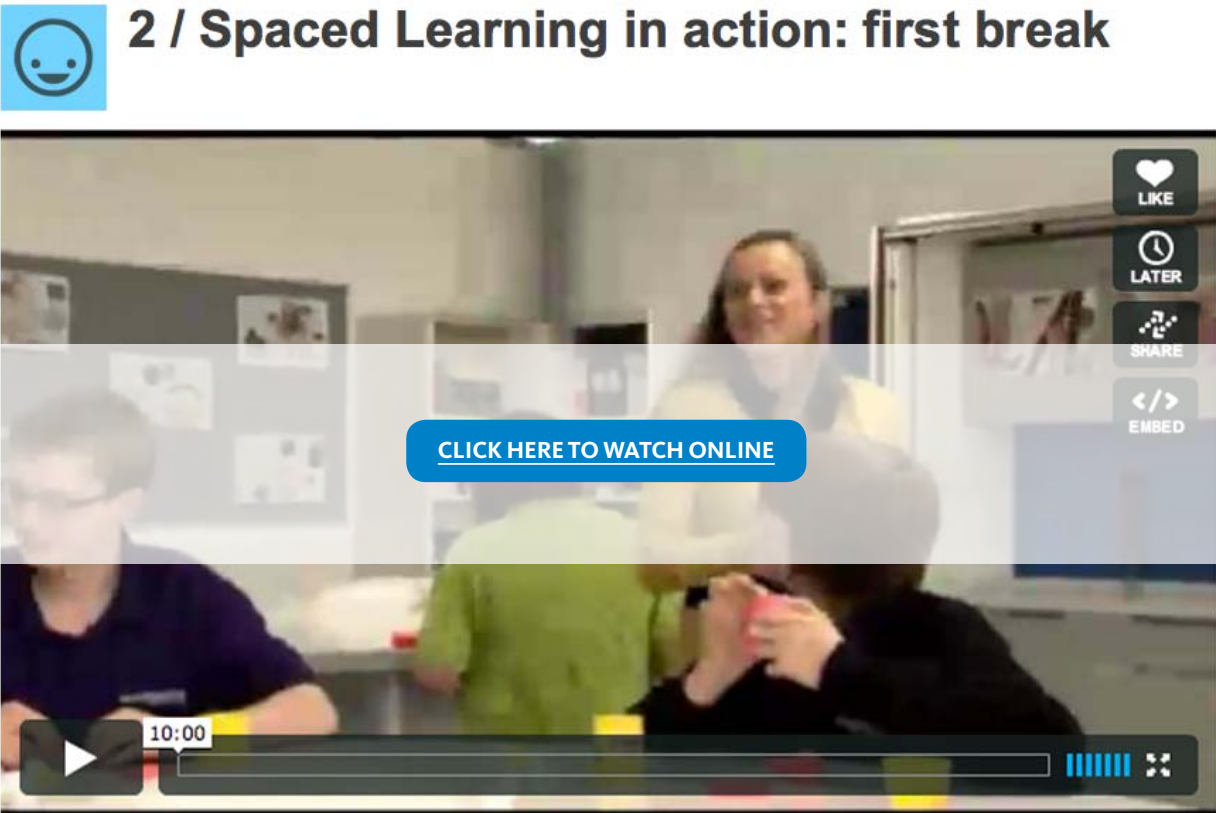
The video player shows a classroom setting. A teacher, Angela Bradley, is standing next to a large screen displaying a presentation slide titled "Pathogens". The slide text reads: "Pathogens are things that cause disease. There are two main types". The teacher is wearing a yellow sweater. The video player interface includes a play button, a progress bar, and a timestamp of 08:04. On the right side of the player, there are icons for LIKE, LATER, SHARE, and EMBED.

# Spaced Learning in action

## First break

In the first break, the aim is to stimulate a different part of the brain to allow the neural pathways created in the first input to be formed. This activity needs to be 10 minutes long as this is the period of time that the pathway needs to be 'rested' before the next stimulation, in order to strengthen the neural pathways recording the information learnt in the first session. The activity should be unrelated to the content of the lesson as this will minimise the danger of disrupting the pathways being formed to record the information in the first input.

In this clip, the students are modelling elephants made from play-dough.



2 / Spaced Learning in action: first break

CLICK HERE TO WATCH ONLINE

10:00

LIKE LATER SHARE EMBED

The video player shows a classroom scene where a teacher is interacting with students. The students are engaged in a hands-on activity, modeling elephants from play-dough. The teacher is standing and talking to the students, who are sitting at desks. The video player interface includes a play button, a progress bar, and a timestamp of 10:00. On the right side of the player, there are buttons for LIKE, LATER, SHARE, and EMBED.

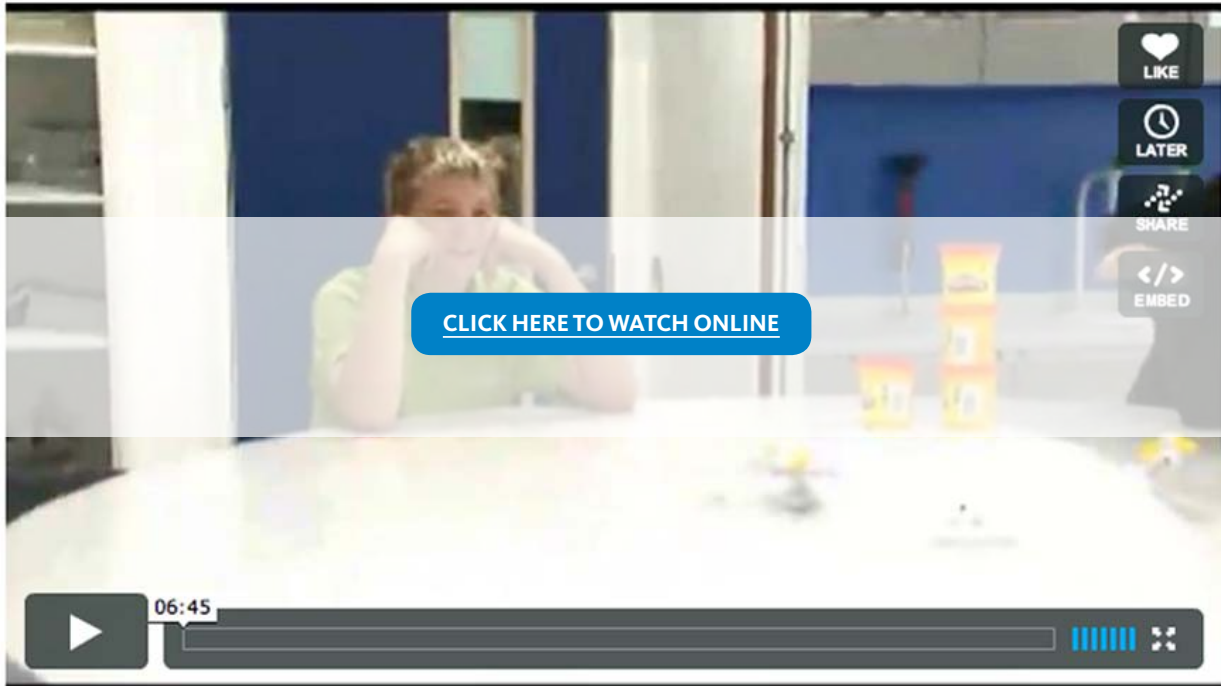
# Spaced Learning in action

## Second input

During the second input, the teacher is revisiting the content from the first session. The same neural pathways will be stimulated, which demonstrates their importance to the brain. To vary this input and make it more interactive, it is advisable to change the way the content is presented. This could be achieved by using different examples of the same thing or missing out some of the key information, allowing the students to see what they can remember from the first input.

In this clip, the students are being shown slides similar to the first input and are asked to 'fill in the gaps' with some of the key information that is missing. It is important to remove information that you want students to know, as their attention will be drawn to it when asked to remember it.

 **3 / Spaced Learning in action: second input**



[CLICK HERE TO WATCH ONLINE](#)





# Spaced Learning in action

## Second break

In the second break, the same principles apply as for the first break. The neural pathways containing the information being learnt are 'rested' for another 10 minutes. The activity this time can be changed or can be a variation on the first gap activity. Again, it is important that the activity is not related to the content of the lesson.

In this clip, the students are modelling frogs made from play-dough.

 **4 / Spaced Learning in action: second break**



[CLICK HERE TO WATCH ONLINE](#)

LIKE  
LATER  
SHARE  
EMBED

10:01


# Spaced Learning in action

## Final input

In this session, the teacher is again using content from the first session. This input places more emphasis on the students, who are demonstrating that they understand the material by applying it. This can be done by giving the students an activity that requires them to use the content from the first input.

This session does not have to be led by the teacher. In this session, the teacher can move around the students and check their knowledge/understanding of the content of the lesson.

In this clip, the students have been given a set of slides printed out into a handout. They are being asked to recall the key information covered in the first two inputs and apply this knowledge to various questions and tasks.

 **5 / Spaced Learning in action: final input**



[CLICK HERE TO WATCH ONLINE](#)

14:31

LIKE LATER SHARE EMBED

# Spaced Learning and enquiry-based learning

*“Students who carry out enquiries become ‘expert learners’, able to find, interpret, and evaluate information for themselves.”*

Spaced Learning has proved attractive to schools because of its obvious potential to help students with recall in examinations. However, Learning Futures has supported the development of Spaced Learning because of its potential for enabling enquiry-based learning (EBL) and project-based learning (PBL).

EBL is learning by seeking out and evaluating information in order to answer open-ended questions and solve open-ended problems. Students who carry out enquiries become ‘expert learners’, able to find, interpret, and evaluate information for themselves and apply their skills and knowledge in a variety of contexts. In PBL, students carry out their enquiries as part of an extended project with a tangible output.

This guide refers to EBL because that has been Monkseaton High School’s focus. However, Spaced Learning is equally applicable to PBL.

One of the challenges of designing EBL in schools is ensuring that students acquire the appropriate range of subject content in addition to doing in-depth research in a specific area. This is where Spaced Learning comes in. By running Spaced Learning sessions in conjunction with extended, student-led enquiries, teachers can ensure that students gain relevant content knowledge without losing breadth of learning.

This is what students want: Learning Futures has found that, overwhelmingly, secondary school students ask for a blend of enquiry-based and ‘transmissive’ learning (60% enquiry to 40% transmission is the approximate ratio). We are excited about Spaced Learning because it is the most efficient, and effective, method of transmissive learning we have encountered.



## Spaced Learning in action: Year 9 Science at Monkseaton

*“You want students to develop as learners, and you can see the bigger picture, but they’ve still got to achieve in your subject.”*

Monkseaton is pioneering the use of Spaced Learning in EBL with an enquiry-based curriculum across Year 9 Science (13 and 14 year olds). This curriculum has been designed by teachers Angela Bradley and Louise Dickson in order to make sure students acquire the science skills they will need. As Angela has observed, it has also made the students more motivated: ‘they like doing something that’s their own, they like the ownership, they like the freedom’.

Angela and Louise felt confident about shifting from a transmission-based curriculum to an enquiry-based curriculum because they could use Spaced Learning to cover a range of subject-specific content. As Louise puts it, ‘I wouldn’t be so happy doing just the enquiry if I didn’t have the Spaced Learning backing it up. You want students to develop as learners, and you can see the bigger picture, but they’ve still got to achieve in your subject’.

Students are doing half-term length multi-disciplinary projects, which include studying ways that human beings are affecting the planet, and working out a (fictional) person’s health problems by studying their symptoms and lifestyle.

Teachers use Spaced Learning presentations to teach both content and science skills. As Angela explains, ‘in the environmental science unit they can focus on any way that humans are affecting the earth, but they’ll need to know the chemistry of global warming for Year 10. So we focused the Spaced Learning session on fuels and the consequences for the atmosphere, because they won’t learn that if they decide to research something like the ivory trade’.

Another Spaced Learning session focuses on the skills they will need to collect and analyse data. This session is focused specifically on preparing them for conducting a thorough enquiry – and on ensuring that the skills are retained.

Angela and Louise have found that the combination of Spaced Learning and EBL allows them to study material that goes far beyond the standard curriculum. For example, they incorporated a dissection of the heart into the unit focused on health. There is nothing about the heart in the Year 9 standard curriculum (or in the Year 10 or 11 curricula, for that matter) but, as biologists, Angela and Louise thought it was important for their students to know how the heart functions, and knew that they would be interested in it. Because they were covering the required curriculum with Spaced Learning and other aspects of the enquiry, they had the freedom to include it within an enquiry focused on biology

# Frequently-asked questions

(answered by Angela Bradley and Louise Dickson)

*“Ask your students what they want to do!  
They know what they enjoy.”*

**What age groups is Spaced Learning appropriate for?**

Spaced Learning should work with students of any age.

However, be aware that the presentations included on this disk were designed for 13–18-year-old students.

**What ability levels is Spaced Learning appropriate for?**

Spaced Learning is appropriate for all abilities, as long as students are able to read.

**How do you decide what to put onto the PowerPoint slides?**

We put on what we really want our students to know. That’s the only guideline we use when we’re making them.

**How long should the inputs last?**

The only limit on the inputs is your students’ concentration, and you will know better than anyone how long that lasts.

In our experience, 10 minutes is a good length for the first input (the absolute maximum time we would spend is fifteen minutes).

The second and third inputs are more flexible – it depends on the nature of the tasks you’ve set your class.

**How much information should I cover in a single session?**

It’s possible to go through a year’s worth of material in a session, but it’s exhausting. We’d recommend breaking a year’s worth down into at least three different sessions.

The really important thing is to stick to the cold, hard facts. As teachers, our instinct is to add opinions and observations but, for Spaced Learning, it’s important to strip our presentation down to the bare essentials.

**How do you decide what to take out of the presentation for the second input?**

You take out the things you want them to remember – so go through and remove the key words/ideas.

You need to decide how many of the words/ideas to remove based on the age and ability of your audience.

**What’s the difference between the second and third input?**

The second input is focused on recall, and the third should check understanding. This means that, for the second input, you want to get an idea of how much the students have picked up so far. In science we take words out of the PowerPoint presentation and have the students fill them in, because science is full of key words. But different subjects will have different needs. For example, in maths, students might have problems to solve on paper, to see if they’ve understood the methods for solving a particular problem.

For the third input, the students should have some kind of task to apply what they’ve learned. So in maths, for example, students could be given a ‘real-world’ problem to solve using the concepts they’ve just been taught.

**What are the best activities to do during the breaks?**

There are three important things to think about here: the activities should be as different from the presentation as possible, they should be varied, and they should last about 10 minutes.

So we recommend physical activity without much talking, and with no writing. This is so that a different part of the brain is used during the breaks.

We’ve found that it’s good to go for stuff that younger kids would enjoy – the most popular activity by far is moulding play-dough. Juggling and sports skills work very well, particularly if you can get outdoors easily from your classroom – but it’s fine for children to stay in the classroom too.

Finally, ask your students what they want to do! They know what they enjoy.

# Frequently-asked questions

(answered by Angela Bradley and Louise Dickson)

*“Spaced Learning has a very specific purpose: to help students acquire a very large quantity of information within a small span of time.”*

What is the optimum amount of information to put on a slide?

When you’re making a slide, think about what’s going to look interesting to your students – if a slide is really text-heavy, it’s going to be boring to read.

However, since the text will be stripped down to key points, you may be able to fit more than you expect onto a single slide without it getting too crammed with words.

I’m not very comfortable with PowerPoint. How can I make slides that look good enough?

The most important thing is that the slides be easy to read. They don’t need to be fancy.

Having said that, we weren’t very confident about using PowerPoint when we created our first Spaced Learning presentations. We modified slides that a teacher at another school had developed for a conventional science presentation.

You can do the same with the presentations that are included on this disk (see [page 18](#)). There is also specific guidance on putting together a Spaced Learning presentation on [page 5](#).

Would it be helpful or counterproductive to play music during a Spaced Learning session?

We don’t have any evidence either way, but if it makes the lesson more enjoyable, go for it!

How quickly should I go through the slides?

We go a bit more quickly than we would with a normal presentation, because there’s so much information to get through, and because it brings some energy into the room. But you don’t need to go quickly in order for Spaced Learning to work. Judge your pace based on your audience, and the amount of information you need to get through, and experiment with different speeds.

Is it always best to talk during the presentation rather than just showing the slides in silence?

We always talk, because it seems like a lot to ask a class of kids to sit in silence and read a PowerPoint presentation without anything else happening.

Also, because the slides are so stripped-down, sometimes the information won’t make any sense without a bit of further explanation.

How often should a student be taught with Spaced Learning?

Spaced Learning has a very specific purpose: to help students acquire a very large quantity of information within a small span of time. Most of the time you won’t want to do this, so Spaced Learning will only be appropriate on a few occasions during a term.

# Students' views on Spaced Learning

*“For every traditional lesson you need a pen, a pencil or books. But Spaced Learning changes all that.”*

## Spaced Learning: A student's viewpoint

LUCY BARRATT, 16

What if I told you that short, intense lessons are more important to good grades than hours and hours of uninterrupted study? Would you think I was crazy? Probably.

How about if I told you to take a few breaks between those lessons too. 'Sure', you'd say in disbelief. That's because you probably haven't tried Spaced Learning, a new approach at my high school in England that is based on science and a new understanding of how brains remember and learn.

So what is Spaced Learning like? It consists of three lessons (presentations) that are almost exactly the same, separated by 10-minute breaks – a bit odd as an experience, but interesting! The lessons are very compressed. For

example, the review of my whole Biology unit was completed in about 12 minutes. The nervous system, diet deficiencies, hormones and the menstrual cycle, drugs, and defence from pathogens all whiz by on slides shown at the dizzying rate of 7–8 per minute. During the 10-minute breaks we get physical, rather than mental, participating in activities like basketball dribbling and teamwork games. The goal is to stimulate a different part of the brain than that stimulated in the lesson. In effect, we give our brains a break, something that new scientific research shows is crucial to making memories stick.

For every traditional lesson you need a pen, a pencil or books. But Spaced Learning changes all that. You have nothing in front of you to distract you. All you need is a teacher, a presentation, and the ability to focus. You listen and watch, and the information gets stored in your long-term memory.

So what happens inside your head during Spaced Learning that is different from what happens during a traditional lesson or review session? I can only answer for myself. I love sports, particularly extreme sports. Why? Adrenaline, quick thinking and having to stay one step ahead. My sport is rock climbing. If you hang around too long before you make the next move on a climb, you lose your confidence – and could lose your grip. You always have to be aware of what comes next, but you can't consciously think about it. If you do, you'll stop moving altogether, have no idea what to do next, and you'll fall. Having completed a climb – one that can take an hour or more – I can replay the whole climb in my head in seconds, seeing everything I've done.

For me, Spaced Learning is a bit like my climbing. I don't try to learn; I don't write anything down, and I don't review. It just seems as if I am seeing a movie in my mind that I have already seen before, and my understanding of the information presented becomes

more precise – clearer – when I see it again. During the breaks, I focus on the instructions for the physical activity. In the end, I am left with a movie in my head of the lesson, just like my memory of a climb.

My first experience of Spaced Learning came in March 2007 when my class re-took our science exams from November 2006. We only had a one-hour Spaced Learning review session (which had four months of work condensed into it from the summer before). These examinations really matter in England – they can decide which university will accept you. Most of us did better on the exams after an hour of Spaced Learning review, even though we did no studying at all. I went from an A, B and C to straight A's and an A+ (that placed me in the top 5 per cent of the A grades in England). It was amazing.

My class was the first ever to experience Spaced Learning. I became a spokesperson, interviewed by BBC television and by reporters from

# Students' views on Spaced Learning

national newspapers such as The Daily Mirror. One reporter, Jeremy Armstrong, even sat in on one of our Spaced Learning review lessons.

It seems to me that if this technique was to be adopted by schools it could change education forever! I know that won't be until I have finished my education, but my children and grandchildren are the ones likely to benefit from this discovery.

## Spaced Learning vs Mass Learning

DYLAN MCGREEVY, 17

During my last 12 years of learning I have been taught primarily using the Mass Learning method. However, I recently had a chance to experience a Spaced Learning lesson.

Compared to the normal teaching method I personally felt that the

Spaced Learning lesson allowed me to store/retain more information. The lesson was split up into five sections; three were dedicated to learning and the other two to a gap activity.

The lesson was able to hold my attention the entire time, which was rather interesting as I can sometimes be distracted and lose concentration near the end of lessons. The two gap activities in the lesson allowed me and my fellow students to retain information on a biochemical level by stimulating a different part of the brain, but also gave us a break so we weren't sitting for the whole time. So when we began to learn again we were able to get comfortable and focus on the subject at hand.

The three learning slots provided the same information about the subject three times. However, the way it was communicated was slightly changed. This allowed us to focus on different parts of the information while we reminded ourselves of the information we learnt prior to the gap activity.

*"The lesson was able to hold my attention the entire time, which was rather interesting as I can sometimes be distracted and lose concentration near the end of lessons."*





# About Learning Futures

*“The Spaced Learning guide is part of a set of free, open-source tools and guides to help schools implement Learning Futures approaches to designing learning.”*

In 2008, the Paul Hamlyn Foundation and the Innovation Unit launched Learning Futures in order to find ways to improve educational outcomes by increasing young people’s engagement in learning.

Since then, we have worked with over 40 secondary schools on developing innovative methods of teaching and learning aimed at increasing engagement.

Through this work, we have identified four high-impact approaches to designing learning:

1. Combining enquiry-based learning with more ‘traditional’ transmission-based methods
2. Seeing school as a basecamp for enquiry that takes students beyond the school walls, rather than as a final destination
3. Attending to and developing students’ extended learning relationships both within school and outside it
4. Transforming school into a learning commons for which students and staff share responsibility.

We have found that these four approaches are most powerful when they are combined, so we are developing a composite ‘Learning Futures model’ for education.

The Spaced Learning guide is part of a set of free, open-source tools and guides to help schools implement Learning Futures approaches to designing learning.

These tools include the following:

### **Guide to Enquiry- and Project-based Learning**

Developed in partnership with High-Tech High in San Diego, this provides a step-by-step guide to planning and managing extended, interdisciplinary projects.

### **Learning Futures Manual**

The Learning Futures Manual provides an introduction to ‘why’ and ‘what’ Learning Futures is, but at the heart of it is the ‘how’. It offers insights into the organisational conditions required to successfully implement this approach to learning and will offer handy tips on curriculum design, material development, and strategies for sustaining practice and embedding staff learning.

### **Enquiry Blogger**

This tool allows teachers to create and monitor project-specific blogs that students can use to document their research, record their achievements and concerns, and tag their posts with the skills or attributes that they are using. Access to blogs is password-protected, but students can read and comment on each others’ posts.

For more information on these tools, and to download them for yourself, visit

[www.learningfutures.org](http://www.learningfutures.org)

## Appendix: PowerPoint slides

On this disk, you will find a selection of presentations developed by classroom teachers using Spaced Learning. They offer insights and ideas on the type and level of information included in each input of Spaced Learning.

You can download each presentation by clicking on its corresponding heading, or access them all via the link below:

[CLICK HERE TO ACCESS ALL PRESENTATIONS](#)

### 1 GCSE English

#### AQA Spec A: Paper 1, Year 11

This was used in one of the last lessons before the GCSE examinations. A more detailed Powerpoint presentation, with similar slides, had been used throughout the course so that the layout was familiar. In the final lesson the Spaced Learning presentation was shown.

### 2 GCSE Maths

#### Used with Year 9 students but can also be used for Years 10 or 11

The first set of slides contains the key information for the Number topic. The second and third set of slides are the same as the first but with certain facts/figures omitted for the pupils to respond to verbally as a class and then on a hand-out individually.

### 3 GCSE History coursework

#### Modern World Conflict – Northern Ireland, Year 11 (includes voice over)

The first set of slides contains the key information and the voice over was applied to this first rotation to

increase engagement. The second set tests student recall of this information and students called out the answers as the gaps occurred. The third set was used to check understanding, and again students called out the answers.

Each area of the topic was then revisited over a series of lessons to extend ideas and test understanding. It was then used again at the end of the topic to summarise the key points covered prior to writing up the final coursework piece.

### 4 GCSE History coursework Crime and Punishment, Year 11

The first set of slides contains the key information. The second set tests student recall of this information and students called out the answers as the gaps occurred. The third set was used to check understanding, and again students called out the answers.

Each area of the topic was then revisited over a series of lessons to extend ideas and test understanding. It was then used again at the end of

the topic to summarise the key points covered prior to writing up the final coursework piece.

### 5 AS Level: Psychology Unit 2: Biological Psychology, Social Psychology and Individual Differences, Year 12

The first set of slides contains the key information, the second set tests student recall of this information and the third set was used as a handout for students to write on to check their knowledge and understanding.

Students are then required to use the completed set of slides as a starting base for their revision. They are usually given a Spaced Learning session just before the examination to provide a relaxed overview of what they already now know.

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## Appendix: PowerPoint slides

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### 6 GCSE Art

#### Stylistics, Year 10

This presentation was used to introduce Year 10 students to different art styles. For each style, it gives them ideas of things to look out for to identify the style and examples of artists who used it.

The second stage of the presentation tests knowledge of the content delivered in the first session on styles and example artists.

The final stage involves the students sorting a mixture of different images and grouping them based on the style they think it is in, with reasons for their choices. They are also asked to recall an example of an artist for each style as part of the final session.

### 7 GCSE Science

#### Human Biology, Year 11

This presentation was used to revise the main content of the GCSE unit on Human Biology. The first stage of the presentation contains the key information, the second aims to test the students' recall of this information and the third is a handout that students fill in to check their knowledge/understanding. This could then be marked and to highlight areas to focus on during revision.

### 8 GCSE Science

#### Human Biology, Pathogens and Diseases, Year 10

This presentation was used at the start of the topic Pathogens and Disease to give the students an overview of the content of the topic.

Each area of the topic was then revisited over a series of lessons to extend on ideas and test understanding. It was then used again at the end of the topic to summarise the key points covered.

### 9 GCSE Spanish coursework

#### Holidays, Year 11

The first set of slides contains the key vocabulary needed to produce a good standard of GCSE coursework on the topic of Holidays.

In the second set, students are invited to recall this key vocabulary. The third set was used as a handout for students to write on, to check their knowledge and understanding.

This Spaced Learning presentation was used after the topic of Holidays had been taught over a half term and immediately prior to the pupils completing their coursework.

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*“It seems to me that if this technique was to be adopted by schools it could change education forever!”*

STUDENT, MONKSEATON HIGH SCHOOL

*“Spaced Learning has helped to give the students confidence in their ability before an exam and has also allowed us to have more flexibility within the timetable to explore other types of learning we previously may not have had time for, such as Enquiry Based Learning.”*

ANGELA BRADLEY, SCIENCE TEACHER, MONKSEATON HIGH SCHOOL



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