FROM 360° CONTENT TO CLASSROOM PROJECTS

HANDBOOK FOR TEACHERS, ACCOMPANYING THE ECO360 MOOC: 360° VIDEO CREATION AND CLASSROOM USE

Eco360

Immersive sustainability and STEAM education through Eco360 interactive learning environments

Eco360

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INTRODUCTION

THE ECO360 PROJECT

Eco360 – Immersive Sustainability and STEAM Education through Eco360 Interactive Learning Environments (Project Reference: 2024-1-DE03-KA220-SCH-000256179) is a European Project co-funded by the Erasmus+ Programme of the European Union. It brings together a diverse consortium of partners from Germany, Greece, Slovenia, and Serbia with a shared goal: **to support educators in making sustainability education more engaging, accessible, and future-oriented.**

Eco360 aims to **reduce the gap between sustainability and digital innovation** by **integrating 360-degree immersive video technology into classroom teaching**.

This project promotes the **use of immersive tools** not just as a trend and innovation, but as a **pedagogical method that enhances participation, critical thinking, and digital literacy**. In doing so, Eco360 contributes to both the European Green Deal and the Digital Education Action Plan by promoting green and digital transitions in education.

PURPOSE OF THIS HANDBOOK

BACKGROUND AND RATIONALE

This Handbook was created to help teachers bring sustainability topics to life using 360° video and immersive, project-based STEM learning. Research shows that while many teachers are still unfamiliar with 360° video and often feel they lack the technical skills to use it, this technology holds significant potential to enrich teaching and promote student motivation and engagement. In environmental and sustainability education in particular, 360° video has been found to improve learning outcomes, foster a greater sense of presence, and strengthen the connection between students and real-world challenges compared to traditional learning materials.

These modules support teachers in discovering, understanding, and applying 360° video technology in their classrooms. They are connected to the online MOOC available on the project website and can be used either alongside the course or as a standalone reference. Through step-by-step guidance, examples, and practical exercises, the course aims to make immersive media approachable and useful for everyday teaching, especially in STEM and project-based learning.

WHAT TO EXPECT?

MOOC is designed to bridge the gap between research and classroom practice.

Here's how the five modules are structured:

- Module 1 provides an orientation to the platform and introduces digital content basics.
- Module 2 explores why 360° matters, offering practical classroom examples, research insights, and tips for finding and using existing content.
- Module 3 focuses on the "how" of 360° video—covering vocabulary, equipment, filming strategies, and classroom-friendly production workflows.
- Module 4 shifts to project-based learning (PBL), outlining its core principles and showing how it connects with STEM and scientific practices.
- Finally, Module 5 brings everything together, presenting guidelines and examples for integrating 360° video into STEM and PBL, and supporting teachers in designing their own units.

Each content module (Modules 2–5) follows a consistent structure: it begins with a brief introduction, continues with a main section offering practical, classroom-ready guidance for teachers' everyday work, and concludes with a practical activity. This final activity helps consolidate the key takeaways while also providing additional ideas and inspiration for immediate use in the classroom.

TO ACESS THE PLATFORM WITH INTEGRATED MODULES, PLEASE FOLLOW THIS LINK OR QR-CODE. THE MOOC LEARNING CONTENT IS FREE TO USE, WITH NO NEED TO GIVE US ANY INFORMATION OR SIGN-IN.

https://eco-360.eu/mooc/

LINKS TO REACH SPECIFIC MODULES YOU CAN FIND IN THE BEGINNING OF EACH MODULE.

THE MOOC PROVIDED ON THE PLATFORM OFFERS YOU THE CERTIFICATION. ALL DETAILS ARE AVAILABLE ON THE PLATFORM.

MODULE 1

ORIENTATION AND DIGITAL CONTENT BASICS

INTRODUCTION

Module 1 is a short orientation that helps you start the Eco360 MOOC confidently and return to it whenever you need a quick reminder of how the course works. It introduces the course pathway, explains how to view and navigate 360° videos on different devices, clarifies how quizzes and certification work, and offers simple troubleshooting tips for common viewing or comfort issues.

In our Eco360 Handbook version, we've included the most essential parts of Module 1 to help you get started quickly. The topics included are “Getting started routine,” “How to watch and navigate 360° videos on different devices,” and a few tips on troubleshooting.

GETTING STARTED - YOUR COURSE ROUTINE

Eco360 is designed for teachers; each module is short and practical, designed in a way that teachers do not need any prior knowledge about it. The interest and curiosity to learn more about the topic is all you need to begin.

We recommend that you read the learning goals, engage with the content, and pause for a brief reflection.

As you go, save any templates or checklists you want to reuse, or ideas you found interesting to try out in your classroom. Many teachers find it useful to keep one running note file for the course and capture just one idea to try and one question to revisit after each module.

If you are new to the topic, follow the modules in order (1–5). If you already have experience, you can treat the MOOC as a toolbox and jump to what you need.

HOW TO WATCH AND NAVIGATE 360° VIDEOS ON DIFFERENT DEVICES

Eco360 uses 360° videos, which let you look around while the video plays.

On a computer, you usually click and drag inside the video to change your viewpoint. Full screen and higher resolution settings can improve clarity.

On a phone or tablet, you can typically swipe to look around, and in some cases move the device to change the view.

With a VR headset (optional), open the video link through the headset browser or a supported app. For first-time use, start seated and keep viewing sessions short.

In classroom settings, comfort and safety matter. Begin with brief clips, choose steady footage, include breaks, and encourage students to stop immediately if they feel dizzy or unwell. If headsets are used, set up a clear “safe zone” and always offer alternatives (e.g., viewing on a laptop) so everyone can participate.

TROUBLESHOOTING: QUICK FIXES

If you cannot look around in the video, first check that it is a true 360° video, then try the correct control method (drag on desktop, swipe on mobile).

If the video is blurry, switch to a higher resolution, view in full screen, and allow time to buffer.

If learners feel uncomfortable, shorten the session, use steady clips, add breaks, and offer non-headset options.

If a link does not load, try a different browser or device and check whether your school network blocks the platform.

In the next module, you will explore why 360° media can be especially effective for sustainability learning and how to select classroom-ready content.

MODULE 2

WHY 360°? PRACTICAL CLASSROOM EXAMPLES AND FINDING CONTENT

INTRODUCTION

As an immersive medium, 360° video enables students to explore complex topics in a more interactive and emotionally engaging manner, particularly in areas such as sustainability education, where connecting with real-world challenges is crucial.

360° video lets students enter real or simulated environments—turning climate reefs, rainforests, or lab set-ups into firsthand experiences that boost curiosity and engagement. In this module, you'll see why 360° often outperforms flat video for motivation and inquiry, with concise research highlights and classroom-ready examples. We'll clarify where 360° sits within digital content (alongside text, images, audio, and interactive media) and what that means for learning design. You'll get practical tips for finding and judging quality 360° resources (pedagogical fit, technical quality, accessibility, and licensing).

Finally, we'll show simple ways to integrate 360° into STEM and project-based learning so students move from passive viewing to guided exploration, discussion, and follow-up tasks.

FUNDAMENTALS OF DIGITAL CONTENT

Any educational resource that is available in digital format and can be accessed via computers, tablets, smartphones, or virtual platforms is referred to as digital content. In addition to text and videos, this also includes infographics, digital games, podcasts, simulations, and immersive media like 360° and Virtual Reality (VR).

Digital content offers more flexibility and engagement than printed materials because it's frequently interactive, flexible, and simple to share. Teachers can use multimedia to encourage deeper understanding, quickly update content, and adapt materials to meet the needs of various students.
It's important to remember that digital content is more than just a digital textbook. When designed with pedagogy in mind, it supports differentiated instruction, accessibility, and student-centred learning, whether in the classroom or online.

The following categories can be used to classify digital content:

TEXT-BASED CONTENT

Articles, PDFs, blog posts, digital textbooks, and transcriptions. These support literacy, close reading, and critical thinking.

IMAGES AND INFOGRAPHICS:

Help clarify complex ideas, reinforce learning, and support visual learners.

AUDIO CONTENT

Podcasts and audiobooks offer flexible learning, supporting language development, listening skills, and reflection.

VIDEO

Standard 2D videos are ideal for demonstrations, explanations, and flipped classrooms.

INTERACTIVE CONTENT

Games, quizzes, and simulations allow learners to apply knowledge, receive feedback, and engage actively.

IMMERSIVE CONTENT

VR, AR, and 360° video immerse students in environments that support exploration, empathy, and experiential learning.

Among immersive tools, 360° video stands out for placing students in real or simulated environments. Instead of watching passively, students can explore, observe, and make choices based on what they see. This sense of presence enhances engagement, emotional connection, and memory. For teachers, it facilitates inquiry-based learning, cross-curricular instruction, and provides virtual access to remote or otherwise unreachable locations, especially when access to the real world is restricted or limited.

KEY RESEARCH: 360° VS. FLAT VIDEO IN SCIENCE LEARNING

A growing body of empirical research has compared the educational impact of 360° video and traditional flat video in classroom contexts, particularly within science education. These studies help educators make informed decisions about when and why to integrate immersive video.

Christopoulos et al. (2023) compared stereoscopic 360° VR and flat video in a high school biology course. While learning outcomes were similar across both groups, students using 360° VR reported higher levels of motivation, attention, satisfaction, and perceived relevance. The study suggests that although 360° video may not boost test scores, it can enhance student engagement and enrich the overall learning experience in science education.

Wu et al. (2021) conducted a quasi-experimental study with elementary students comparing spherical video-based virtual reality (SVVR) and traditional flat video in science inquiry tasks. Students in the SVVR group showed significantly better problem-solving performance, especially those with lower initial motivation. The immersive experience also improved engagement and contextual understanding. The study suggests that 360° video can effectively support both learning outcomes and motivation in inquiry-based science education, particularly for less motivated learners.

Parong and Mayer (2018) examined the effects of flat video, 360° video, and fully immersive VR on university students learning about the circulatory system. While all groups performed similarly on knowledge tests, students in the 360° and VR conditions reported higher engagement and enjoyment. The study concludes that immersive video enhances emotional involvement but does not necessarily improve learning unless combined with instructional support or scaffolding.

PEDAGOGICAL BENEFITS OF VIRTUAL FIELD TRIPS

One of the most impactful uses of 360° video is its ability to simulate field trips to remote or otherwise inaccessible locations. These immersive experiences can transport students to the Amazon rainforest, the Great Barrier Reef, a wind farm or even the surface of Mars without ever leaving the classroom. This powerful sense of presence activates a range of pedagogical benefits, supporting more engaging, inclusive, and meaningful learning.

EXPERIENTIAL LEARNING

360° video places students inside real-world environments, allowing them to explore complex systems, like ecosystems or weather patterns, in context. This supports experiential learning, in which understanding develops through direct observation and interaction, as well as through learning by doing and connecting knowledge to lived experience.

MULTISENSORY ENGAGEMENT

Unlike traditional media, immersive video activates multiple senses (visual, auditory, and spatial) enhancing cognitive processing and memory. When students observe a rainforest canopy, hear insects buzzing, and scan the forest floor, they connect abstract concepts with sensory input. This is especially effective in sustainability education, where empathy for ecosystems and non-human life plays a key role in shaping values.

INQUIRY-BASED LEARNING

Immersive scenes naturally spark curiosity. As students explore, they form questions, notice details, and draw connections, mirroring how scientists conduct fieldwork. Teachers can guide this process through structured tasks that encourage observation, analysis, and reflection. For example, students might identify signs of environmental change, compare habitats, or develop their own scientific questions.

INCLUSIVITY AND ACCESSIBILITY

360° video provides a more equitable alternative to traditional field trips, which not all students can afford or physically access. Virtual field trips allow all learners, regardless of ability, location, or background, to explore places that might otherwise remain out of reach. This promotes broader access to meaningful, high-quality learning experiences.

LANGUAGE AND COMMUNICATION DEVELOPMENT

Immersive environments are also powerful tools for language development. After a virtual visit to a coral reef or rainforest, students can describe what they experienced, write reflections, or create digital narratives. These activities build expressive and academic language, especially when learners are encouraged to articulate their thoughts and interpret their surroundings.

4. TIPS FOR SELECTING AND SOURCING QUALITY FREE 360° VIDEOS

Knowing how and where to locate excellent, free educational resources is beneficial as you start implementing 360° video in your classroom. While 360° video offers rich learning opportunities, its success depends on careful selection and thoughtful integration. Not all immersive content is suitable for every classroom, so it's important to align it with your goals, your learners, and your teaching context. The following key points can guide you:

Preview for Purpose and Pedagogy

Always watch the full video before presenting it to your students. Think about whether it helps you reach your lesson objectives, connects with the curriculum, and is appropriate for the age of your students. A visually engaging video that lacks educational value may entertain, but it won't deepen understanding. Look for content that introduces new perspectives, complements existing knowledge, or puts abstract ideas in a real-world context.

Check Technical Quality and Clarity

High-definition quality is essential for immersive video. Since students are encouraged to look closely at things, low-resolution or unstable footage can disrupt learning. Aim for videos in 1080p or higher resolution, with smooth camera movements and clear audio. These elements help maintain immersion and prevent distraction during group or individual viewing.

Prioritise Accessibility and Inclusion

Choose videos that offer closed captions or text overlays. These features not only support students with hearing impairments but are also valuable for English language learners and younger students. Clear narration and appropriate pacing further improve accessibility. When possible, choose videos that provide subtitles or multiple language options to ensure all students can interact with the content in a meaningful way.

Check the Source and Licensing

Use content from credible educational sources like NASA, National Geographic, or university and museum websites. These resources typically offer accurate, high-quality learning content and materials. Always verify the licensing terms—prefer Creative Commons or content clearly marked for educational use. Unless specifically allowed, refrain from downloading or editing content.

Think Beyond the Viewing

Watching a 360° video should be part of a broader learning process. Prepare students before the experience by introducing important vocabulary or setting a purpose for viewing. During the video, pause at key points to encourage observation or discussion. After that, reinforce learning with follow-up tasks such as mini research projects, presentations, reflective writing, and drawing. This approach transforms the experience from passive viewing into active, student-centred engagement.

Consider Technical Logistics and Classroom Management

To prevent interruptions, test all devices and internet connections in advance. Make sure students understand how to swipe, drag, or tilt the screen to navigate the video if they are using tablets, phones, or headsets. For shared screen viewings, guide students' attention by controlling the direction of the view. In larger classes, consider grouping or pairing students to support collaboration and peer learning. Do not forget to consider the appropriate classroom setting organisation, for students to have enough space to use VR headsets safely.

To support the effective use of 360° video in the classroom, educators can draw on a range of high-quality, curriculum-aligned sources that offer immersive content tailored to diverse subject areas and learning needs.

YouTube: Provides wide range of educational 360° content. To find high-quality videos, search using topic-specific keywords like “360 coral reef” or “Amazon rainforest 360”, and include terms such as “VR” or “virtual reality” to refine your results. Use filters to check video quality and license type.

National Geographic 360 (YouTube): Offers a rich collection of high-quality 360° videos exploring ecosystems, wildlife, indigenous cultures, and climate-related topics around the world. These immersive experiences support teaching in geography, environmental science, and global citizenship, encouraging students to develop curiosity about the natural world and an awareness of environmental and cultural diversity.

NASA 360 & VR Resources: Offers a wide selection of immersive educational experiences, including virtual tours of Mars, the International Space Station, and major space missions. These resources are ideal for supporting lessons in physics, astronomy, and environmental and space science, helping students grasp complex scientific ideas through visual and experiential learning.

Google Arts & Culture: Offers immersive 360° tours of museums, heritage sites, and natural landmarks. Ideal for cross-curricular teaching in science, art, history, and cultural studies, this platform allows students to explore collections and spaces they might not otherwise encounter, encouraging visual literacy and cultural engagement.

Discovery Education VR: Provides a variety of virtual field trips and immersive learning experiences aligned with educational standards, including environmental exploration and cultural understanding. Educator guides and classroom resources are also available for structured integration.

These platforms give teachers an easy way to start using immersive instruction. By selecting quality content and aligning it with learning goals, 360° video can become a powerful tool for engaging, inclusive, and meaningful classroom experiences.

COPYRIGHT BASICS AND CREATIVE COMMONS FOR EDUCATORS

Understanding fundamental copyright principles is crucial when utilising digital content in the classroom, including audio, video, and images. Something is not necessarily free to use just because it is freely available online. Since many resources are copyright-protected, it is illegal to share, copy, or alter them without the creator's consent and permission. Using such materials without consent can breach intellectual property laws and go against responsible educational practices.

In the European Union, copyright is guided by common directives, but individual countries may have specific laws and exceptions, especially for educational use-so it's important to consult national guidelines where applicable.

Copyright applies to original works, including written texts, photographs, music, films, and digital media. It grants creators the exclusive right to control how their work is used, shared, or altered. For example, a video posted on YouTube may be publicly viewable, but that does not automatically give you the right to download, edit, or show it in your classroom, unless the licensing terms explicitly allow it.

Creative Commons is a licensing system that allows creators to permit others to use their work under specific conditions. These licenses are clearly marked and easy to follow. For educators, they offer a reliable way to find and use resources legally and ethically.

Some commonly used Creative Commons licenses include:

CC BY – Allows you to use, share, and adapt the content, as long as you give appropriate credit to the creator.

CC BY-NC – Allows reuse and adaptation for non-commercial purposes only, with proper credit to the creator.

CC BY-SA – Allows reuse and modification, as long as you credit the creator and share your work under the same license terms.

Many trusted educational, scientific, and cultural groups have content that is licensed under Creative Commons. Teachers not only protect themselves and their schools from copyright infringement by choosing and using materials that are properly licensed, but they also show their students how to be responsible digital citizens. Showing how to respect intellectual property helps students learn how to use media ethically and how valuable creative work is.

PRACTICAL EXERCISE

FOR EDUCATORS

Exploring and Planning with 360° Video

This hands-on activity will help you reflect on what you've learnt in this module by asking you to explore a 360° video and consider how you might integrate it in your teaching in a meaningful way. The goal is not only to find good and suitable content, but also to reflect on its educational value and how it aligns with your curriculum and pedagogical aims.

Step 1: Search and Select

Visit a trusted platform such as YouTube, National Geographic, or NASA. Use keywords that combine your subject area with terms like “360 video”, “360 VR”, or “virtual field trip”. For example: “360 video rainforest”, “360 volcano geography”, or “360 VR renewable energy”. Choose a video that allows for immersive exploration (e.g. moving the screen or device to look around). As you browse, consider whether the video is visually clear, age-appropriate, and relevant to your learning goals.

Step 2: Reflect on Pedagogical Potential

After previewing the video, reflect on how it could support learning in your classroom. Use the following guiding questions:

- Curriculum connection: What subject area(s) or learning objectives does the video support?
- Pedagogical value: What skills, concepts, or competencies could it enhance (e.g. observation, empathy, critical thinking, collaboration)?
- Student engagement: What aspects of the video do you think students will find interesting, surprising, or challenging?

3 Step 3: Outline a Lesson Integration

Sketch a short plan showing how you would incorporate this video into a lesson, including three phases:

- Before viewing: What background knowledge or key vocabulary do students need? How will you introduce the topic and set a purpose for watching?
- During viewing: Will you guide students with prompts, pauses, or specific focus areas? How will you support interaction through note-taking, small-group discussion, or paired exploration?
- After viewing: What follow-up activity will extend learning? You could assign creative writing, drawing, research tasks, reflection journals, or short presentations to reinforce and deepen understanding.

Optional Extension

Share your selected video and lesson outline with a colleague or in a professional learning community. Reflect together on how immersive media like 360° video can enrich classroom learning and promote inclusive, place-based, or inquiry-driven approaches.

MODULE 3

WHAT IS 360° AND RECOMMENDATIONS

INTRODUCTION

Eco360 helps teachers bring sustainability topics to life by placing learners “inside” real places and processes. Module 2 explained why immersive media supports curiosity, discussion, and inquiry when it is used with clear learning goals and simple scaffolds (e.g., prompts, pauses, and follow-ups). Building directly on that foundation, this module focuses on the minimum you need to know to use 360° video confidently in school: what it is, what to buy (or borrow), a three-step workflow that works on phones or laptops, and a few practical safety and comfort habits. The emphasis is practical. You will find straightforward choices, a short comparison of affordable cameras, and an easy classroom exercise to consolidate your skills.

ABOUT 360° VIDEO AND BASIC VOCABULARY FOR TEACHERS

A 360° camera records everything around it at once. When students play the video on a phone, tablet, computer, or VR headset, they can look around by swiping the screen or moving the device. That ability to choose where to look—left, right, up, down—turns a short clip into an exploratory space rather than a fixed viewpoint.

You may come across two terms:

MONOSCOPIC 360°

It gives a convincing "you are there" feeling on any screen and is the simplest to capture and edit.

STEREOSCOPIC 360°

It adds a stronger sense of depth in headsets, but it demands more careful filming and editing time.

For school projects, monoscopic is the sensible default.

Next, you can find a list that helps clarify a few basic terms for teachers to confidently navigate the world of immersive media.

- **Virtual Reality (VR).**

A computer-generated environment that can be fully immersive. 360° video is a non-interactive form of VR.

- **360° Video (Spherical Video).**

A video that captures every direction at once, allowing viewers to look around by swiping, dragging, or moving a device or headset.

- **Monoscopic vs. stereoscopic.**

“Mono” is one all-around picture and works on any screen; “stereo” is two pictures (one per eye) for headset depth. Start with mono.

- **Stitching.**

The automatic blending of the two lens views into a seamless sphere—handled by the app.

- **Equirectangular.**

The flat “map” of your sphere that editors and platforms expect. You don’t need to manage this manually.

- **Chapters.**

Simple timestamps in YouTube’s description that guide attention toward key ideas; they are a powerful teaching scaffold.

- **Reframing.**

Optional: turning a 360° clip into a normal, flat video with pans/zooms chosen after the fact.

- **Field of View (FOV).**

The visible area in the scene. In a 360° video, viewers can change their FOV by navigating the video.

- **Gyroscope Functionality.**

Allows mobile device movement to control viewing direction, enhancing immersion without extra equipment.

EQUIPMENT - WHAT TO BUY (OR BORROW)

You can start with one small camera, a slim stick-tripod, and optionally a simple mic/recorder. The models below are widely available in Europe and play nicely with free apps.

Manufacturers often advertise “5.6K” or “5.7K.” You can read that as “high enough to look clear on phones and headsets.” In practice, where you place the camera, how steadily you record, and how long you let a moment play matter more than tiny differences in those numbers.

In the next table, you can find the key specifications and practical notes for three popular 360° cameras, recommended by our expert partner.

Camera	Insta360 X5	GoPro MAX 360 (2025)	Ricoh THETA SC2
What it's like to use	Friendly, bright touchscreen; quick pairing.	Tough and very steady	Minimal controls; good for simple videos
Max 360 video	8K	5.6K	4K
Waterproofing	15 m out of the box	5 m	Case recommended for heavy rain
Typical EU price (in year 2025)	from ≈ €520	≈ €260	≈ €350
Notes	We recommend, by far the quickest and easiest editing software	Cheapest option	Obsolete, can be found quite cheaply

360° cameras use two ultra-wide lenses. Where their views overlap, the software “stitches” the image and hides a thin, aligned stick, so the camera seems to float. Choose a 2-in-1 invisible selfie-stick + mini-tripod and keep it straight under the camera for the cleanest results (Insta360 explains this effect clearly).

Built-in microphones are fine for almost all lessons. If you want richer “sound all around”, a small recorder like the Zoom H3-VR is a teacher-friendly add-on: one button, one device, and exportable spatial audio you can pair with your video. It is widely used in education and is easy to operate.

The Insta360 X5 supports an inexpensive USB-C mic adapter (useful if you prefer a lapel mic). GoPro MAX relies on GoPro’s own mic adapter or recording separately. Our recommendation is to simply keep the built-in audio and place the camera close to the speakers.

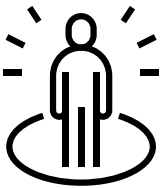
Within the Eco360 project, we use the Insta360 X5 because it reliably delivers the feeling of “being there” with very little setup. The camera is waterproof to 15 m (IPX8), so a rainy day or a splash by the stream won’t end your field session. For true underwater sequences, add the Invisible Dive Case to avoid stitching artefacts (water bends light differently; the case corrects for that).

Battery life is generous for school use. With the standard battery (2400 mAh), you can expect about 84 minutes of continuous recording at a typical classroom quality setting (8K/30) —far more than you need for a set of short, purposeful clips.

For field safety and care, keep lens caps on during transit to protect the easily scratched, curved lenses. Weigh down the tripod in windy conditions. Remove lens guards before going in or near water, as noted in the manual. Use the dedicated dive case for underwater shooting to ensure clean stitching.

Overall, a simple setup, careful handling, and sensible audio choices are enough to produce immersive, reliable 360° recordings for field-based teaching with minimal technical overhead.

FILMING THAT SUPPORTS LEARNING (COMFORT, SAFETY, AND PRIVACY)



COMFORT SHOULD COME FIRST WHEN FILMING FOR IMMERSIVE LEARNING.

Learners new to immersive media sometimes feel uneasy when the camera moves quickly. The cure is simple and reliable: favour stationary shots, keep the horizon level, and keep viewings short with breaks, especially the first time. If using a headset, start seated. These are standard comfort guidelines in educational and industry safety notes.

FIELD SAFETY AND CLASSROOM PRIVACY ARE EQUALLY IMPORTANT.

Place the stick-tripod where it cannot be knocked over; weigh the base in wind and keep a clear “no-touch” zone. Follow your institution’s consent policy, avoid filming identifiable bystanders where not allowed, and share via Unlisted links when the piece is for your class only.

WEATHER CONDITIONS AND BATTERY MANAGEMENT SHOULD BE PLANNED IN ADVANCE.

Your X5 is fine in rain (IPX8 to 15 m)—dry the lenses before opening any doors, and avoid swapping batteries in heavy weather. With the 2400 mAh battery, plan many short takes rather than one long roll; you'll conserve power and make editing easier.

THE SIMPLEST CLASSROOM PIPELINE WITH X5 (PHONE OR TABLET ONLY)

Before editing, decide what kind of video you want to create. Freely explorable videos require a true 360° workflow; for 2D or reframed videos, the mobile app is usually sufficient. The Insta360 app is suitable for filming, transferring, previewing, and creating simple 2D/reframed videos. For interactive 360° videos, editing and export should be done, for example, with the free desktop app "Insta360 Studio."

Step 1 — Prepare (stitching is automatic).

Open the clip in the Insta360 app. It recognizes X5 files and stitches them for you. If needed, transfer files from the camera to your phone in the app's Album; the X5 user manual and support pages show the exact steps and, if you ever import sample files, explain the IMPORT folder method on iPhone/Mac.

Step 2 — Tidy (trim + horizon + a gentle polish).

Trim off the "walk up to the camera" moments at the start and end. Tap Horizon Level if the scene feels tilted. Nudge brightness or contrast only if you need to. Keep edits light and let each moment breathe for learners to explore (10–20 s per scene is enough). These one-tap fixes are exactly what the app is built for; you don't need advanced features to teach well. (For teachers who prefer a computer, Insta360 Studio—free for Mac/Windows—remains a simple fallback.)

Step 3 — Export and share the right format.

For a true 360° classroom link, export with Insta360 Studio or another verified 360 export path, upload to YouTube as Unlisted, and check that YouTube shows the drag, swipe, or gyro controls before sharing. If you only need a flat or reframed clip, export it from the mobile app and share it through your usual school-approved channel.

Tools you can rely on (free)

Mobile (recommended for flat or reframed clips): Insta360 app: Capture, stitch, trim, apply Horizon Level, and export a normal flat video. This is simple, fast, and classroom-friendly when students do not need to look around inside the scene.

Desktop (recommended for true 360 video): Insta360 Studio: Free for Mac/Windows. Use this when the final result must stay interactive for YouTube, laptops, tablets, phones, or VR headsets. After uploading, check that 360 controls appear before sharing the link.

For true 360° viewing with broad device support, Unlisted YouTube remains the easiest path once you have exported a real 360 file. For flat or reframed clips, use your usual school-approved sharing option.

With this straightforward capture-to-share workflow, teachers can focus on learning design rather than technical complexity—setting the stage for a few simple filming habits that further improve results and help avoid common pitfalls.

TEACHER-FRIENDLY FILMING HABITS, COMMON PITFALLS—AND EASY FIXES

A few simple filming habits can make a noticeable difference to comfort and clarity when using 360° video in the classroom. Although 360° filming can sound technical, in practice, it comes down to a handful of easy habits and quick fixes that noticeably improve classroom usability and learning experience.

EYE-LEVEL PLACEMENT

Put the camera roughly at standing eye height. Plant the tripod and step back; things very close to the lenses will look distorted.

LET MOMENTS PLAY

Record 30–60-second clips so students have time to look around and notice the evidence you want them to see.

SOUND TELLS A STORY.

If sound matters, move the camera closer to the speaker, or add the optional mic nearby. You will hear more, and so will your students.

THE STICK IS VISIBLE.
Keep it directly under the camera and straight; that puts it in the stitch overlap and it vanishes.

THE HORIZON IS TILTED.
Tap Horizon Level in the app and re-export.

YOUTUBE DOESN'T SHOW THE 360 CONTROLS.
Make sure you exported as a 360 video (not a reframed flat video). Upload again as Unlisted and give YouTube a few minutes to finish processing.

STUDENTS FELT DIZZY.
Use stationary shots, shorten sessions, and start seated for headset viewing; these comfort practices are widely recommended.

Start with small steps. A single, steady 60-second scene—paired with a clear question—can spark close observation and evidence-based discussion. Keep sessions short, use Unlisted links, and add chapters as signposts. As summarised in Module 2, immersive viewing is most effective when it is guided with light scaffolds and purposeful prompts. Used thoughtfully, immersive video naturally integrates into everyday teaching, enhancing observation and discussion without disrupting established classroom routines.

PRACTICAL EXERCISE

FOR EDUCATORS

Edit 360° Video Clip On Your Own

Goal: produce a private, classroom-ready video and share one reflective comment about your biggest challenge. Use the Insta360 mobile app for a quick flat or reframed clip; use Insta360 Studio for the final export if your result must remain an interactive 360° video.

PRACTICAL EXERCISE FOR EDUCATORS

Edit 360° Video Clip On Your Own

1 Step 1: Get the clip.

Download the Eco360 X5 sample clip provided with this MOOC (we supply a short native file). If you prefer, record your own 30–60 s school-site clip (e.g., near a rain gutter, bike racks, or garden beds).

2 Step 2: Bring it into the Insta360 app.

Open the app and connect the X5 to transfer your clip or import the sample file (follow the manual's "File Transfer" steps; on iPhone/Mac the IMPORT folder method is documented).

3 Step 3: Tidy.

Trim start/end; apply Horizon Level if needed; keep edits light.

Step 4: Annotate and upload.

Export as a 360 video and upload to YouTube as Unlisted. In the description, add three chapter timestamps that match your learning points (e.g., 00:00 Riverbank, 00:15 Erosion, 00:40 Planting). Copy the link.

Step 5: Reflect (one sentence).

Post your Unlisted link plus one reflective comment on your biggest hurdle (e.g., “I needed to slow down camera moves,” or “Chapters helped structure the discussion”). This turns a technical step into a teaching insight—the approach emphasized in Module 2.

MODULE 4

PROJECT-BASED LEARNING FOUNDATIONS

INTRODUCTION

Project-Based Learning (PBL) is a teaching method in which students actively explore real-world problems and challenges to acquire deeper knowledge (PBLWorks, n.d.-a). Unlike a traditional classroom, where projects come after the content is taught, PBL uses the project itself as the primary mode of instruction. Learning occurs throughout the process as students explore a complex question or solve a real problem. (Markula & Aksela, 2022).

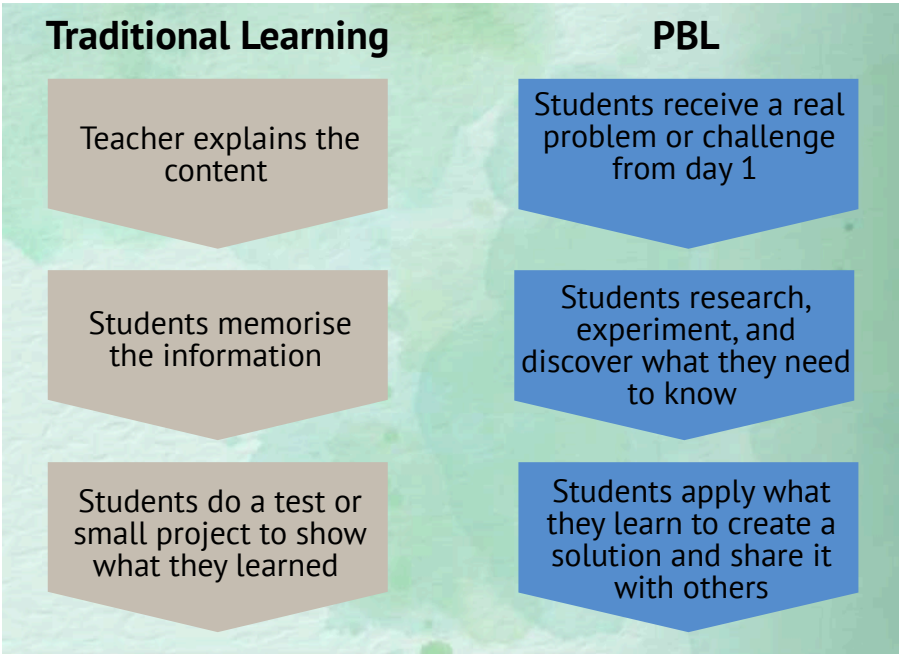
In traditional teaching, a “project” typically means an activity added at the end of a unit, such as a poster, model or presentation to summarise the content previously taught. While these tasks can be creative, they often do not require sustained inquiry or deeper engagement. This is where PBL differs. In PBL, the project is not an extra activity but the process through which learning unfolds. Instead of coming after the content is taught, the “project” itself becomes the primary mode of instruction. This way, learning occurs throughout the process as students explore a complex question or solve a real problem (Markula & Aksela, 2022).

Lecture-based classroom vs PBL group work

PBL is inquiry-driven, student-centred, and extended over time.

Instead of doing a short task that shows what they learned at the end of the a unit, students investigate, analyse, test ideas, and apply knowledge throughout the unit itself. This approach supports the development of critical thinking, collaboration, and communication skills, and allows students to demonstrate their learning through authentic products or public presentations (Krajcik & Shin, 2014). Traditional themed projects (e.g., constructing a volcano model) may reinforce content but often lack depth and long-term engagement (Bell, 2010).

Research shows that students perceive clear benefits when PBL is implemented, including increases in motivation, teamwork, and problem-solving abilities (Rahardi et al., 2023). To use PBL effectively, however, teachers must understand what distinguishes authentic project-based learning from end-of-unit tasks, and which core elements are needed to support meaningful inquiry.



Learning flow in traditional teaching vs project-based learning

This module continues by outlining the core elements of effective PBL, how it aligns with scientific and engineering practices, common challenges teachers face when using it, and a final activity to help you begin shaping a project of your own.

CORE ELEMENTS OF EFFECTIVE PROJECT-BASED LEARNING

High-quality project-based learning is not simply about assigning a project at the end of a unit. It is a structured teaching approach built around a few essential elements. According to PBLWorks (n.d., -b), these include:

- A challenging problem or question that drives the unit;
- Sustained inquiry through research, testing, and revision;
- Student voice and choice in how the work is approached;
- Authenticity through real-world tasks or audiences;
- Regular feedback and revision;
- A public product shared beyond the classroom.

Students share their work with the school community and receive feedback.

These elements work together to turn content into meaningful work. As Aldabbus (2018) notes, authentic PBL is defined by more than just project output; it requires active student involvement, real-world application, and teacher facilitation throughout the process. For teachers new to PBL, it can be helpful to compare this approach with more traditional classroom projects. The table in the next page highlights the differences.

Comparing a Traditional Themed Project and Project-Based Learning (PBL Works, n.d.-b)

Aspect	Themed "Project" Approach (Traditional)	The PBL Approach
Role in Unit	Added at the end of a unit; follows a direct instruction	Forms the core of the unit; teaching and learning take place through the project
Purpose	Demonstrates previously taught content	Students learn content through the project
Student Autonomy	Teacher controls all aspects; outcomes are similar across students	Students make meaningful choices; outcomes vary
Inquiry Depth	Basic fact-finding; often done individually or at home	Ongoing inquiry with research, collaboration, and iteration in class

Aspect	Themed "Project" Approach (Traditional)	The PBL Approach
Real-World Connection	Classroom-focused; audience is usually just the teacher	Linked to real issues, real data, or real audiences outside school
Feedback & Revision	Usually submitted once, at the end of the project, with little revision or opportunity to improve	Includes cycles of feedback, reflection, and improvement throughout the project.
Final Outcome	Displayed or graded within class; little relevance beyond school	Shared publicly; quality and real-world relevance emphasised

In summary, effective PBL learning begins with a meaningful problem and uses the project as the primary method of instruction. Pupils do more than complete a task; they investigate, analyse, revise, and present work that has purpose. This approach shifts classroom learning from routine assignments to work that develops deeper understanding and lasting skills.

PBL AND SCIENTIFIC & ENGINEERING PRACTICES

One of the key strengths of PBL is its close alignment with how scientists and engineers actually work. Modern science education emphasises not only the learning of facts but also participation in the practices that build and apply knowledge. For example, the Next Generation Science Standards define core scientific and engineering practices such as asking questions, designing investigations, analysing data, and using evidence to explain findings (NGSS Lead States, 2013). These practices occur naturally within PBL.

Students engage in authentic scientific and engineering practices during a PBL investigation.

Rather than reading about science, students in a well-structured PBL unit engage in scientific thinking and behaviour.

They ask their own questions, test ideas, interpret data, and communicate their findings.

For example, a project might ask: How can we improve access to clean drinking water or reduce our school's energy use? In this case, students investigate the issue, explore possible solutions, gather data, consult relevant sources or experts, and revise their ideas based on evidence. This mirrors the scientific method and the engineering design cycle.

By tackling real challenges through open-ended inquiry, students build a deeper understanding of content and often show increased interest in STEM subjects when they see the relevance and impact of their work.

Students investigate a real environmental problem through field data collection.

PBL connects academic content with real-world practices. It supports curriculum standards while helping students develop skills and habits that are essential both within science and across all areas of learning.

CHALLENGES TEACHERS MIGHT FACE AND HOW TO OVERCOME THEM

PBL offers many benefits, but it also presents challenges, especially for teachers implementing it for the first time. Research and teacher reports have identified several frequent challenges in shifting to a project-based approach (Aldabbus, 2018; Bell, 2010).

Time Constraints

Teachers often worry that projects will take too long and prevent coverage of required content. This can be addressed by starting small, by replacing part of a unit with a short project lasting one to two weeks. Integrating multiple standards into one project can also save time in the long run. Using timelines and checkpoints helps keep students on track and ensures that key content is addressed steadily throughout the process (PBLWorks, n.d.-b).

Assessment Complexity

PBL assessment can seem difficult, particularly when balancing group work with individual performance. Rubrics are essential: they should clearly outline expectations for both process (e.g. collaboration, inquiry) and product (e.g. accuracy, clarity). Combine group assessments with individual reflections or short oral check-ins to verify personal understanding. Formative assessment, such as journal entries or draft reviews, allows for feedback and improvement over time (Bell, 2010).

Classroom Management

Project work often involves movement, discussion, and collaboration, which may appear chaotic at first. Teachers can manage this by setting clear group norms and assigning roles (e.g. facilitator) to distribute responsibility. Regular check-ins, progress logs, or daily summaries help maintain structure. Over time, students adapt and become more self-directed, making the classroom more focused and purposeful.

Scepticism from Parents or Colleagues

Some stakeholders may question the rigour of PBL or see it as apposed to traditional teaching. Sharing student work and evidence-based research can help change perceptions. For instance, PBL has been shown to increase motivation and critical thinking (Bell, 2010). Public presentations and family involvement can also build support. Starting with a small, successful pilot project allows teachers to demonstrate clear outcomes aligned with curriculum goals.

Curriculum and Resource Constraints

In rigid or test-focused systems, PBL can seem difficult to implement. However, projects can be framed around existing content. For example, a topic like "simple machines" can become a project in which students design devices to solve everyday problems. PBL activities can be developed with basic classroom materials or community resources. The key is aligning projects with learning outcomes and focusing on meaningful tasks, not elaborate tools (PBLWorks, n.d.-a).

With planning, flexibility, and support, these challenges can be managed. Many teachers find that the initial adjustments are well worth the long-term benefits of increased engagement and deeper learning.

PRACTICAL EXAMPLES OF PBL IN DIFFERENT SUBJECTS

PBL can be applied across different subjects which allows students to engage deeply with content through real-world tasks. The following examples provide a brief overview of how project-based learning can be applied in mathematics, language arts, and history/drama. They are not full lesson plans, but rather outlines that help visualise what a PBL unit might look like.

Example 1 – Designing a School Garden (Mathematics)

Students build a scaled garden model to test layout and planting choices.

Driving Question: How can we design a school garden that stays within a budget of €500?

Overview: In this project, students act as planners tasked with designing a functional school garden. They measure available space, research costs for materials (soil, seeds, tools), and create a budget that fits the €500 limit. They also draw scaled layouts and make design decisions based on space, cost, and purpose (e.g., vegetable beds, pollinator plants, seating areas).

Inquiry and Student Work: Students calculate area and perimeter, compare prices, and prioritise features. Mini-lessons can address geometry, multiplication, and budgeting. Each group proposes a unique design, justifying their choices with both numbers and reasoning.

Final Product: Students present their garden proposals to teachers or school staff, explaining their design, calculations, and spending choices. Even if not built, they gain a sense of using maths in a real-world challenge.

Example 2 – Student-Podcast Series (Language Arts)

Students record and edit their own podcast episodes as part of a storytelling.

Driving Question: How can we use storytelling to explore a theme or issue we care about?

Overview: Students work in pairs or small teams to create podcast episodes on topics that matter to them—such as local history, social issues, music, or fiction. They research, write scripts, and record audio using basic tech tools.

Inquiry and Student Work: Students learn to interview, structure a narrative, and edit for clarity. The teacher supports them with mini-lessons on writing techniques, hooks, tone, and audience awareness. They give and receive peer feedback to refine their drafts.

Final Product: Each episode becomes part of a class podcast series, which can be shared at a school event or online. The format gives students creative control while building research, writing, and speaking skills.

Example 3 – Bringing History to Life (History/Drama)

Students reenact a historical moment, sharing what they learned through performance.

Driving Question: How can we, as storytellers, bring a moment in history to life for our school community?

Overview: In this project, students explore a historical period or event by creating short dramatic scenes. The goal is to show what life was like at the time, using research, writing, and performance. Topics can match the curriculum—for example, daily life in Ancient Rome or the signing of the Magna Carta.

Inquiry and Student Work: In groups, students choose a specific situation or character to focus on. They research primary and secondary sources to understand the setting, culture, and events of the time. They then write a short script based on what they've learned. The teacher supports with lessons on historical inquiry and script writing. Students rehearse and refine their scenes, using costumes or simple props when available.

Final Product: The class hosts a “History Alive” event, where each group performs for an audience of classmates, teachers, or parents. After the scenes, students stay in role for a short Q&A, explaining the facts behind their performance. The public aspect motivates accuracy and creativity and helps even quieter students engage more.

In all three examples, students improve their work step by step: they plan, make a first version, get feedback, and then make it better. Learning through these repeated improvements is a key part of PBL. This way, these projects demonstrate that PBL can be integrated into any subject area, offering authentic learning experiences that promote engagement, content mastery, and transferable skills.

PRACTICAL EXERCISE

FOR EDUCATORS

Preparing a PBL Lesson Plan

The goal of this activity is outline a possible PBL lesson plan adapted to a specific teaching context. It does not need to be a full lesson plan but rather a concise, one-page draft to help the teacher organise key elements. As suggested by Aldabbus (2018), early-stage planning, even in simplified form, helps teachers clarify their goals and structure activities that align with core PBL principles. The outline can later be expanded or refined for classroom implementation.

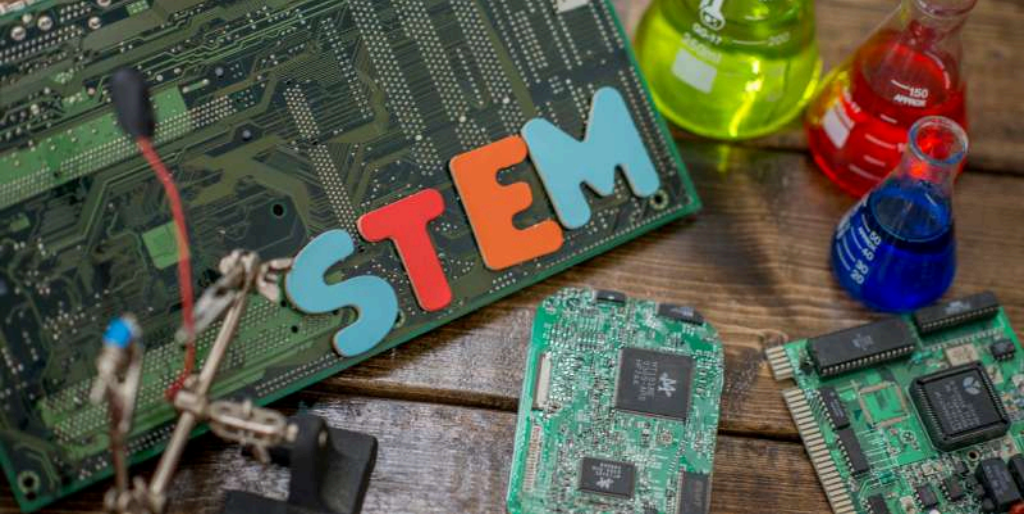
Step 1: Plan your lesson

Open a word document or grab a sheet of paper and use the fields below to draft a simple outline of your project idea:

- Title of the Project
- Topic or Subject Focus: The school subject(s) and key transversal skills involved.
- Driving Question: An open-ended, challenging question that guides the project.
- Learning Objectives: What students should understand and be able to do by the end of the project.
- Inquiry Activities: The main research or exploratory tasks (e.g. interviews, fieldwork, data collection).
- Final Public Product: What students will create or present, and who the intended audience is.
- Materials and Resources Needed: Tools, space, technology, or external support required.
- Estimated Timeline: An outline of how the project might be distributed across class periods.

Step 2: Think about additional elements

A complete lesson plan may incorporate additional elements, such as curriculum alignment, detailed session breakdowns, or optional multimedia components like 360° video production. These aspects can be addressed at a later stage, once the foundation is in place. Becoming comfortable with this basic planning structure is a helpful first step toward that more detailed work.



MODULE 5

INTEGRATING 360° CONTENT INTO STEM AND PROJECT-BASED LEARNING

INTRODUCTION

In sustainability and STEM education, PBL allows students to tackle authentic environmental challenges, from climate change to community conservation, through inquiry and creation. 360-degree immersive media – including 360° videos, virtual reality (VR) field trips, and interactive virtual tours – is emerging as a powerful tool to enrich PBL. These technologies can transport students to remote ecosystems or industrial sites, provide virtual field experiences, and even enable students to create their own immersive content. Research indicates that such immersive experiences can increase student engagement, understanding, and even empathy toward environmental issues.

In the previous modules, we explored both the basics of 360° video and an introduction to the PBL approach. Building on the PBL foundations from Module 4, this module shows how 360° media can enrich each stage of the project cycle—from sparking inquiry to presenting solutions.

SCIENTIFICALLY RESEARCH-BASED GUIDELINES FOR INTEGRATING 360° MEDIA INTO PBL

Designing an effective PBL experience with 360° media requires careful instructional planning. 360° videos have been shown to benefit multiple outcomes – content mastery, student attitudes, immersion, and sense of presence – when designed thoughtfully (Evens et. al, 2023).

SCIENTIFIC ARTICLE-BASED RESEARCH OFFERS YOU SOME KEY DESIGN GUIDELINES.

Practical strategies for integrating VR with PBL can be proposed by three approaches: VR as an engaging introduction (e.g., a virtual field trip to spark interest in an environmental issue), VR for investigating complex concepts (e.g., manipulating virtual models or visualising abstract STEM ideas in 3D), and VR for student content creation. In general, summarised from the study by Evens et al. (2023), with a comprehensive literature review of 26 studies on 360° video in education, 360° content in studies tended to fall into three categories – environment explorations, situational simulations, and demonstrations. Additionally, they can include interactive “hotspots” or other add-ons, or not.

If you think in advance about how to seamlessly tie them into the lesson plan to perform the most effective learning action, you can add the 360 videos actually, anywhere into your lesson plan. Wai Ying et al. (2024) developed a socio-scientific Inquiry-based learning module for environmental citizenship that embeds 360° VR experiences at each phase of learning. Their sustainable environmental education module was structured using Merrill's First Principles of Instruction (activation of prior knowledge, demonstration, application, integration).

Effective 360° lesson design often keeps videos short (5–15 minutes), uses VR headsets for immersion (used by each student individually), and focuses the experience on clear learning objectives (Evens et. al, 2023).

THE STARTING POINT FOR INTEGRATING IMMERSIVE MEDIA INTO PBL IS USING 360° VIDEO TO PROVIDE SITUATED CONTEXT FOR A PROBLEM, PROMPT EXPLORATION WITH GUIDED QUESTIONS OR HOTSPOTS, AND ALLOW STUDENTS TO CONTROL THEIR VIEWPOINT FOR GREATER ENGAGEMENT.

EXAMPLES FROM PRACTICE

Example 1 – Sustainable environmental education module

The sustainable environmental education module spans five units (water pollution, air pollution, waste, climate change, etc.).

In practice, 360° videos were used in the activation phase to immerse students in polluted rivers and cities, making abstract issues concrete. In the demonstration phase, 360° videos showed best- and worst-case scenarios of environmental practices, supplemented by 2D videos (e.g. a "Beat Plastic Pollution" video) to illustrate processes. During the application phase, students engaged in problem-solving (e.g. comparing 360° views of urban vs. wilderness environments to discuss climate change impacts) and even conducted at-home Audits to collect data.

Finally, in the integration phase, students created their own content – using a platform like CoSpaces Edu – to propose solutions, effectively becoming producers of immersive media. This structured approach provides a framework for integrating 360° content at each stage of a PBL unit, ensuring the technology is tied to inquiry and action.

Example 2 – Students as 360° Content Creators

In the project “I Deserve a Street” from Spain, instead of only consuming VR content, this project had students produce their own interactive 360° experiences as the culmination of a PBL activity.

Teams of students across different schools researched notable women from history and made a case to rename a street in their town after their chosen figure. To enhance their persuasive presentations, they introduced a 360° interactive format: students captured 360° images of the street and embedded multimedia (voice narration, photos, text) to create a virtual tour for city officials. This approach turned a traditional research project into an immersive, student-driven experience.

To support the process, each school received a kit with an iPad loaded with content-creation apps and a 360 camera, plus a mobile Wi-Fi router to enable fieldwork on-site. Tutorial videos and an organisational ThingLink account were provided so that even young students (primary and secondary level) could author their VR content step by step.

The results were impressive: students created "wonderfully engaging and immersive content" that served as a virtual city guide and persuasive exhibit, as an "immersive canvas" that places their research into context. Beyond the tangible product, the project developed a wide array of skills. Students practised research and writing (for the persuasive element), used technology for recording and editing, and honed soft skills through teamwork. This kind of immersive PBL was observed as an ideal way to "combine and develop a multitude of skills essential for young people in the 21st century," including creative communication, critical thinking, and collaboration. This case study exemplifies how students can be empowered as creators of 360° media, yielding high engagement and deeper learning. It also underscores the importance of providing access to tools and support.

Source: Thinglink blog

Example 3 – Environmental Science Meets Art

Students from three courses (Immersive Video Production, 3D Animation, and Sculpture) collaborated to highlight trees in the campus arboretum as part of a sustainable infrastructure initiative.

The project tasked each group with contributing via their discipline: the video production class captured 360° videos of selected tree sites, the animation class created 3D digital sculptures of the trees, integrated these into the 360° footage, and the sculpture class developed performative sequences (perhaps environmental-themed performances or installations) in response to the trees. All these elements were combined into a geolocative augmented reality (AR) experience—effectively a campus "tree tour" that people could experience on-site. The final event featured a public presentation where attendees donned AR devices to see the students' 360° videos and animations overlaying the actual trees, and even participated in planting new trees on campus as an action component.

The project connected students to their campus environment, taught practical sustainability knowledge (tree planting best practices, species' roles in climate mitigation), and engaged creative expression to foster both scientific understanding and artistic engagement with sustainability.

360° IMMERSIVE MEDIA CAN ENRICH PBL AT ALL STAGES.

These case studies collectively demonstrate that 360° immersive media can enrich PBL at all stages: from introducing a driving question, to enabling virtual field work, to becoming the medium of student-created artefacts. Moreover, the authenticity provided by 360° experiences – visiting real places virtually, seeing problems first-hand, or showcasing solutions immersively – aligns perfectly with the real-world orientation of PBL. Teachers across different educational levels have reported heightened student motivation and cross-disciplinary learning when using these tools.

DESIGNING A PROJECT-BASED LEARNING UNIT WITH 360° VIDEO

STEP 1: FRAME AN AUTHENTIC DRIVING QUESTION AND DEFINE LEARNING GOALS

Begin by looking out the window, not into the textbook. Walk the school grounds, scan the local news, or poll learners about issues they notice on their daily journey. Aim for a question that is:

OPEN-ENDED – INVITES MULTIPLE SOLUTIONS

"How might …?" "In what ways could …?"

LOCALLY GROUNDED YET GLOBALLY RELEVANT

A nearby river becomes a lens on ocean health.

CURRICULUM-CONNECTED

Link the project directly to specific science or geography standards, ensuring every activity contributes to the mandated learning objectives.

Then, anchor it in official guidelines—this turns an exciting idea into a suitable lesson plan.

NATIONAL STEM STANDARDS

Highlight the topics you are addressing (e.g., “Biodiversity – River Ecosystems”). 360° media can be a vehicle to meet standard curriculum objectives: e.g., a 5th-grade NGSS standard on ecosystem interdependence could be met by a 360° tour of a prairie habitat where students identify producers, consumers, and decomposers and see the impact of invasive species.

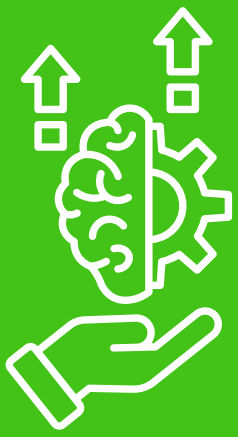
EU AND WORLDWIDE POLICY LINKS

Action plan for digital education: students met not only the project’s social studies goals but also built STEM skills in media production, understanding VR technology, and communicating information in innovative formats. The alignment of immersive PBL with standards is thus multi-faceted: science and environmental standards are addressed through the content of the projects, while technology standards are addressed through the process of creating and using 360° media.

EDUCATION FOR SUSTAINABLE DEVELOPMENT

SDG goals, Greencomp (The European sustainability competencies framework)

VR experiences can make students feel present in the community or environment and prompt rich discussions and ideas, far more effectively than a paper-based case study. This signals that sustainability education can leverage 360° media to meet learning objectives around systems thinking and global awareness. By aligning VR content with frameworks like UNESCO's ESD competencies (e.g. critical thinking, empathy, problem-solving in sustainability contexts), teachers can ensure immersive activities reinforce the desired skills and values.



In practice, teachers planning a 360°- enhanced PBL unit should link the immersive activity to specific learning standards or outcomes. For example, if a standard requires students to evaluate solutions to an environmental issue, a PBL unit might have students explore the issue through 360° video (to ground their understanding) and then develop and present a solution (fulfilling both the science standard and practising communication skills). Different cases demonstrate that this alignment is not only feasible but can be highly successful – VR field trips and student-created virtual tours can be implemented in ways that seamlessly integrate into existing curricula and standards.

STEP 2:
DECIDE WHERE 360° VIDEO ADDS THE MOST VALUE

Think of the inquiry cycle as three acts: hook, investigate and create, and place 360° media where it changes the learning experience, not simply decorates it. It is important to think carefully about what you want to show and teach with the video. With this in mind, you can consider the script for 360° video and its recording plan, and finally, effective integration into your lesson plan.

1. HOOK – INTRODUCTION

Spark curiosity, establish emotional context, and connect to prior knowledge while unveiling the driving question.

Example: Play an immersive clip of a degraded stretch of the local river.

2. INVESTIGATION – DATA COLLECTION

Gather firsthand evidence—measurements, observations, interviews—to address the driving question using scientific inquiry methods.

Examples: Filming the environment segments by the students, or conducting a 360° walk and recording the work of a local ecologist.

3. CREATION / SOLUTION DESIGN

Synthesise findings and prototype interventions, visualising potential improvements in immersive form.

Examples: Before/after recordings, include data overlays at specific hotspots, VR storyboard with problem evolving over time, and simulations.

STEP 3:
MAKING THE 360 VIDEO RECORDING – WHAT TO CONSIDER BEFOREHAND?

As the recording itself is time-consuming and involves more people than just one individual, it is recommended to plan it carefully in advance. Here are some tips which will make your implementation of recording 360 video and editing it easier.

Clarify the driving question and outcomes.

Decide what inquiry or concept the video will illuminate and shoot only the scenes that answer that question. Narrative can spark the engagement - add a short student voice-over or on-screen captions to raw 360° habitat footage; even minimal narrative elements can lift presence and sharing intent.

Sketch a micro storyboard – prepare the script.

Choose the frames, the duration, the actors. Keep footage short and focused. Aim for 15–30-second raw clips—easier to edit, faster to stream, and kinder on student attention. A three-scene shot list (scene • angle • evidence) prevents wandering cameras and wasted class time. Think about the built-in reflection part – encourage wondering and inquiry.

Assign roles (camera pilot, data note-taker, timekeeper/editor)

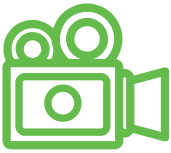
Choose and confirm location and permissions.

Prepare and check the equipment needed

After recording, start with editing the video. Think about the add-ons, hotspots, and additional texts.

STEP 4: REFLECTION

A good PBL sprint does not end when the headset comes off; it ends when learners and teachers have made sense of the experience and chosen a next step. You can consider building in some short but purposeful reflection layers into the lesson plan.



REFLECTION ON THE 360-VIDEO RECORDING

The teacher can guide discussion using the following points:

- What surprised me most during filming or editing?
- Which skill—scientific, collaborative, or media—did I strengthen?
- One thing I would do differently next time.
- Did you have sufficient time for all tasks? At which step would you appreciate some additional time?

Or share a common slide or sheet, and students complete with a simple +/- chart:

- Plus: moments that clearly answered the driving question and met the learning goals.
- Minus: scenes, data, or workflows that need improvement.

REFLECTION ON THE GAINED KNOWLEDGE

Discuss with open-ended questions:

- Which competences do you feel grew the most in you?
- Did we clearly answer the driving question?
- Where is the place for improvement to better touch the driving question issues?
- What is one realistic next action we can take to leverage this activity in the future?

PRACTICAL EXERCISE

FOR EDUCATORS

How to plan the 360-video recording to fit your lesson?

As the recording itself is time-consuming and involves more people than just one individual, it is recommended to plan it carefully in advance. Take a piece of paper and prepare your plan to record the video that suits your lesson.

PRACTICAL EXERCISE FOR EDUCATORS

How to plan the 360-video recording to fit your lesson?

Step 1: Clarify the driving question and outcomes.

Which inquiry or concept will the video illuminate?
Do you want to add narratives?

Tip: Shot only the scenes that answer that question. Add a short student voice-over or on-screen captions to raw 360° habitat footage.

Step 2: Sketch a micro storyboard

Think about the frames, the duration, and the actors. Keep footage short and focused.

Tip:

Think intentionally about how the 360° environment will create added value for the viewer—use the space to spark curiosity and invite exploration. Aim for 15–30-second raw clips; they're easier to edit, stream more smoothly, and keep attention focused. Design each moment so it encourages wondering and inquiry within the immersive 360° setting.

PRACTICAL EXERCISE FOR EDUCATORS

How to plan the 360-video recording to fit your lesson?

Example of storyboard template:

Scene 1: Title, duration

Sketch

What's Happening Here; Actors

Place, Assigned roles, Notes, Additions

Scene 2: Title, duration

Sketch

What's Happening Here; Actors

Place, Assigned roles, Notes, Additions

Step 3: Plan dynamic elements for video editing

Think about the add-ons, hotspots, and additional texts that can be added in the editing phase of the video for each scene.

Step 4: Choose a location, plan your team and needed equipment

How many students do you need for recording? Prepare an equipment checklist.

Tip:
Assign roles in advance: camera pilot, data note-taker, timekeeper/editor...

CONCLUSION

You've reached the end of the Eco360 handbook accompanying the massive open online course—and, ideally, the beginning of your own classroom experiments with 360° media and project-based learning for sustainability.

Across the modules, one message stays consistent: 360° video is not the lesson by itself. It becomes powerful when it is used as a purposeful learning experience—to spark curiosity, support investigation, and empower students to create meaning and take action. Combined with PBL, 360° video can help learners move from "watching" to questioning, researching, designing, communicating, and reflecting on real sustainability challenges.

KEY TAKEAWAYS

- Start with the learning goal and the sustainability question, not the technology. Choose a driving question that is authentic, local when possible, and age-appropriate.

- Use 360° media strategically:
  - as a hook (build curiosity and empathy),
  - as a field experience (observe, annotate, gather evidence),
  - and/or as a student product (communicate findings and propose solutions).

- Make thinking visible through scaffolds: observation prompts, evidence tables, claim–evidence–reasoning, storyboard templates, peer feedback, and reflection routines.

- Assessment works best when it values both process and product—collaboration, inquiry, ethical practice, and communication, not only the final video.

- Ethics and inclusion are non-negotiable: protect privacy, gather consent, plan safe filming routines, and offer alternatives for learners who cannot or prefer not to use headsets.

If you're wondering "Where do I begin?", pick one small, realistic entry point.

You can try a simple activity, using a single 360° clip as a "virtual field visit.", run a mini environmental based project in 2-3 lessons using an immersive learning experience with watching a 360° video for gathering data, or launch a longer project based learning unit, producing your own 360° video with your students.

Your first implementation does not need to be perfect. Aim for a version that is feasible with your available time and equipment, safe and ethical for students and the community, meaningful for learning and sustainability, and reflective, so you can improve it next time.

This guide is designed to work hand-in-hand with the Eco360 MOOC. Revisit the modules as needed—especially when you are:

- selecting or producing new 360° content,
- planning scaffolds and assessment,
- or troubleshooting practical classroom constraints.

Sustainability education is ultimately about helping learners understand the world—and their agency within it. With thoughtful design, 360° video can widen students' perspectives, strengthen empathy, and make complex systems more tangible. When paired with PBL, it can also give students what they need most: a reason to care, a structure to investigate, and a platform to create. Your classroom can be a starting point for real-world change—one question, one project, and one learning experience at a time.

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