



CLASSVR®

# 30

# CREATIVE WAYS TO USE CLASSVR

Sharing Best Practice





“WE NEED TO EMBRACE TECHNOLOGY TO MAKE LEARNING MORE ENGAGING. BECAUSE WHEN STUDENTS ARE ENGAGED AND THEY ARE INTERESTED, THAT'S WHERE LEARNING TAKES PLACE”

# Introduction

Since we launched ClassVR in January 2017, it's been incredible to see how teachers all around the world have taken the technology and made it their own. This book gives you just a taster of the creativity we've seen develop as schools explore the possibilities that Virtual and Augmented Reality can offer in the classroom.

It's designed to be a practical and inspiring guide to using ClassVR as a teaching tool. You'll find out about how students of all ages have explored a wide range of content. Some lessons used 360 degree images, videos or interactive experiences as an incredible stimulus across the curriculum, from Antarctica to Ancient Maya and the Maldives to the Moon. Others gave students the opportunity to examine 3D models up close using Augmented Reality; imagine holding a snowy owl, Roman sword or distant planet in your hands!

But it's not just the ClassVR published resources that you'll see in this book – many teachers and students have begun capturing their own immersive content using 360 cameras, building 3D models, and crafting interactive worlds. They may have been built with a range of tools, but they've all been sent to the school's headsets using ClassVR's online portal, as you'll read in the following pages.

We hope that you'll enjoy reading about the ways VR and AR are having an impact in classrooms across the globe; who knows, it may even spark a lesson in your own. We've certainly enjoyed the process of supporting this community of schools to grow – and of course, we'd like to extend a massive thank you to the teachers who made this possible.

**Hannah Davies**

Head of Educational Services  
Avantis Education

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# Creating 3D Shapes

MATHEMATICS Age 9 - 10



Chris Bass



Educational Specialist  
Avantis Education

## Learning Aims:

- To identify 3D shapes from 2D representations.
- To draw shapes using given dimensions and angles.
- To create content using a range of programs.

## CONTEXT

Before I started working for Avantis I was a Year Five teacher for three years and I was always looking for new ways to embed computing across the curriculum. One really exciting way to do this is using Paint 3D to create 3D models of shapes that can then be viewed and checked using ClassVR headsets. Giving students the ability to actually create their own shapes using simple computer software deepens both their understanding of the properties of shape and their digital literacy skills.

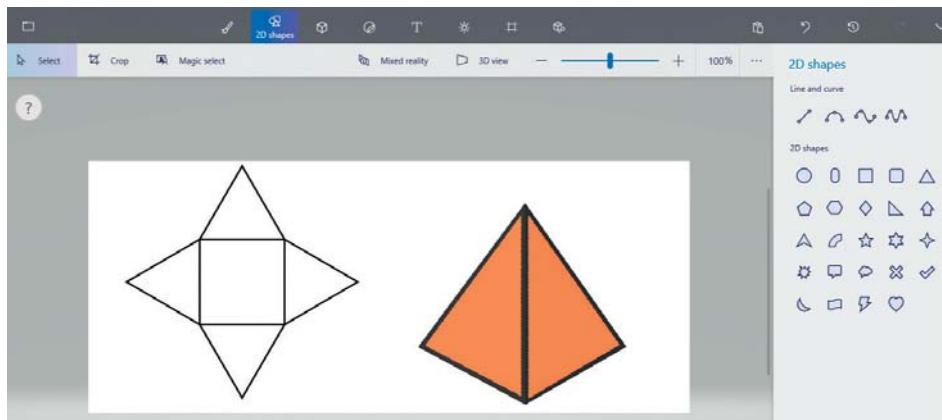
## PRACTICAL SESSION



To start this session I talk with students about the differences between 2D and 3D shapes and how they relate to one another. We then look at how a net relates to its 3D counterpart using a printed cube net – I like to use the ARCube net for this, as it can then be used with the resultant 3D models! After introducing the basics of using Paint 3D I then challenge students to create 3D models of some pre-prepared nets. These can be grouped to differentiate for varying abilities or completed in mixed ability pairs. As the students complete their shapes, I can upload them to My Cloud on the ClassVR portal and upload the model directly to them for evaluation. Does it look correct? Is it symmetrical? Do you need to edit it? The students can then use their ARCube to manipulate their creation and study it from all angles before deciding if they need to do any further editing.

## IMPACT ON LEARNING

Exploring shape in a new and exciting way using Augmented Reality gives students a broader depth of experience and a greater frame of reference when facing challenges in the future. When it comes to solving problems relating to 3D shape they will have a tangible first-hand memory of creating shapes from nets. Even more importantly, they are experiencing and using new technologies to help them understand the world and simultaneously improve their overall digital literacy. While Paint 3D is a relatively simple modelling program it can lead into all sorts of other digital forms of expression and allows for creativity in an exciting and innovative new medium.



# Writing a Christmas Story

ENGLISH Age 8 - 9



Meneka Leon



Marlborough Primary,  
London

## Learning Aims:

- To know the key features of a narrative story.
- To use figurative descriptive language.
- To make sure there is a clear sequence of events.
- To begin to think about different writing techniques.

## CONTEXT

We used VR to write the third section of our Christmas stories, describing the journey on Santa's sleigh to the North Pole. Prior to this, children had been given the opportunity to meet a reindeer and ask questions about what life was like in a cold climate. In their writing, our main focus was for children to extend their ideas and add detail as this was a real struggle for them. Initial ideas were quite limited and children were using quite basic vocabulary. Up to this point, children had been exposed to a variety of different story openings and we had done quite a bit of work on figurative language.

## PRACTICAL SESSION



Santa's Sleigh Ride



Christmas Playlist

The children worked in groups of three; each group had an observer, scribe and creator. In addition to the published Christmas Playlist and the Santa Sleigh Ride track, I created a bespoke Playlist. This allowed the children to journey across the arctic and identify the intricate and specific details of the landscape and physical geography; they discussed some of the synonymous adjectives which could be used to enhance their writing and used the imagery to scaffold and springboard their written language. Finally, the children enjoyed the Santa's Sleigh Ride track, which helped the children to understand and visualise what they had heard in many Christmas stories and apply some of the grammar-based learning prompted by this visual experience.

## IMPACT ON LEARNING

Children were excited and engaged in their writing as they felt as if they were actually seeing the Northern Lights; this sense of immersion and reality provided a near-tangible experience, which enabled many children to draw upon their grammar learning, recall the vocabulary and then apply it in a more skilful and scaffolded way. In their writing, the quality and range of vocabulary used was of a much higher level and children were also now using figurative language and detail. They are beginning to increase their writing stamina and were more engaged throughout the writing process.



# Spanish Vocabulary

SPANISH Age 9 – 10



Frankie  
Smith

LGfL



Granard Primary  
School, London

## Learning Aims:

- To develop and refine vocabulary and pronunciation in order to describe settings.
- To put vocabulary into context and understand its meaning.

## CONTEXT

The idea of this lesson is to allow students to read, speak and familiarise themselves with Spanish vocabulary. As part of our Spanish scheme of work, the children studied a unit called 'La Casa'. In this unit, the children explored objects in the house and how to describe a room; ask questions about a room; and explain and describe the objects. I taught this lesson at the beginning of the 'La Casa' unit to introduce the children to new vocabulary that they would come across. They then used this experience to generate a word bank in their books, which they annotated in English, adding pictures to represent the words.

## PRACTICAL SESSION

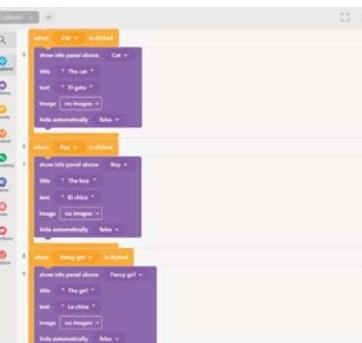


CoSpaces

I created a CoSpaces world based on our current unit of work; we created a house with everyday objects that the students might come across. The objects in the CoSpaces world were labelled with both the English and the Spanish. Students worked in groups of three in order to collect, share and use new vocabulary. It also meant that the person using the headset had someone to help guide them around the classroom. The children were free to explore the CoSpaces world at their own leisure. They shared the new vocabulary they discovered with each other and compiled a list of new vocabulary. I encouraged the students to say the Spanish words aloud to their partners. Their partner could then give the English translation (if they've been taught it); guess what the English might be (if they have yet to learn the vocabulary) and/or check the pronunciation.

## IMPACT ON LEARNING

Learning a foreign language can be off-putting for some children so this immersive, hands-on approach removed those barriers through an exciting stimulus. They all wanted to take part, have a go and share their new vocabulary with their peers. The children were willing to share what they've learnt and were excited to support others in saying their new vocabulary. When we did say the words altogether as a class, it wasn't as challenging as the children had seen the words before and attempted to say them. The vocabulary was understood at a deeper level and the children were able to embed and use these words more effectively in following lessons and pieces of work. To be able to put pictures to the Spanish (both written and spoken) meant that all of my students were able to access the lesson and were engaged from the start.



# Estimation and Prediction

MATHEMATICS Age 5-7



Simon  
Pile

LGfL

Anson Primary School, London

## Learning Aims:

- To be able to accurately estimate using a range of mathematical strategies.
- To be able to analyse 3D objects and name their composite shapes based on the object's properties.

## CONTEXT

As part of our mission to embed Virtual Reality across the curriculum, we have begun to use the technology to create opportunities for independent exploration and creative mathematical thinking. Geometry, estimation, prediction and logical reasoning are all key areas of mathematics and we wanted to stretch our pupils' reasoning through contextualised, VR learning.

## PRACTICAL SESSION



### Estimate and Count

Within a mathematics lesson, we used a photograph of a celebration of light from China and asked the children to begin by looking for different shapes within the lanterns. They were able to zoom in and deconstruct the shapes by moving around the 360 image and thoroughly examining each lantern from various angles. We then wanted to move the children's learning on, and as such, we asked them to identify different composite shapes within the image and within larger objects. This involved the children applying their understanding of shape and geometry to a variety of objects and then explain how and why they have reached their decision. We encouraged the children to explain their strategies and thinking, so as to deepen their mathematical reasoning and also choose different objects within the image independent of our guidance. Afterwards, we asked the children to estimate the number of lights within the image and discussed how they could methodically and systematically have found an answer to this – again, scaffolding their deeper reasoning and higher order thinking skills.

## IMPACT ON LEARNING

As an immersive mathematical experience, it is very powerful and also means that you are encouraging students to think about the world around them in different, creative and explorative ways. In doing so, we found that having these opportunities then fed into students applying their mathematical understanding within their social times and across a wide variety of subject areas. The impact of this meant that the children were constantly re-applying and re-visiting their mathematical skill base, because of having had the opportunity to apply their knowledge and understanding in such a fun and unique context.



# Fly, Eagle, Fly

ENGLISH Age 7 – 8



Michelle  
Quinlan

LGfL

St Stephen's CE  
Primary, London

## Learning Aims:

- To engage reluctant writers.
- To increase the range of powerful vocabulary.
- To apply the powerful vocabulary to independent writing.

## CONTEXT

Our Literacy learning was focused on stories with a moral. We had been reading 'Fly, Eagle, Fly' and were beginning to think about writing our own story with a focus on setting description. To inspire our own writing, we looked at the description of the Farmer and his friend climbing the mountain at the end of 'Fly, Eagle, Fly' - and what they saw below. The plan was for us to rewrite this description (and the ending of the story) with the children using powerful vocabulary and noun phrases to describe scenes from different countries in Africa.

## PRACTICAL SESSION



### Africa Playlist

The children were in groups of three with one headset per group. I had created a playlist of photos and videos from different countries in Africa. Each member of the group had a different job; one child wore the ClassVR headset and used adjectives and nouns to describe what they saw; another child listened to the description and wrote down (on a provided template) the nouns and adjectives the first child said; the third child had a thesaurus, with which they would look up the adjectives that had been written down and find powerful synonyms. After a few minutes of the children talking and using the thesaurus, I sent the headsets to the waiting room. They would then work in their group to use the new synonyms to form a noun phrase to describe things that they saw in the picture/video. We shared them as a class. The children then swapped jobs, looking at a different photo/video and creating more noun phrases to add to our working wall display.

## IMPACT ON LEARNING

Every child was engaged, enthusiastic and achieving. The range of language used during the session was excellent and promoted great discussion on the effectiveness of different words to convey the right meaning. In particular, one reluctant writer, who had previously not been able to produce more than about half a page of writing due to his limited vocabulary, was extremely vocal, engaged and excited about describing what he saw. The piece of writing straight after that lesson involved applying those noun phrases to a new setting description and he did so independently and with pride – writing over a page and a half – which I put down to his enthusiasm from the headset session!



# Experiencing the Trenches

HISTORY Age 10 – 11



Anthony Isaac

LGfL

Crowlands Primary School, Essex

## Learning Aims:

- To understand and explain some of the major events during World War One.
- To write in first person from the perspective of a soldier.

## CONTEXT

This year marked the 100th anniversary of the ending of World War One, and Year 6 pupils at Crowlands Primary School marked the occasion by writing a piece from the point of view of those brave soldiers in the cold, unforgiving trenches. The anniversary is a hugely symbolic time and as such, we wanted this topic to be made even more personal, immersive and experiential. Most children started the unit of work with a limited conceptual understanding about life in the trenches and how a typical day would be; we therefore wanted to provide a learning experience to broaden and deepen their understanding and appreciation of the conditions and expectations which soldiers endured.

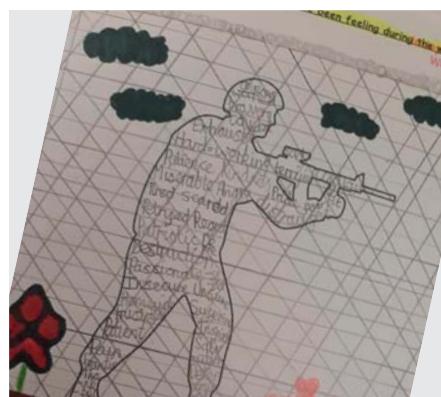
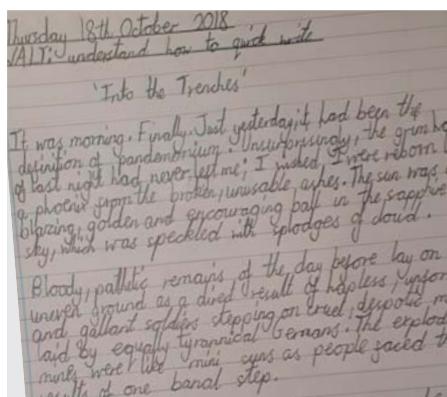
## PRACTICAL SESSION

### WW1 Trenches Experience

Firstly, the children had to come up with emotions of the soldiers and an outline of the settings using all five senses. To provide the most real, tangible experience possible, the children were given the headsets with the WW1 Trenches Experience loaded up; they then explored the 360 video, focusing on the grime, mud, rain and sobering surroundings. As the video has background audio projecting distant battlefield cries and warzone explosions, the children were given further food for thought and this fed nicely into expanding their choice of language and vocabulary. Whilst viewing the video, pupils were able to ask and pose questions to each other and raise further points to explore in groups and as a class. To codify and bring together this experiential learning, the pupils then removed the headsets and decorated a silhouette of a soldier with words and phrases that could describe what it might have been like to fight in the trenches.

## IMPACT ON LEARNING

As 10-11 year olds, they really struggled to step into the footsteps of people that lived over 100 years ago. ClassVR helped the children to engage with the task and gave them inspiration for how to describe the sights, sounds and smells of the trenches. The children were astonished at what the soldiers had to go through even though we had already covered trench life as part of our World War Topic and had a brand new understanding and empathy for the millions of courageous soldiers that gave their lives to fight for this country. This immersive nature of VR helped them think more creatively and their work was imaginative and detailed.



# Generation Ocean: Coral Reefs

GEOGRAPHY & SCIENCE Age 11+



Dr Amanda  
Waite



Megan  
Hendrickson



**ANGARI Foundation,  
Florida Academy of the  
Holy Names, Florida**

## Learning Aims:

- To identify corals as animals and recognize their common forms.
- To describe how corals form reefs and understand reef composition and features.
- To explain a coral reef's geographical, societal, and scientific importance.

## CONTEXT

Using Virtual Reality and 360 film, 3D printed and fossil coral specimens and related lessons, students were introduced to corals and reef ecosystems in preparation for a field trip to the Florida Keys. This served as important pre-learning and pre-exposure to these concepts, as it was the majority of students' first exposure to the topic. It helped students understand what to expect in the field, provided a solid foundation for deeper learning, and served as a springboard for discussions about the subject area.

## PRACTICAL SESSION



[Generation Ocean Video: Coral Reefs](#)



[Underwater Playlist](#)

First, students were introduced to corals, the reefs they form, and their local reef tract. The students were then given the opportunity to explore corals and reefs independently through a series of observation-oriented stations. At one station, the students accompanied coral scientists on a research expedition, both above and below water, via viewing of the 360 film Generation Ocean: Coral Reefs in Virtual Reality. The remaining stations asked the students to examine, draw/describe, and identify modern and fossil coral skeletons. The students were asked to compare what they learned of ancient and modern corals and the environmental history of Florida to better understand how Florida coral reefs have changed through time.

## IMPACT ON LEARNING

The students were engaged, asked thoughtful questions, and readily drew connections to other topics that they'd covered in their courses. Their lab notebook pages demonstrated a strong attention to detail and accurate application of the introduced coral vocabulary. The Virtual Reality expedition helped the students understand and anticipate what they would see and experience underwater on the reef. This alleviated student apprehension about entering the water and resulted in a cohort of students that was eager to get into the field and apply what they'd learned. Once in the field, the students were immediately engaged and able to make coral identifications while snorkelling in an unfamiliar environment.



# Inside "El Quijote"

SPANISH Age 15-18



MariSol  
Padilla



New Braunfels  
High School,  
Texas, USA

## Learning Aims:

- To understand and comprehend Spanish texts.
- To describe settings, characters and atmosphere skilfully.

## CONTEXT

In my Advanced Placement Spanish Literature and Culture course, students are required to tackle a large quantity of required readings in the target language. An example of this are the required chapters to be covered from Miguel de Cervantes' *El ingenioso hidalgo Don Quijote de la Mancha*. It is a daunting task for teenagers to read and interpret literary works in archaic Spanish. As such, being able to incorporate Virtual Reality experiences such as those available in the ClassVR Library, combined with outside sources that I have found on my own and uploaded into my portal, allows me to customise my anticipatory set to really bring to life the world that inspired Cervantes' great masterpiece.

## PRACTICAL SESSION — Focus on immersing the pupils in Spanish culture



### Padilla/ Cervantes Playlist

We began by immersing ourselves in the whimsical surroundings of authentic 360 degree photos from certain Spanish cities. We were also able to view a 360 3D video narrated in beautiful Castilian Spanish inside the prison cell that is claimed to be where Cervantes created his work! Once the class had finished going over the "Códigos" (pre-reading discussions designed to provide historic and cultural background and insight into the works before we read them) I led students on a VR journey as described in my article. I then took my class amongst the windmills of La Mancha – another amazing VR experience – which truly enabled them to feel, see and appreciate a part of the landscape.

## IMPACT ON LEARNING

To be able to take my students to the sites that inspired Cervantes truly piqued their interest in the subject and allowed them to more effectively internalize the challenging work of *El Quijote*. It should go without saying that this type of experience is beyond my wildest dreams of what I thought possible when teaching a unit on 17th century Peninsular literature. Breadth of descriptive vocabulary in the target language increased in both content discussions and essays.



# VR Worlds

COMPUTING Age 9-10



Laura  
Woods



Neree  
Sale



LGfL



**Elm Park  
Primary School,  
Hornchurch, Essex**

## Learning Aims:

- To create a complex game using code and go beyond tutorials.
- To use skills already developed to create content using unfamiliar online technology.
- To save a document/file in various formats.

## CONTEXT

The students explored the virtual world and how it can be used in the classroom. Over a period of six lessons, they built their own virtual worlds using CoSpaces. Some of the key vocabulary we explored in this unit of was Virtual Reality, server, visual coding, z-axis, MP3, cloud, password, virtual world, and story map. Online Safety also formed part of the focus and this enabled the students to understand a bit more about file saving and organisation works.

## PRACTICAL SESSION

Students had one or two headsets on each table. The students began by creating small sections of their own virtual worlds on the desktop application CoSpaces. After students finished each phase of the virtual world, they then scanned the QR code to experience their world and test its functionality; if it had errors, mistakes or could be improved, then they undertook the computational process of debugging – to remove the errors and replace it with fully-functioning code. They also asked one or two other students on their table to view their world and then give feedback on both what they enjoyed and suggestions on how it could be improved.

## IMPACT ON LEARNING

Using the Virtual Reality headsets, the children could immerse themselves in the worlds they and their peers created; this enabled them to improve, critique and debug their worlds in a collaborative and constructive manner. One student commented, *"We have made VR worlds before, but when we used the headsets it made it real. Seeing it I could see what worked and where I needed to make changes and could improve my world."*



# Weather & The Seasons

GEOGRAPHY Age 5 - 6



James  
Tromans



Prince Albert  
Primary School,  
Birmingham

## Learning Aims:

- To become immersed into different extreme weather scenarios.

## CONTEXT

Children had previously looked at the four seasons and what they associated with each season. They had looked at weather and what weather to expect in each season; we explored simple reasons as to why certain weather is more common at various points in the year and what kind of temperatures, sensations and noises you might hear in the different seasons. This then led on nicely to what might be considered as normal weather and extreme weather.

## PRACTICAL SESSION

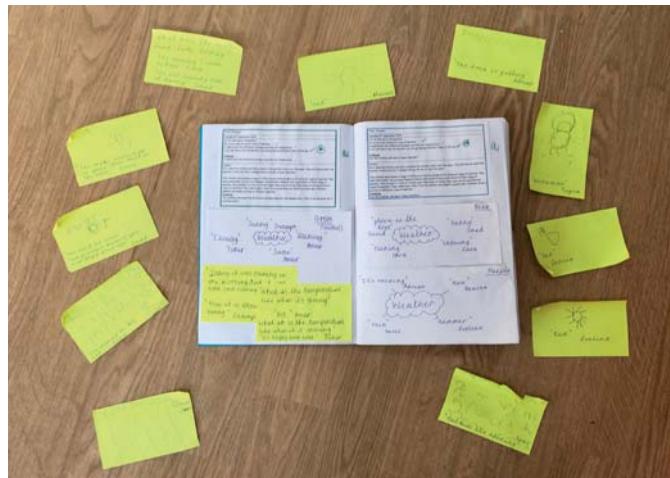


### Seasonal Changes Playlist

During the session children were exposed to extreme weather conditions. They were immersed into a tornado and they looked at a frozen gorge and the northern lights. Following each immersive experience, the children were given the time to discuss what they had just seen, how it would have felt to have been there at the time, and what clothes and equipment would have been appropriate for that extreme weather condition. From this the children created a mind map of each immersive experience and wrote down all of the vocabulary that they generated. This then formed the basis of their next Literacy lesson where they used these mind maps to create sentences and explain what they had seen.

## IMPACT ON LEARNING

Many of our children will never get to see or experience the extreme weather conditions that they saw using the ClassVR headsets. By using the immersive headsets, the children got a real feel for the weather and through the use of the visual and auditory elements, they were able to accurately describe what the weather condition was like and how it made them feel. The language generated by the experience was far superior to what would have been generated by simply looking at photos or watching a standard video and formed the basis of a fantastic writing stimulus. The ClassVR immersive experience also allowed the teachers to bring Science, Geography, Literacy and Computing into one lesson, creating a cross curricular experience that took learning to the next level.



# Early Communication

EARLY YEARS Age 3 - 4



Rebecca  
Combes

LGfL



Fleet Primary  
School, London

## Learning Aims:

- To begin using more complex sentences to link thoughts.
- To use talk to connect ideas, explain what is happening.
- To build up vocabulary that reflects the breadth of their experiences.

## CONTEXT

This lesson took place in a nursery class of 23 children aged three to four; there is a high proportion of English as an additional language and bilingual pupils. Our baseline assessments demonstrate a low entry level for most children in communication and language skills; as such, we decided to incorporate as much visual and immersive learning as possible to support and accelerate the children's language skills.

## PRACTICAL SESSION



### Giraffes at Riga Zoo

In pairs, the children looked at a photograph of some giraffes and talked about what they could see. I then introduced the headset with the track preloaded and ready to use. One child wore the headset and described what they could see using the Giraffes at Riga Zoo image. They then swapped over so their partner could see what they had been describing and talked about the image further – using descriptive language and predicting what was actually happening.

## IMPACT ON LEARNING

The initial photograph led to some statements, such as "Look...a giraffe!" and "It's big" but the conversations were quite limited and short, and vocabulary was not developing as a result of the activity. When the headset was introduced, the children were more stimulated to say what they could see. It led to more imaginative vocabulary, expressive statements and extended sentences. **Child 1:** "I can see a man, no...two mans. They are actually feeding the giraffe. There's another man. He has a green t-shirt on!" **Child 2:** "I see a giraffe. I'm scared of it! It's big! It's going to eat me! I see the audience too!" **This child was referring to the people in the image. This discussion led to finding out more about giraffes and what they eat – luckily not nursery children!** **Child 3:** "Wow! I see a human. That's a big giraffe! More humans! I'm on the ground but I'm not on the ground! The giraffe is looking at me and fooding (feeding). They look great!" The children loved using the headsets; feeling around them for the objects in the image and even exploring how to control them – one child worked out how to move the image by tilting his head, "It's like a steering wheel on a car!"



# Bringing History to Life

HISTORY Age 8 – 9



Simon Harris

LGfL



Ardleigh Green  
Junior School,  
London

## Learning Aims:

- To identify similarities and differences between ancient civilisations.
- To answer, create and evaluate historically-valid questions about ancient civilisations.

## CONTEXT

This session served as a springboard and initial introduction for a teaching sequence focused around historical sites of ancient civilisations. The objective was to make sure pupils were able to explore both the human and physical comparative points between various ancient civilisation and appreciate how they developed in different ways. We wanted the children to be able to compare, contrast and understand what an ancient civilisation looked like and how people of the era might have lived.

## PRACTICAL SESSION



### Ancient Maya

Taking turns, the children described what they saw and as a class we talked about how each civilisation was different in terms of technology, resources and sophistication. Using the focus tool to draw children's attention to specific areas of the VR experience allowed greater understanding in discussion. For instance, we were able to really interrogate the North Acropolis, Tikal, discussing specific parts of the structure, what it was used for and encouraging the children to hypothesise and predict whilst immersed within the experience. Being able to see what and where the children were viewing directed the discussion and led onto more structured, tailored and specific questions.

## IMPACT ON LEARNING

Having a virtual experience of the Mayan sites, the children had a better understanding of that civilisation and its place in history; it allowed them to see exactly what it was like to stand next to a Mayan temple. The experience provoked discussion amongst children of all abilities and allowed them to describe and discuss their experiences of what they saw and how they felt because of the 3D images and artefacts they experienced. This provided a first-hand, experiential approach to learning, which enabled a deeper understanding of the topic we were studying.



# Under the Sea

GEOGRAPHY Age 6 – 7



Anna  
O'Connor

LGfL

Beatrix Potter  
School, London

## Learning Aims:

- To be able to use adjectives to create a descriptive paragraph about what a character sees under the sea.

## CONTEXT

The children had completed a series of lessons on The Snail and the Whale by Julia Donaldson and had been focussing on using imaginative adjectives to describe a scene. Part of the unit of work was based around expanding their vocabulary and use of synonymous language to improve the coherency and fluency of their writing.

## PRACTICAL SESSION



### Underwater Playlist

At the end of a sequence of teaching The Snail and the Whale, our Year 2 students used the VR headsets to explore a range of underwater scenes from around the world. Through this experience the pupils were able to apply the adjectives they had generated in their previous lessons to a real life setting. The children used the headsets in pairs; partner A put the headset on and told partner B what they could see, partner B scribed what partner A said and then they swapped tasks. We were amazed by how much vocabulary the children were able to use and how they were able to build upon the language they had already acquired. Because the children had immersed themselves in the setting they were writing about, we found that they were more able to apply the new vocabulary they had acquired, for example "shimmering, glistening water", "majestic, large shark". A key feature in this lesson was being able to direct the children's attention to a specific point in the scene. This allowed children to focus on one object at a time and the teacher to direct the discussion.

## IMPACT ON LEARNING

The children then wrote a descriptive paragraph about their experience under the sea using the vocabulary they had curated after each session on the VR headsets. Class teachers commented that they were so impressed by the willingness of some reluctant writers to use challenging adjectives in their writing and felt that their class had a better understanding of their vocabulary because they were able to apply it to a real life situation. The richness of the writing was evident when it was compared to a similar piece of writing completed by the pupils without the use of the ClassVR headsets.



# Jacobites

HISTORY Age 9-10



Simon  
Luxford-Moore



ESMS Junior School,  
Scotland

## Learning Aims:

- To understand the key events of the Battle of Killiecrankie.
- To show a basic understanding of different types of historical evidence and bias.
- To understand how the Jacobites' defeat at Culloden impacted on Scottish life/culture.

## CONTEXT

Video and still footage was taken at Killiecrankie at the site at which Donald McBane allegedly leapt 5.5 metres across the raging River Garry whilst escaping his Jacobite pursuers. I also visited Culloden Battlefield and took footage of the Memorial Cairn, the Jacobite and Redcoat lines, the crofter's cottage which was commandeered as a field hospital for the British troops and the battlefield itself to highlight the terrain. Children read the story of the battle(s) and discussed the order of events.

## PRACTICAL SESSION

After reading and discussing the battles (individually) and gaining an understanding of events, the headsets were introduced to help reinforce key points such as the distance between the two lines of armies at Culloden and how the famous Highland Charge would need to be maintained for some distance over heather moorland before reaching the organised ranks of Redcoat artillery and infantry. Children were then invited to add more thoughts to their discussion points, mindmap and plans, based on experiencing the actual battlefield, including the sound of the wind over the moor. This deepened their appreciation for the stamina involved and, based on how tired the Jacobite troops were from their forced march through the night, how their charge was futile. This is also the case with the Soldier's Leap video footage. As an extension, groups were invited outside to see how far they could leap, as if pursued by soldiers, and then discuss the enormous difficulty in jumping 5.5 metres. The discussion on bias and early propaganda can be raised here and children can debate the feasibility of Donald McBane's efforts.

## IMPACT ON LEARNING

Children gain a far deeper understanding of the events having 'witnessed' the conditions first hand and seen the terrain which is not clear in textbooks. So too with the "Soldier's Leap" in which the actual distance is far more realistic with the headsets than from an account in a book, or a diagram. Seeing the river rushing by between the rocks adds a whole level of appreciation, or disbelief. Importantly, every child enjoyed the lesson because of the enhancement from the headsets and therefore will better understand and remember the learning outcomes.



# Print 3D Spinning Tops with AR

DESIGN & TECHNOLOGY Age 10-12



David  
Mann



Educational  
Services Director  
Avantis Education

## Learning Aims:

- To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose.
- To generate, develop, model and communicate their ideas through discussion, annotated sketches, prototypes and computer-aided design.

## CONTEXT

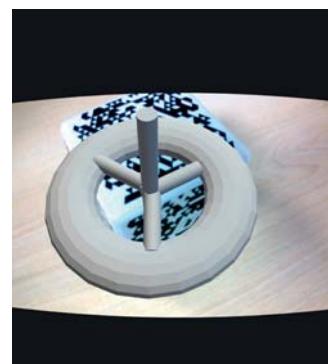
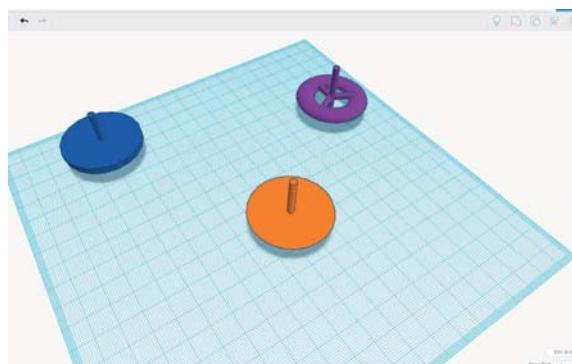
It's crucial that students have had the opportunity to explore some manufactured small spinning tops of various types, so they can begin making predictions about what makes them work effectively. Students also need experience using basic tools in a 3D modelling platform – we used Tinkercad. They will need to know how to: create and modify basic blocks, align blocks, and group them to create a single model.

## PRACTICAL SESSION

This teaching sequence takes place over a series of sessions; students need time to research, plan, design, review, make and evaluate their creations. Once students have had time to investigate existing designs and have narrowed down a few key shapes, they can begin modelling in CAD. Make sure they think carefully about the axis around which their top will spin – how will they make sure it stays upright? Check that students are using appropriate 3D shapes as building blocks, then aligning and grouping them accurately. Once they've done this, export their models as STL files and upload them directly to the Shared Cloud library in the ClassVR Portal. Send these to the headsets and give students an opportunity to view them from all angles using the ARCube. Use this as a chance to review and make any edits before the 3D printing phase. Finally, it's time to find out whose top can stay spinning the longest!

## IMPACT ON LEARNING

The ability to view and manipulate 3D designs in Augmented Reality before 3D printing adds a tactile dimension to the process of designing and making a real-world object. This is particularly helpful for students who find 3D visualisation difficult, and offers a valuable opportunity to discuss how designs can be optimised and improved. The satisfaction students gain from seeing a project like this through from start to finish is hard to underestimate, and it's a great way to integrate several different types of technology into the curriculum. All too often, incredible assets like 3D printers can lie unused in schools; providing scaffolded teaching sequences that use the technology for a purpose can help to unlock their potential.



# Cave Exploration

EARLY YEARS Age 5-6



Brittany  
Korstanje

**Kinnwood Central  
Public School, Forest,  
Ontario, Canada**

## Learning Aims:

- To use language to communicate thinking, reflect and solve problems.
- To ask questions for a variety of purposes.

## CONTEXT

Our students first practiced using the VR headsets to explore hot air balloons. This was sparked after reading the story "Not a Box". After heavily investigating what a hot air balloon looked like up close, and how it moves, our class ended up building a hot air balloon and encouraging school community members to come experience hot air balloon expeditions. The students learned lots of scientific language and how to operate the VR headsets. Next, they expressed interest in caves and requested that we look up various cave expeditions.

## PRACTICAL SESSION



### **Rocks and Caves Playlist**

We started by using 360 cave images, which provoked a wide variety of questioning, researching, discovering, creating, and writing. After exploring a cave with the headsets, our students had many questions: Why are there icicles hanging? How do caves form? How could animals live in the dark? When they went on the expedition a second time, they were excited to talk about stalactites, stalagmites and columns which they were seeing and eagerly searched for troglobites inside the cave. They recreated many of their own findings by building a large cave inside our classroom and creating paper and digital books. This extended to investigating water and ice caves, and researching animals that may live inside or on top of ice caves such as penguins. Students measured their height and compared it to these animals. Finally, they produced educational videos and provided QR codes to attach to the cave to add to this interactive experience when visitors arrived.

## IMPACT ON LEARNING

We approach learning concepts by providing fun, interactive, authentic and rich experiences based on the interests and needs of our students. We are educators who listen, ask open-ended questions, wonder, problem-solve and discover WITH our students. We believe VR technology was the perfect learning tool to extend our students' ideas and promote analytical thinking. ClassVR engaged and inspired every student in our learning community. It added a third dimension to their learning experience that they could connect with and become inspired by.



# Animals and Their Adaptations

SCIENCE Age 6-7



Hannah  
Davies



Head of Educational  
Services  
Avantis Education

## Learning Aims:

- To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.

## CONTEXT

This lesson works really well as part of a sequence where students have already begun to think about animals they're familiar with from their own environment, in small habitats nearby (e.g. a school pond or garden, or even a large tree). It's also helpful for students to have a basic understanding of simple food chains and the idea of predators and prey.

## PRACTICAL SESSION – Focus on working with a partner



For this session, you'll need printed AR Cubes; these are available to download from the ClassVR Portal. Make a playlist of the animals you'd like to send, or use the Animals 3D pre-made playlist. Decide which animal you'd like students to focus on first, then use the play button to send it to all the headsets simultaneously. This can work really well if students are in mixed-ability pairs, with one student using the headset and the other asking questions or recording ideas. It can also be really useful to have a scaffolded worksheet or prompts for students at this point, to focus their thinking. Students can hold the animal in their hand using the cube (don't forget, to make the model appear larger, swipe up on the panel at the right of the headset). Try prompting students to discuss these questions: What kind of habitat does this animal live in? How does this animal move around? What does it eat for food? Is it prey for any other animals?

## IMPACT ON LEARNING

The ability to closely examine creatures of all kinds from all angles – without any risk of harming them (or of being harmed, in the case of the lion!) – gives students a fantastic opportunity. They can spend as long as they need looking carefully at the features of each animal, dipping in and out of using the headset as they find out more about its habitat. A fantastic activity to follow up on this session could be for students to design their own imaginary creature that has adaptations suited to a given environment. You'll be amazed what they'll come up with!



# Natural Disaster Strikes!

GEOGRAPHY Age 7 – 11



Andrew  
Shelton



Educational  
Specialist  
Avantis Education

## Learning Aims:

- To understand the various types of natural disasters.
- To explain the impact specific natural disasters can have on human and physical geography.
- To explain how certain natural disasters occur.

## CONTEXT

This lesson works really well as part of a sequence where students are exploring what causes different disasters around the world; it enables teachers to expand their pupils' geographical vocabulary by honing their understanding of the Richter Scale, environmental changes and natural phenomenon. This practical session will also provide an insight into intricacies of hurricanes and volcanic activity.

## PRACTICAL SESSION – Focus on using geographical language



[Natural Disasters Playlist](#)



[Volcanoes Playlist](#)

Pre-load the Playlists onto the headsets and begin exploring the external structure of volcanoes. Dig deeper with questions about how you can tell active and dormant volcanoes apart; explore the difference between magma and lava and the general structure of volcanoes. To encourage higher order thinking, ask the children to consider why people might choose to live close to volcanoes and discuss the arguments for and against this. Move on to other natural disasters, comparing the impact they have to encourage the children to use analysis and evaluation. Unpick reasons as to why certain countries – some of which are densely populated – might be prone to such disasters, and why settlers hundreds of years ago still chose to live in these locations. Consider unpicking some of the science behind these events and understanding the intricacies of how water temperature, air pressure and tectonic activity can all contribute to these huge events.

## IMPACT ON LEARNING

Using immersive visualisations to show the scale, impact and type of damage different natural disasters can cause enables children to appreciate the colossal severity that each event can bring. Equally, by using the Playlists as a trigger for key questioning, the children can use the imagery to scaffold and support their answers. In turn, this will enable them to recall, apply and integrate more subject-specific and complex vocabulary into their responses and thus have a deeper understanding of the geographical and scientific specifics.



# The Future is History

## HISTORY & COMPUTING

Age 12 – 13

A ghetto is a part of a city in which members of a minority group live typically as a result of social, legal, or economic pressure.



Phil  
Nottingham



Daniel  
McKune



Joseph  
Cauldwell



### The Mosslands School, Merseyside

#### Learning Aims:

- To be able to understand and explain significant events of the Holocaust.
- To be able to design and create a 3D world.
- To use computational language to improve the usability of the 3D world.

#### CONTEXT

After meeting with several departments, I developed a cross-curricular project between history and computing. By using 'CoSpaces', alongside the ClassVR headsets, pupils were able to create their own virtual world. A piece of work by which they could demonstrate both their understanding of a historical concept, and the effective use of coding and design to create an engaging digital space. After initially creating worlds to explore the coding, the students were given their brief for the creation of a Virtual Holocaust Museum: a space that a visitor could explore, that not only conveyed the creator's understanding of the topic material but also engaged the viewer through effective use of CoSpaces.

#### PRACTICAL SESSION



#### CoSpaces

In pairs, the students built their worlds using CoSpaces. Over the course of six weeks, students had a range of both history and computing lessons to embed the depth of historical knowledge and learn the technicalities involved with the computer science aspect of creating a fully-functioning 3D world on CoSpaces. In week three, students learnt about the rise of Nazism and the final solution, as well as starting to create their space which reflected this series of chronological events. In week four, we introduced the headsets: this involved the students pulling together the various worlds they had created on CoSpaces to then test, trial and debug any coding or design errors. The final week involved sharing the spaces and providing peer feedback – evaluating both the technical computing elements and the historical accuracy of their content.

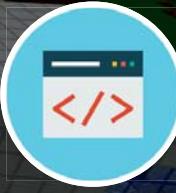
#### IMPACT ON LEARNING

The work the students produced was not only of an excellent standard but also of an incredible variety. Some students had chosen to create a traditional "gallery" with information adorning the walls of the space, while others had chosen to create enclosed spaces to simulate the conditions of the transport and accommodation of the camps involved in the events of the time period. After six weeks and approximately 8-10 hours working on the projects, the final session allowed pupils to explore each other's spaces. Many students commented on how students had effectively used the VR setting to create a sense of immersion, particularly long corridors and cramped train compartments.



# Minecraft Meets ClassVR

COMPUTING Age 7 – 11



Mark  
Savery



Emmanuel College,  
Queensland, Australia

## Learning Aims:

- To develop digital technology skills.
- To learn how to be a good citizen within a digital world.
- To communicate design ideas for their designed products, services and environments using modelling and simple drawings.

## CONTEXT

Students have been invited to join a Minecraft server hosted by the teacher to build individual homes from a central path. The students need to build in a manner which shows how to be a good digital citizen, recognising their footprint and that everything that happens in the world can be seen. From their individual builds, the students then work on collaborative building tasks to construct something for the village to use collectively (for example a park/playground, school, library, supermarket, church, farm/factory business).

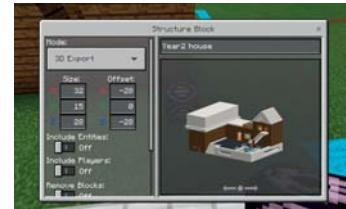
## PRACTICAL SESSION



Within Minecraft, students chose either a house or a building that they built collaboratively. Students used a Minecraft structure block to export their building as a 3D object (Structure blocks in Minecraft). Students opened Paint 3D and using the 3D shape and text tools, students wrote their name with a background rectangle as an embossed plaque on their collaborative build. When finished, students then exported their work from Paint 3D as a 3D object (\*.glb file type). These 3D objects were then loaded into the ClassVR Portal and uploaded to the ClassVR headsets and viewed by the whole class (including being able to explore the objects fully through the use of the AR Cubes).

## IMPACT ON LEARNING

Students were excited to be given building challenges in Minecraft as game-based learning, but they took a further pride and ownership of their creations when they were able to bring their work from the digital world into their physical environment and then manipulate it through the use of ClassVR. Students were able to share their work with other students and staff beyond the Minecraft environment and reflect on their designs, seeing every aspect fully as a 3D object, and collaboratively discussing how they may improve their designs in future builds.



# Out of this World Writing

ENGLISH Age 9-11



Anna  
Alford



Penybont Primary  
School, Bridgend,  
Wales

## Learning Aims:

- To select appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning.
- To describe settings, characters and atmosphere skilfully.

## CONTEXT

This session slotted into a teaching sequence for narrative writing, which linked well with our studies in Science (finding out about the Earth and space). Prior to the lesson, students had already used the ClassVR headsets in pairs. They had read a number of texts linked to space exploration, and identified key vocabulary from these texts. They had also been learning about how narrative structure can build suspense.

## PRACTICAL SESSION — Focus on speaking and listening in mixed-ability pairs

### Lunar Rover

Each student's strengths and weaknesses were complemented by working together. One partner wore the headset and described everything they could see on the moon's surface, while the other partner acted as a scribe. This approach is particularly helpful for those students who find writing difficult, as they could practise their verbal skills and really get creative with vocabulary, while their partner listened and noted down key words and ideas. Difficulty in recording ideas can really put some children off writing, creating a huge barrier to learning. The combination of an exciting stimulus, which they instinctively want to talk about great detail, and a partner to write down ideas is extremely powerful and managed to engage even our most reluctant writers.

## IMPACT ON LEARNING

The notes made during the partner work were invaluable when it came time for the writing session. Students wrote poetry from the perspective of an astronaut on the moon. Their Virtual Reality experience had given them all sorts of details about textures and colours; it allowed them to consider what objects or senses they might include and supported their ability to use more ambitious vocabulary in their writing. In combination with visualising the striking image they had experienced earlier and revisiting their peer-created notes, the final outcome on the quality of writing was really impressive.

**The Moon**

Suddenly, a rapid wave of cold, icy air rushed over me, as my space shuttle landed onto the powdery surface of the moon, creating a floating cloud of grey dust. Excitedly, I leapt out, amazed at the weightless feeling. The jagged ground crumbled beneath my feet. My dark shadow slithered silently behind my light, crunching footsteps. Not even the slightest form of life could be found on this bare and deserted landscape. As I curiously gazed around me, the moon was as blank as a plain sheet of paper. Bumpy, towering cliffs cast creepy shadows- pitch black like dark lumps of coal. Above me the jet black space sky was dotted with glistening stars, beaming brightly down at me, and the cold air hung still and silent. The unpleasant smell of powdery dust slowly reached my nose as I cautiously stepped over the rusty grey craters surrounding me. I felt oddly stiff in my thick, strong astronaut suit, but travelling around seemed as easy as blinking. All of a sudden I heard a creaking

**The Moon**

of tension washed over me as I slowly drifted out of my shuttle. A thick breath of icy, cold air unexpectedly hit me. Inquisitively, I peered round the enormous void and wondered what awaited me on this deserted land. One by one, almost screaming under my big, clunky leap, it surprised me suddenly, how weightless I was, I could hold me down! Nothing could be heard in the rumbling thumps of my light footsteps, echoing behind a whirlwind of grey dust, coiling around my body like a Dry rocks scattered randomly upon the bumpy, cold is unique place. Millions of golden, glimmering stars pop me, as if they were watching over me somehow, I gripped a handful of old dust, and I slipped through my r of soap. Craters dipped and dived though the ground, the ocean, swimming happily. Shining milky ways and stars in the pitch black scene engulfed me, quickly.

# Magnificent Desolation

PHYSICS Age 9 - 13



Phil Birchall  
Managing Director  
Inspyro



Managing  
Director  
Inspyro

## Learning Aims:

- To understand the difference between mass and weight.
- To understand the relationship between gravity and weight
- To calculate weight in newtons.

## CONTEXT

'Beautiful, beautiful, magnificent desolation' Buzz Aldrin's description of his impression of the lunar surface is not as iconic or as remembered as Neil Armstrong's 'one small step...' As a child, I watched the moon landings and was in awe of the astronauts, bouncing around the surface of the moon, seemingly effortlessly and with such grace (with the occasional mishap). That powerful experience made me question what was happening. Why were they walking like that? When we created our first lunar VR experience with full physics emulation, I couldn't wait to have my virtual moment on the moon! Now, let's figure out why things are so different on the lunar surface and how would it be to walk on the planets of our solar system!

## PRACTICAL SESSION

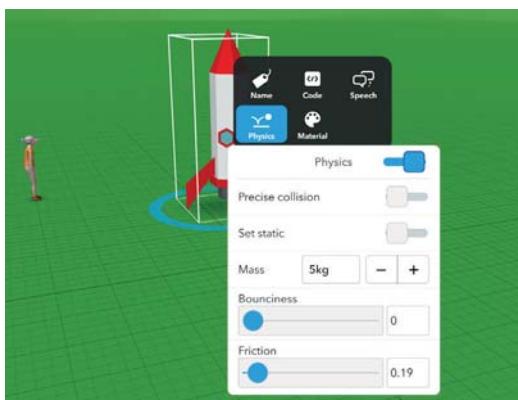
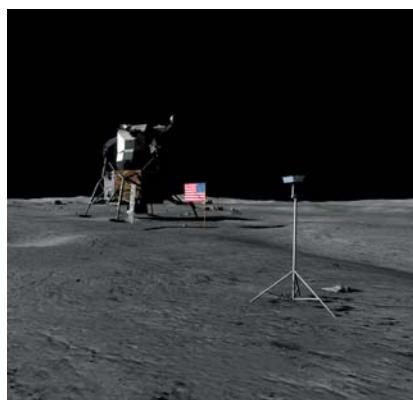


### CoSpaces Physics Engine

Allow students to virtually walk on the moon inside ClassVR Space Adventures or LunarVR. Talk to the students about how they moved around the surface and how different it was. Students should be made aware of the difference between weight and mass, as well as the relationship between gravity and weight. Weight is a force based on the effect of gravity on an object's mass. Weight is measured in newtons (N). The gravitational field strength of the Earth is 10 while the moon's is 1.6. Weight in newtons can be calculated by multiplying mass (in kg) by the gravitational field strength (N/kg). Students should research the gravitational field strength of all the planets in the solar system to discover their weight in newtons on each of them. Additionally, students can setup a CoSpaces simulator using the physics engine to alter mass and gravity, noting the effects on objects.

## IMPACT ON LEARNING

ClassVR allows pupils to pull on a virtual spacesuit and walk in the footsteps of Armstrong and Aldrin. That ability to experience something out of the ordinary has a powerful effect on learners. The excitement and pull of that experience can create a strong desire to learn more and to take that learning further. The ability to then create a virtual environment in CoSpaces and alter gravity and mass add a further immersive layer. Activities like this, a blend of approaches covering science (physics), computing and maths are held together by the shared experience of pupils who have just 'walked on the moon'.



# Virtual Reality Tour of Our School

CROSS-CURRICULAR Age 10 – 11



Susie  
Grant

LGfL



Brooklands  
Primary, London

## Learning Aims:

- To experiment with new technologies.
- To use the technology to aid writing.
- To take responsibility of the new technology and share with the younger students.
- To describe the setting.

## CONTEXT

The overall school topic was "This is me. This is us!" The class were asked what this title meant to them and we decided to make a virtual tour of the school, which tied in with our Design and Technology project. In DT, the class were making different sections of the school; each group were given responsibility of a specific section. The class were introduced to the ClassVR headsets, and they were used to aid a descriptive piece of writing. This piece of work sparked their interest around the headsets, so we wrote instructions on how to use them and even used ClassVR for a still life drawing.

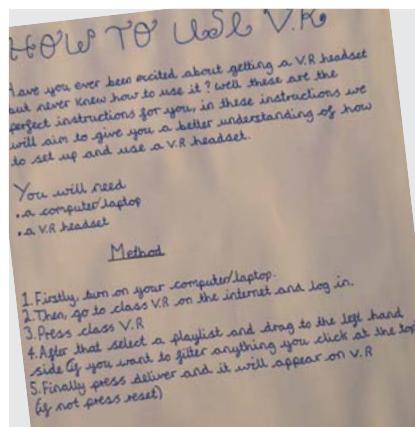
## PRACTICAL SESSION

Ricoh Theta

The class were shown the 360 camera, and the Theta app. As a class we took a picture and talked about the process. We discussed how we could make the picture better; for example, using the tripod not our hands for stability and greater focus, hiding so we weren't in the picture to give the image a professional look, and positioning the camera in a sensible part of the room so it captures all corners and sections in as much detail as possible. Each group had a go at taking the pictures and using the device to capture various parts of the school. We then came back together to share some of the images the children had captured and were able to share these images as a Playlist on the ClassVR Portal and headsets.

## IMPACT ON LEARNING

It was important for my class to see that all the small parts combined together made something which everyone was impressed by. The children loved seeing the VR map next to their models at the showcase. They really enjoyed showing their work to the other classes, which allowed every class to experience the school tour. They have really enjoyed using the headsets and their engagement in the task was increased because of the active nature of both image capture, but also appreciating their own collaborative VR tour.



# Creating in CoSpaces

COMPUTING Age 5-7



Sheela  
Yadav

LGfL



Grange Primary  
School, Suffolk

## Learning Aims:

- To create a 360 degree virtual space.
- To be able to use computational thinking, algorithms and debug code.

## CONTEXT

Students were exposed to Virtual Reality for the first time during their lesson on 'Space'. They had the experience of viewing the individual planets and the solar system as a whole in 3D. These experiences facilitated the students to better understand the concept of space. During these lessons one of the students curiously asked, "We are actually not on the moon but how, just using this headset, can we see and feel as if we are on the moon?" This led to explaining what programming is in computer language and made the student even more curious thinking that what he is seeing is actually possible to create.

## PRACTICAL SESSION

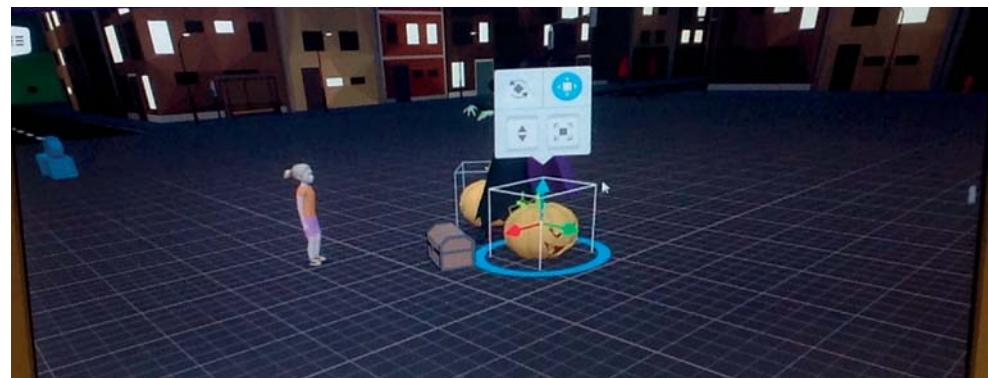


CoSpaces

I asked the children to go onto the CoSpaces gallery and explore some of the pre-published creations; in conjunction with this, I also copied some of the links onto the ClassVR Portal, so students could view the example creation via the ClassVR headsets. The students' ideas of creating space started to change and they wanted to create different worlds with different foci. I gave the VR Club support in getting themselves registered and then, after this point, they were left to explore all the tools they had and how to use them independently. Initially, they were tasked with coding their characters/objects to move and speak. This was challenging for some of them, as one student explained, "I want this witch to speak but it is not working!" students were introduced to the concept of 'debugging' and how important it is to check the steps they were taking to perform the desired action. At this point, I asked them to share their unfinished creation with me and I showed their work via a ClassVR headset; they explained why they chose that specific world, how they created it and what they wished to add further. Some students wanted to move two objects at the same time, e.g. a car and the sitting man, a boat and a man standing on it. This was set as their homework to find out how to get two algorithms running concurrently.

## IMPACT ON LEARNING

The students learnt how a 3D world can be created and then shared with their peers. They felt that they could be teleported to any world through their imagination and hard work, without having to even leave home/school. They learnt to solve complicated problems through reasoning and that if the sequence in coding is not correct, then the desired action is not accomplished. The use of the headsets provided a platform for the children to publish their work on and enjoy experiencing other children's work too.



# Polar Exploration

SCIENCE & COMPUTING Age 9 – 11



Emma  
Hardy

LGfL



Exning Primary  
School, Suffolk

## Learning Aims:

- To understand how creatures have adapted to their habitats.
- To be able to explain why certain features are crucial to surviving in challenging environments.

## CONTEXT

We start every topic with a 'sparkling start' to engage the children; for our 'Explorers' topic, we used the ClassVR headsets to look at different environments to immerse the children in such a way that they could really explore and compare each setting. The children followed the journey of the Nimrod expedition, using the interactive map and using the links to the actual photographs, artefacts and diary entries. Equally, with the Terra Nova expedition story, we were able to captivate their children's interest in comparing Robert Scott's survival kit with that seen by a modern day explorer.

## PRACTICAL SESSION



### Gentoo Penguins in Antarctica

Linking to our science 'Evolution' topic, we explored the Gentoo penguins project video; this enabled the children to see the penguins in their natural environment and analyse their surroundings, behaviour and habitat. We challenged the children to identify features of the penguins and how these support their habitation in such a cold and tough environment. In addition, we then used CoSpaces to create our own Antarctic world – focusing on the environment features which would be appropriate for this setting and using the coding options to incorporate computing into the science-led topic. The children then created their own creature and added it to the Antarctic setting which they had earlier created. The children were then able to use CoSpaces' share feature and provided collaborative feedback to each other about the science and computing within their projects by viewing and experiencing their worlds and creatures through the ClassVR headsets.

## IMPACT ON LEARNING

These resources brought the explorations and expeditions to life for the children and removed many layers of abstraction from their learning to give them a more tangible grasp of these huge, mammoth events. Further to this, the headsets supported children in moving their learning forward by giving them the access to viewing and unpicking environments which they and their peers had created. Their level of enthusiasm, engagement and resilience in this topic was greatly increased and we were very impressed with the children's retention and ability to apply their understanding across the board. The high levels of cognitive engagement and achievement during the topic would not have been possible without these amazing new opportunities provided by the digital technologies.



# The Science of Flight

PHYSICS Age 11 - 13



**Red Arrows**  
Royal Air Force

## Learning Aims:

- To identify the forces affecting an aeroplane.
- To describe forces using force diagrams.
- To create Virtual Reality experiences based on prior learning.

## CONTEXT

A big aim of the Royal Air Force Aerobatic Team is to inspire the next generation - potential future pilots, engineers and technicians. The Red Arrows is one of the world's premier display teams and has provided great footage from inside the cockpit to ClassVR. This offers a fantastic opportunity to bring the science of flight to life. This lesson will require a moderate level of digital literacy and a core understanding of CoSpaces – the ability to create an environment, add objects and code them using block coding or Javascript will be required to get the most from the session.

## PRACTICAL SESSION



[Red Arrows Video](#)



[CoSpaces](#)

This session explores the key forces that are involved in flight, specifically when looking at the Hawk jet used by the Red Arrows. To begin, use the ClassVR portal to play the video and discuss with students how they think the plane is able to stay in the air. This is an assessment opportunity for prior knowledge and a great time to discuss the forces in play on a plane in flight – thrust, drag, lift and weight. After explaining and demonstrating these forces, introduce students to the 3D model of the jet and ask them to identify key features of the vehicle, as well as any specific design aspects which make them aerodynamic and fit for purpose.

Afterwards, introduce the students to the CoSpaces website and instruct them to create and code a working model of a Hawk jet with accurate labels to demonstrate their understanding. Students with a more advanced understanding of coding can create an interactive model that changes based on the forces acting upon it using more advanced variables from either the CoBlocks or Javascript options. Finally, use the CoSpaces app within the ClassVR portal to explore the students' interactive models and collectively debug the code that was used.

## IMPACT ON LEARNING

Using a tool like CoSpaces is an incredible way to help embed learning into a students' long-term memory – by experiencing the content directly through Virtual Reality footage and then creating new content to explain key concepts. In doing so, students are using advanced cognitive recall techniques that give a genuine, first-hand memory to draw upon when they need to either remember a specific topic or build upon their knowledge later in the year.



# Space

SCIENCE Age 9 – 10



Graham  
Bowman



Educational Technology  
Consultant  
Tablet Academy

## Learning Aims:

- To gain an understanding of the relationship between Earth, the Moon, the Sun and other planets in the Solar System including their size and properties.
- To gain an understanding of the varying gravitational forces in place and how these relate to the Solar System and Milky Way.

## CONTEXT

This lesson is intended as a hook at the beginning of the topic so no prior knowledge is assumed, although most students will have a basic understanding of the solar system and gravity. This lesson would fit in well to a scheme of work which focuses on space exploration, understanding the solar system and/or comparing size, speed and shapes (such as a geometry focus in mathematics).

## PRACTICAL SESSION



### Space Playlist

The session starts inside a servicing facility at NASA's Kennedy Space Center. Students are asked to look around and think about where they might be, why everyone is wearing special clothing and what the large silver object might be. Next, students watch a 360 video of a rocket launch which gives a great idea of the size of the rocket and the amount of thrust required to leave Earth's gravitational pull. Following the launch, the class then arrives at the International Space Station. Students are asked to think about what difficulties astronauts would face and tasked with finding as many modifications made to support the crew for life in Space. Next, we go out into deep space and look back to see an amazing view of the Earth, the Moon and the Sun in the distance. Here we discuss the relative sizes of the objects and how that mass affects the gravitational pull. At this point, the class watches a truly inspirational and emotional video called One Strange Rock, in which we find out more about what it's like to live onboard the International Space Station travelling 17,000 mph around the Earth. Finally, we explore images of the Solar System and Milky Way to get an idea of how small and insignificant the Earth really is.

## IMPACT ON LEARNING

Students were massively engaged by this experience. As well as finding out information from the session, they go away with even more questions than answers! This puts students in a great place for the follow-up lessons exploring the topic in more detail.



# Seasonal Change

SCIENCE Age 5 – 6



Iona Bullard

LGfL

**Minet Infant School, London**

## Learning Aims:

- To describe the features of Summer.

## CONTEXT

Children had been learning about seasonal change; we focused on the characteristics and features of Autumn, Winter and Spring to provide scaffolding and background about the other seasons, thinking about how they each feel, smell and look.

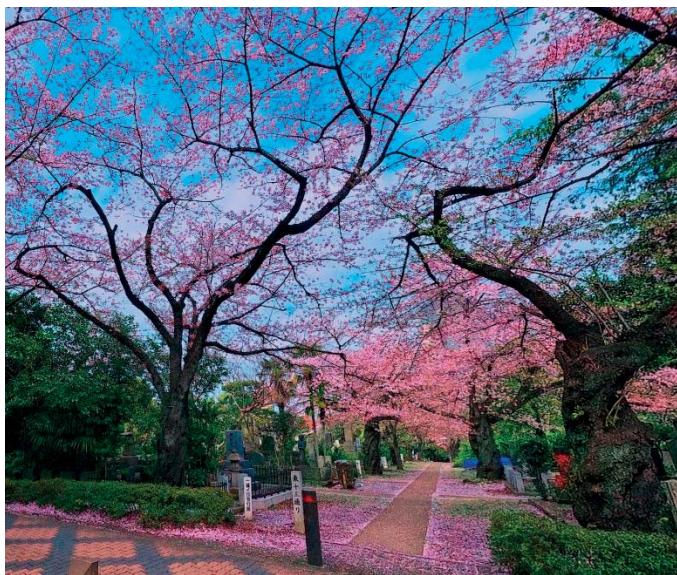
## PRACTICAL SESSION

### Summer

In talking partners, children were asked to think of all the words they could think of about Summer; they were challenged to think of as many words as they could. I scribed the children's comments and encouraged a discussion about the season; the children then went to their tables to explore and experience summer images from the seasonal Playlist. They were asked to write sentences about what they could see, focusing on their senses and use of vivid, powerful language. We then undertook a word association game for the season of summer and I gave them a challenge to think of more than 15 words, having now experienced the Virtual Reality. I then scribed their new and improved ideas on the whiteboard.

## IMPACT ON LEARNING

The children seemed to really enjoy using the ClassVR headsets. Our school is 98% EAL and the language they gained from using ClassVR was great to see. As many of them have never seen summer like the one in the picture, it enabled a multisensory and visualised approach to enriching their learning. Further, it encouraged them to work in a team, by sharing the ClassVR headsets and using dialogue to explain the wonderful sights they were seeing. They also showed responsibility in how they handled the equipment and were eager to do the writing activity afterwards.



# Comprehension Skills

ENGLISH Age 9 - 11



Muriel  
Thompson

LGfL



Brecknock  
Primary School,  
London

## Learning Aims:

- To be able to use inferential thinking to support understanding and comprehension.

## CONTEXT

A key focus within our school is to ensure children are given the right tools to become successful readers and are able to fully comprehend high-level texts independently. Inference was a clear domain children struggled with across the school when analysing assessment data.

## PRACTICAL SESSION

While strategies such as use of a dictionary, morphology and context can be taught, we needed to stimulate the knowledge already there and build on it. At the start of our 'War and Peace' topic, we worked with a group of children and gave them a poetry comprehension about a topic they knew little of – World War One. We then integrated the World War One trenches experience to provide a visually-immersive and audio-enhanced learning opportunity, so the children had virtually explored, first-hand, the conditions and living arrangements of that era. This really supported the work we went on to do based around the text 'War Horse'. We spent a lesson focused on figurative writing and understanding the deeper meanings of text, asking key questions, such as "Why does the poet choose to look up?" and "How did the poet/character feel?" This led on nicely to a number of VR-based lessons we undertook, which explored: questioning, clarifying, making connections and inferential thinking skills – all of which underpinned our drive to improve reading and comprehension skills.

## IMPACT ON LEARNING

Giving children an ownership of discovering word meanings would allow them to be able to use their growing understanding of vocabulary to make accurate and valid inferences. Some of the pupils said, "The VR experience helped me imagine the scene" and "I didn't realise how much could be going on in a trench or battlefield." Having experienced the trenches and understood the conditions, one pupil recalled that the poet chose to look up in one of the poems studied to "get away from the guns and dead bodies and see his family in heaven." As such, the use of ClassVR stimulated talk, which is vital for children to articulate themselves and communicate their thinking.



# The Human Body

BIOLOGY Age 10 - 11



James  
Tromans



Heathfield  
Primary School,  
Birmingham

## Learning Aims:

- To have an awareness of the different parts of the human body.

## CONTEXT

This was the children's first lesson in their Science topic – The Human Body. The idea was to immerse them in learning which would hook their interest in how various parts of the body functioned and worked. The medium term plan was make sure the children understood exactly why certain parts of the body were designed in such a way and how the shape, size and structure of different aspects of the human body contributed to a healthy human being.

## PRACTICAL SESSION – Focus on exploring the different parts of the human body

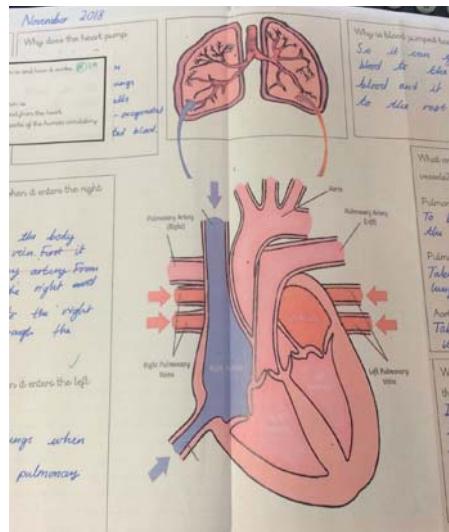
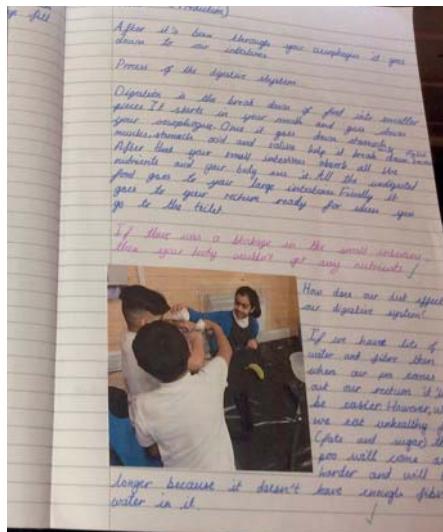
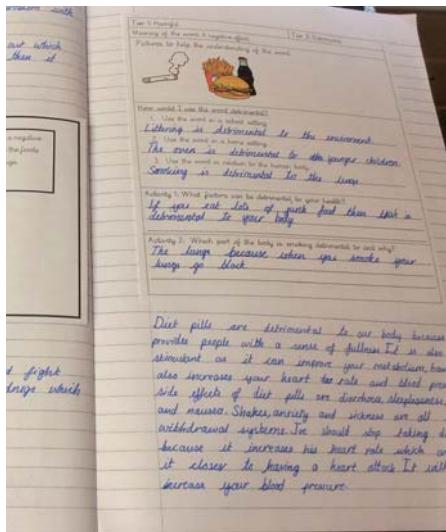


### Human Anatomy Playlist

During the session, the children were given the opportunity to take a 360-degree virtual tour of the human body using the ClassVR headsets. We used the Human Anatomy Playlist to explore different sections of the body and provide a detailed view of body parts for the pupils to interrogate and ask questions about. Following the experience, children wrote down as many body parts, facts, questions and key words that they could, based on what they had experienced. For example, we looked at how the skull was shaped and structured to provide protection to the brain; we also looked in more detail at how the skeleton was formed to provide protection to the vital organs within the torso.

## IMPACT ON LEARNING

This VR experience formed the starting point to their topic. It generated questioning, which allowed the teacher to tailor future lessons to meet the children's needs. It exposed students to language that they might not have experienced normally and gave the children the chance to explore the human body in a safe and purposeful way. Following this lesson, the children then explored the heart in more detail using the ClassVR headsets, looked inside a beating heart and explored its job within the body. This was the perfect starting point for the heart dissection that took place the lesson afterwards, as children already had an understanding of the heart's role, and what they should expect to see inside it.





# “THE ONLY SOURCE OF KNOWLEDGE IS EXPERIENCE”

Albert Einstein

To learn more about how VR & AR can increase engagement and improve outcomes for your students, get in touch with us today to arrange a free consultation with our education specialists.