

Guidelines for creating a training module - Version 1

The training modules on the EU-Citizen.Science platform will be developed using the Moodle learning management system¹. In this section, we provide the guidelines needed to create and design a new module on the Moodle system.

1. Introduction

The conditions under which the training modules of EU-Citizen.Science need to operate are the most challenging for online learning - they are intended for a student who cannot benefit from a cohort of other students who start the unit at the same time, or from the availability of an instructor who can answer questions and help clarify different issues. Therefore, modules - and each section of them - need to be engaging and interesting, while also providing up-to-date and useful information for the student. Because of these conditions, it is critical that you carefully plan and design your module well before any material is developed.

EU-Citizen.Science **modules should be designed to provide 1-2 hours of self-directed learning**, as described on Page 25 of the project's DoA. The aim here is to provide modules that can fit into many people's schedules and time constraints and fill a gap in the training and education for citizen science. The process of developing content for an online module without an instructor is a task that requires significant attention and time investment. The design and development of your module's content will take about 10-20 hours for each hour of online training material.

In Section **2** of this document we will provide guidance on **how to design the content for your Moodle module** which is supported with the use of a design template, and in Section **3** on **how to create the framework for a module on the Moodle platform (this section is not yet available under version 1 of this document)**. The information on how to design the content for your module is based on the University College London (UCL) Connected Learning course material, and more heavily on the UK Open University OpenLearnCreate course 'How to make an open online course'. We highly recommend that you take this course². Additionally, you might want to refer to UCL's Connected Learning material³ and Coursera⁴.

2. Designing the module content

2.1. Design Template

For the training and educational modules, the [Content Design Template](#) will help guide you through the design process. **We recommend that you always use this template when designing a module/ course** as it provides you with a methodical approach to thinking about content and ensures you have accounted for all the data fields. The template is

¹ <https://moodle.org/>

² <https://www.open.edu/openlearncreate/course/view.php?id=2221>

³

<https://www.ucl.ac.uk/teaching-learning/education-planning-2020-21/staff-development-prepare-teaching-and-assessment-2020-21/ucl-connected>

⁴ <https://www.coursera.org/>

provided with an example of how to design a module. Here, we provide guidance on the process of designing a training unit to ensure that quality assurance standards are maintained.

2.2. What sort of content can I create?

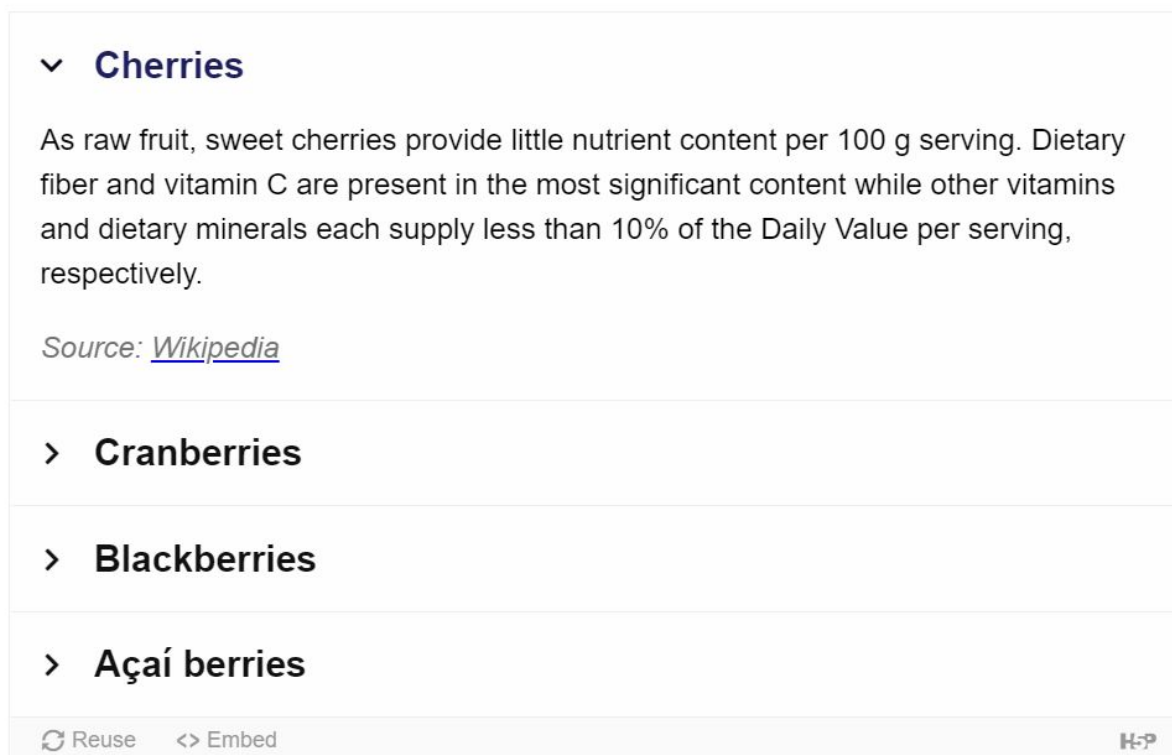
Before designing your content, you'll need to consider the type of content you want to produce. Content types could include:

- Text
- Images
- A presentation
- A video
- An interactive video
- An audio file

2.2.1. H5P

If you choose to create a presentation, a video (interactive or not) or an audio file you may choose to use your own existing software (e.g. MS Powerpoint) but it's worth noting that Moodle has a built-in interactive content creation tool called H5P. There are currently 46 different media types you can create with H5P but below is a short list and explanation of the content types we think would be most useful for the training modules:

- **Accordion:** The Accordion content type can be used for presenting text when there is a limited amount of vertical space (see image below). The content inside Accordion is shown in collapsible panels with a title. Each panel expands by clicking on the title. To see a demo of the H5P accordion, visit [here](#).



✓ **Cherries**

As raw fruit, sweet cherries provide little nutrient content per 100 g serving. Dietary fiber and vitamin C are present in the most significant content while other vitamins and dietary minerals each supply less than 10% of the Daily Value per serving, respectively.

Source: [Wikipedia](#)

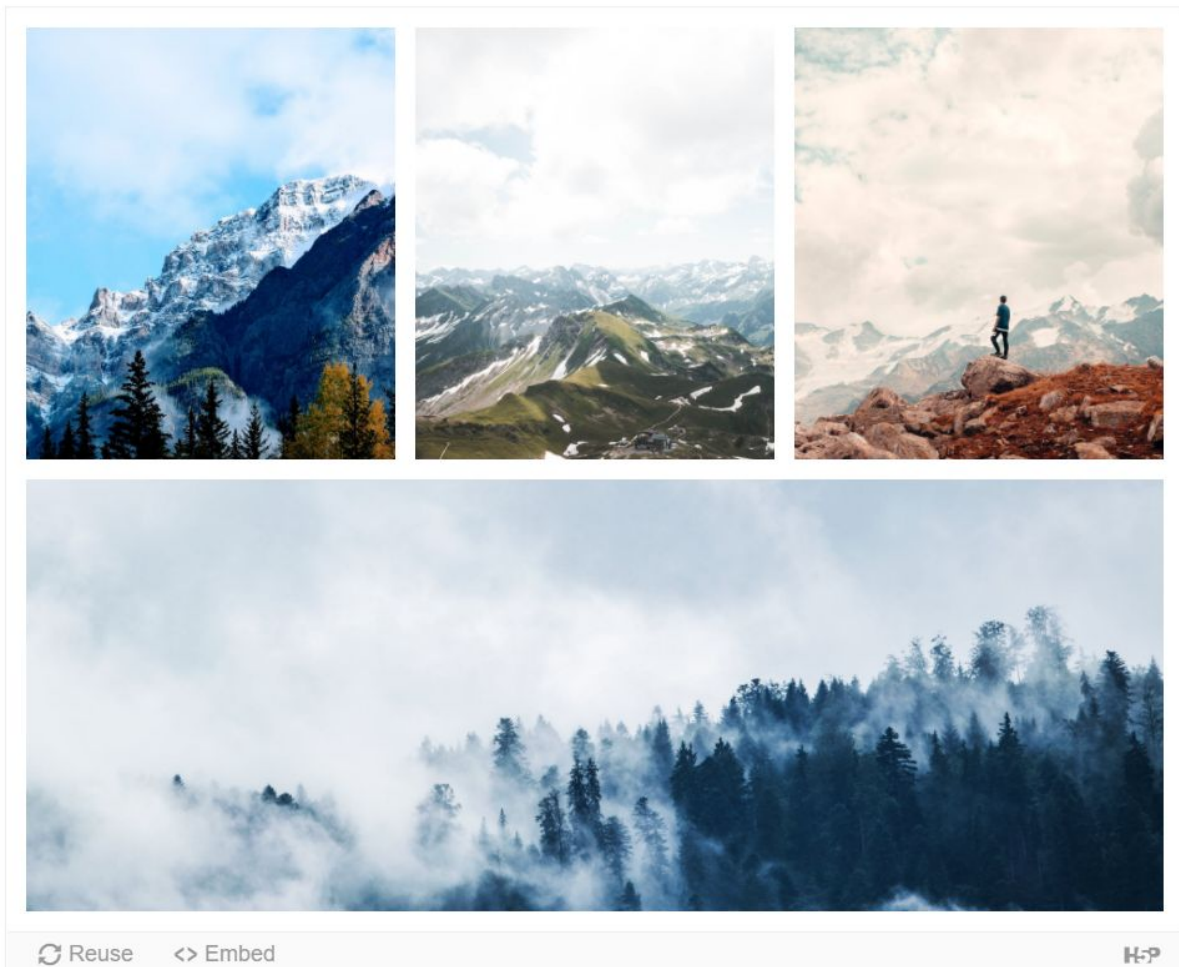
> **Cranberries**

> **Blackberries**

> **Açaí berries**

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- **Audio recorder:** An HTML5 audio recorder. Record your voice and playback or download a .wav file of your recording. Use the H5P plugin to create the H5P Audio Recorder to your Drupal, Wordpress or Moodle site. For a demo of Audio Recorder, visit [here](#).
- **Audio:** Audio is the tool you need in order to upload your H5P audio file to Moodle. For a demo, visit [here](#).
- **Collage:** You can use the Collage tool to put together images in a nice composition (see image below). There are several layouts to pick from. To see a demo of the H5P collage tool, visit [here](#).



- **Column:** The Column content type could be used to organize your H5P content into a one column layout (see image below). Content types that address similar material or share a common theme can be grouped together using Column to create a coherent learning experience. For example, if you're creating a quiz that's made up of Drag and Drop (see below), Drag the Words (see below), Multiple Choice (see below) content types then you can use this tool to group all these different content types together. To see a demo of the H5P column tool, visit [here](#).

Geography Quiz

Answer the questions below and check your knowledge of European geography!

Fill in the missing words

Europe is bordered by the Ocean to the north, the Ocean to the west, and the Sea to the south.

Europe had a total population of about 740 million (about % of the world population) as of 2015.

Match cities with countries.

The capital city of Albania is .

The capital city of Austria is .

The capital city of Bulgaria is .

The capital city of Finland is .

The capital city of France is .

The capital city of Italy is .

The capital city of Netherlands is .

The capital city of Norway is .

The capital city of Russia is .

The capital city of Sweden is .

Which of these countries are not located in Europe?

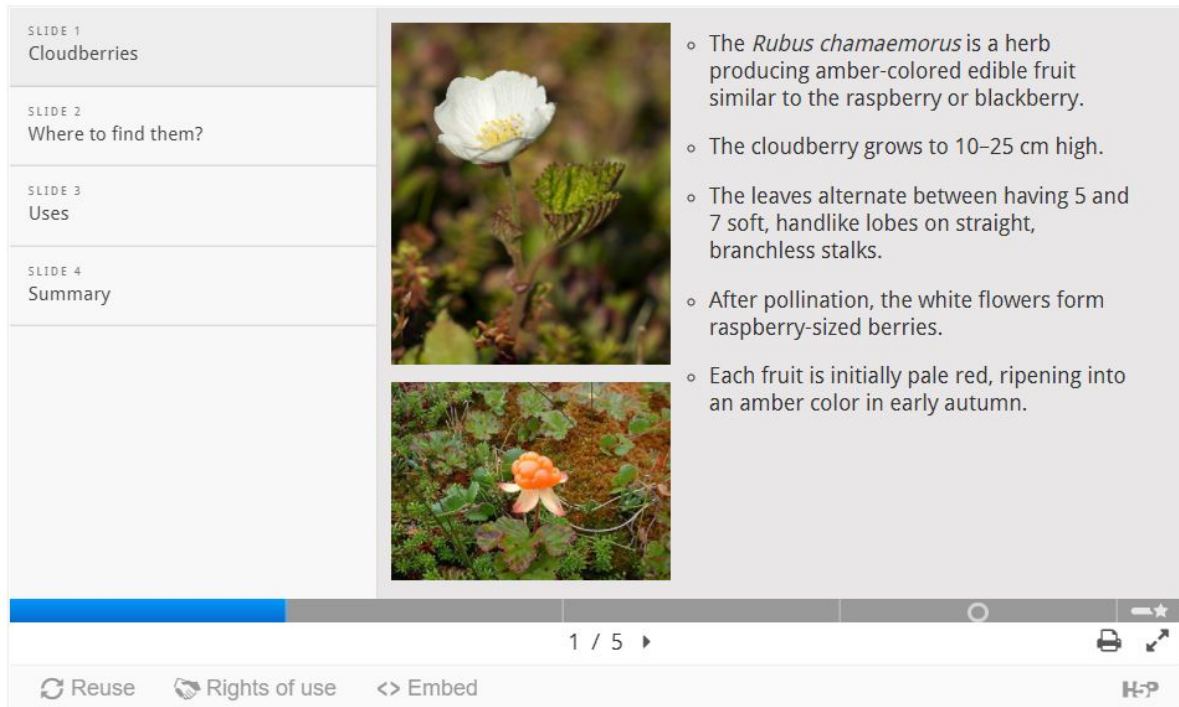
Austria, Italy, Japan, Mexico, France, Canada, Spain, Australia

Time spent: 0:00
Card turns: 0

H5P

- **Course presentation:** Course presentations consist of slides with multimedia, text, and many different types of interactions like interactive summaries, multiple choice questions and interactive videos (see image below). Learners can experience new interactive learning material and test their knowledge and memory in Course Presentations. As always with H5P, content is editable in web browsers, and the Course Presentation activity type includes a WYSIWYG drag and drop based authoring tool. A typical use of the Course Presentation activity is to use a few slides to introduce a subject and follow these with a few more slides in which the user's knowledge is tested. Course Presentations may however be used in many different ways, including as a presentation tool for use in the classroom, or as a game where the usual navigation is replaced with navigation buttons on top of the slides to let the

user make choices and see the consequences of their choices. To see a demo of an H5P course presentation visit [here](#).



The screenshot shows an H5P presentation slide titled "SLIDE 1 Cloudberries". The slide content includes two images of the plant: a close-up of a white flower and a cluster of orange berries. To the right of the images is a list of bullet points describing the plant's characteristics and fruit. The presentation interface includes a slide navigation bar at the bottom with "1 / 5" and icons for "Reuse", "Rights of use", "Embed", and "H5P".

SLIDE 1
Cloudberries

SLIDE 2
Where to find them?

SLIDE 3
Uses

SLIDE 4
Summary

- The *Rubus chamaemorus* is a herb producing amber-colored edible fruit similar to the raspberry or blackberry.
- The cloudberry grows to 10–25 cm high.
- The leaves alternate between having 5 and 7 soft, handlike lobes on straight, branchless stalks.
- After pollination, the white flowers form raspberry-sized berries.
- Each fruit is initially pale red, ripening into an amber color in early autumn.

1 / 5

Reuse Rights of use Embed H5P

- **Dialog Cards:** The Dialog cards content type enables you to create a set of cards with corresponding words or expressions on either side of the cards (see images below). To see a demo of the dialog cards, visit [here](#).



Arándanos azules



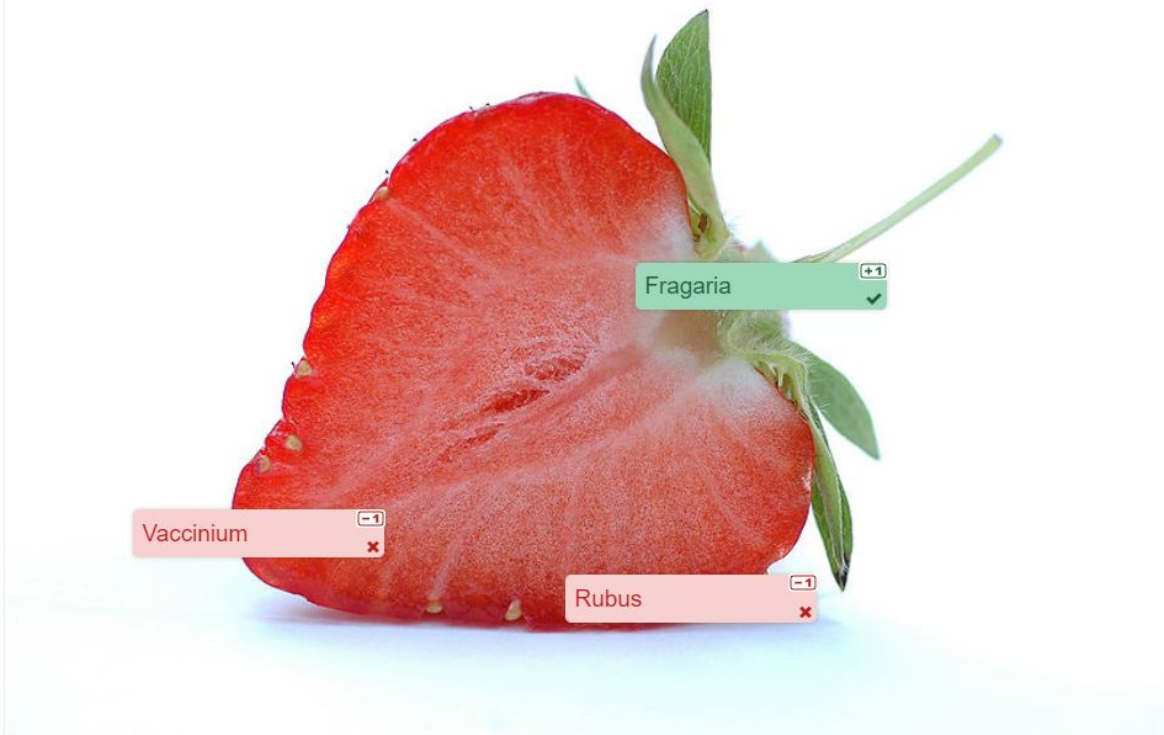


Blueberries

 Turn

- **Drag and Drop:** Drag and drop enables the learner to associate two or more elements and to make logical connections in a visual way (see image below). Here are some examples: 1) Group elements that belong together or have something in common, 2) Match an object with another object, 3) Put elements in the correct order, 4) Place elements at a correct position. To see a demo of Drag and Drop, visit [here](#).

Drag and Drop



You got 0 of 1 points.



- **Drag the Words:** Drag the Words allows content designers to create textual expressions with missing pieces of text (see image below). The end-user drags a missing piece of text to its correct place, to form a complete expression. To see a demo of Drag the Words, visit [here](#).

What are the colors of these berries when they are ripe?

Blueberries are

Strawberries are

Cloudberries are

Reuse Embed

- **Fill in the Blanks:** The fill in the blanks allows eLearning designers to create cloze tests (see image below). Portions of words or sentences are removed from a text and the learner is asked to replace the missing text. For a demo of Fill in the Blanks, visit [here](#).

Fill in the missing text about Strawberries!

Insert the correct plural form of the noun *strawberry*:

The strawberry is a juicy, edible fruit which has a color when it is ripe.

Tom has 2 strawberries. Jill gives him 4 more strawberries. Now, Tom has strawberries.

[Reuse](#) [Embed](#) H-P



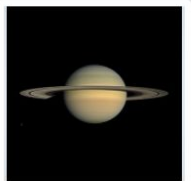

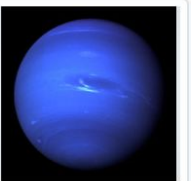


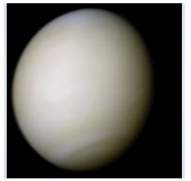
- **Image Hotspot:** The Image hotspots content type allows you to place an overlay of hotspots on images and graphics (see image below). The user presses the hotspots to reveal an associated text. For a demo of Image Hotspots, visit [here](#).



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- **Image Sequencing:** A content type that allows authors to add a sequence of their own images (and optional image description) to the game in a particular order (see image below). The order of the images will be randomized and players will have to reorder them based on the task description. For a demo of Image Sequencing, visit [here](#).

Order the planets from smallest to largest

 Mercury	 Jupiter	 Saturn	 Mars	 Neptune
 Earth	 Uranus	 Venus		

Time spent
0:00
Total Moves
0

[Reuse](#) [Rights of use](#) [Embed](#) H5P

- **Interactive video:** Add interactivity to your video with explanations, extra pictures, tables, Fill in the Blank and multiple choice questions. Quiz questions support adaptivity, meaning that you can jump to another part of the video based on the user's input. Interactive summaries can be added at the end of the video. Interactive videos are created and edited using the H5P authoring tool in a standard web browser. To see a demo of an H5P interactive video, visit [here](#).
- **Mark the Words:** Mark the words allow content designers to create textual expressions with a defined set of correct words (see image below). The end-user highlights words according to the task description and gets a score. For wrong answers, the user gets negative points. To see a demo of Mark the Words, visit [here](#).

Click the various types of berries mentioned in the text below!

Bilberries, also known as blueberries are edible, nearly black berries found in nutrient-poor soils.

Cloudberry are edible orange berries similar to raspberries or blackberries found in alpine and arctic tundra.

Redcurrants are red translucent berries with a diameter of 8–10 mm, and are closely related to blackcurrants.

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H-P

- **Multiple Choice:** The Multiple Choice content type is your staple multiple choice quizzing tool (see image below). Multiple Choice can be used to test the learner's level of knowledge on a given topic. For a demo of Multiple Choice, visit [here](#).



What color does the blackcurrant berry actually have?

Black

Very dark purple

Blue

✔ Check

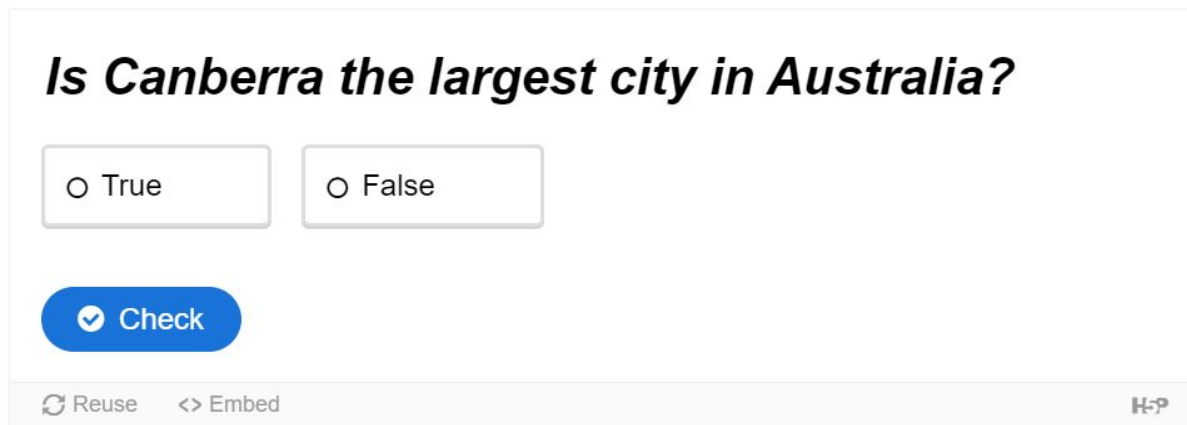
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H-P

- **Question Set:** The question set allows eLearning designers to create a sequence of various quiz types, including Multichoice questions, Fill in the blanks, and Drag and

drop. The question set supports customized text feedback as well as video feedback to the learner. For a demo of Question Set, visit [here](#).

- **True/ False:** A True/False question is often used in surveys and consists of a statement that demands a true or false answer (see image below). Alternatively, you could change the answers to Yes/No, Agree/Disagree, etc. For a demo of True/ False, visit [here](#).



Is Canberra the largest city in Australia?

True False

Check

[Reuse](#) [Embed](#) H5P

If you want to learn about the other types of H5P interactive content then visit <https://h5p.org/>.

2.2.2. Quizzes/ activities

You will also need to design some quizzes or activities at the end of each section within your module (see section [2.4.4](#) for more details). To help you think about what sorts of quizzes/ activities you'd like to design here is a list of all the options within Moodle:

- Multiple choice - Allows the selection of a single or multiple responses from a pre-defined list
- True/ False - A simple form of multiple choice question with just the two choices 'True' and 'False'.
- Matching - The answer to each of a number of sub-question must be selected from a list of possibilities.
- Short answer - Allows a response of one or a few words that is graded by comparing against various model answers, which may contain wildcards.
- Numerical - Allows a numerical response, possibly with units, that is graded by comparing against various model answers, possibly with tolerances.
- Essay - Allows a response of a file upload and/or online text. This must then be graded manually.
- Calculated - Calculated questions are like numerical questions but with the numbers used selected randomly from a set when the quiz is taken.
- Calculated multiple choice - Calculated multichoice questions are like multichoice questions in which choice elements can include formula results from numeric values that are selected randomly from a set when the quiz is taken.
- Calculated simple - A simpler version of calculated questions which are like numerical questions but with the numbers used selected randomly from a set when the quiz is taken.

- Drag and drop into text - Missing words in the question text are filled in using drag and drop.
- Embedded answers (Cloze) - Questions of this type are very flexible, but can only be created by entering text containing special codes that create embedded multiple-choice, short answers and numerical questions.
- Random short-answer matching - Like a Matching question, but created randomly from the short answer questions in a particular category.
- Select missing words - Missing words in the question text are filled in using drop-down menus.

2.3. Designing the content

2.3.1. Course summary

COURSE SUMMARY is a large textbox for a detailed course description. It is very useful to fill in this section including lots of keywords that accurately describe the content (i.e. learning objectives and outcomes, length of time it takes to complete the course, and the main sections) of the course as this will help the course be more 'visible' when people are searching for it on the internet. Make sure you include terms/ keywords that most people actually use when describing these various elements so it matches what people would naturally be searching for.

Learning objectives describe the purpose of the course, while learning outcomes state what the learner should be able to do and are usually measurable outcomes that can be linked to evaluation. Of these tasks, the most important are the design and the writing of the learning objectives or outcomes. Learning objectives and outcomes are about the expectation of what the learner should know and be able to do at the end of a unit. They are frequently described using [Bloom's taxonomy of learning](#)⁵ which include:

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

As the units will be short and without the opportunity for the marking of essays, it is most likely that our quizzes/ assessments will focus on **knowledge and comprehension**. For learning objectives, see [Writing Good Learning Outcomes by University of California, Davis](#)⁶ and for a good vocabulary of learning objectives see the end of [Writing and using Learning Outcomes by University of Cardiff](#)⁷. An example of a learning objective is:

“By the end of this course, the student will be able to explain the historical background and current activities in Citizen Science, by identifying key terms and concepts”.

In an EU-Citizen.Science training module, please aim for 2 or 3 objectives.

⁵ https://en.wikipedia.org/wiki/Bloom%27s_taxonomy

⁶ <https://canvas.ucdavis.edu/courses/34528/pages/writing-good-learning-outcomes>

⁷ <https://www.cardiff.ac.uk/learning-hub/view/writing-and-using-learning-outcomes>

2.4. Design of module topics/ sections

2.4.1. Framework for designing module topics/ sections

As mentioned earlier, your module will split into about 8 - 12 sections. Here we describe how to design the content for each of these sections. Please use section 2 i.e. Detailed Section Plan in the 'Content Design Template'.

2.4.2. Designing the topics/ sections

As mentioned earlier, each module will at the very least contain the following sections:

- **Welcome and introduction to the course** - this section provides an introduction to the module from the course tutor, which must be in video or audio format and lasting about 1 - 2 minutes. It is important that the students see the face of someone who has helped develop the module, as this can enhance credibility and trust in the module. In this section, please include an overview of the content and the learning outcomes. If relevant, provide a teaser and a sample for something that is central to the course so the learner can assess if the course is for them. The introductory text needs to be clear and enticing. When recording the video (or other videos for the course) be aware that audio clarity is key, and that you can use smartphone quality as long as it is clear.
- **Summary and self-assessment** - summary of the module and end-of-module quiz. The summary should review the topics and highlight the key messages. Please also include links to the other final sections, though do not make these compulsory for course progression. The final part must be the end-of-course quiz. The end-of-course quiz is critical and standardised in terms of its content, and described in details below. This is because the completion of the quiz with a grade of over 50% correct answers will trigger the provision of completion badge and certificate to the learner.
- **Further information** - other sources of information and further learning on Citizen Science. This can include links to other online courses and Massive Open Online Courses (MOOCs), training resources on the EU-Citizen.Science platform, and further reading, videos, and podcasts that are relevant to the topic.
- **Sources and acknowledgements** - a list of sources that are used in the course, details of the people that created it, and funding sources that funded the work.

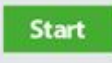








You can design the rest of the sections to suit the specific content needs for your module but remember you should not exceed a total of 12 sections.

Once you've decided on the sections you'll need, use the following tips to guide the design of the content. This list is developed from online course design best practice principles:

1. When designing activities, try to **keep activities to between two to 10 minutes**. If you are planning to record a lecture or a set of slides, be aware that evidence from online learning shows that the people will not watch long videos, and therefore any video that is integrated as an activity should be a maximum of 5 - 6 minutes. Studies suggest that 2.5 minutes is the optimum. Videos can be 'broken down' into sections.
2. **It is recommended that you use the H5P tools for creating your media content**, this is an in-built tool on the Moodle platform.

3. When designing activities, **consider using a range of activity types**:
 - Assimilative - reading material, watching a video, or listening to a recording
 - Finding and handling information - asking the learner to look out for information
 - Productive - asking the learner to produce their own ideas or take notes
 - Experiential - provide an opportunity for the learner to apply the knowledge in their own context
 - Interactive/communicative - these are activities where learners can communicate with others, such as a discussion forum. However, this is more difficult to implement in an asynchronous situation so should be optional, if used at all.
4. **Clearly indicate how long each activity should take to complete** (5 to 10 minutes for the purpose of designing activities for the EU-Cit.Sci platform).
5. **Ensure that you have a clear structure/learning journey through the materials.** The heading can be used to indicate the structure.
6. As you develop the details, **regularly check your content against your learning outcomes**. Ask someone else to look at your planning grid before you start writing the content.
7. **Be very clear about what the student should be doing** (e.g. 'write yourself a list of your top priorities when managing data').
8. As you design the course, **consider how you can prevent learners from navigating away from the course where possible**. For instance, if using third-party material, a video from YouTube, embedding these within the course is preferable to linking out and requiring students to leave the course/platform (whilst bearing in mind that this may have copyright implications). If you do require learners to leave the platform to access content, then it is advisable to suggest learners open the link in a new tab or window so that they can return to the course easily.
9. **Use imagery - photographs, figures and illustrations**. When designing the section, you can consider the use of decorative images that will represent the context of the specific section but be aware that they may disrupt learners' attention to the studies.
10. **Make sure that each topic/section (apart from the Welcome and introduction, Sources and acknowledgements, Further information) ends with a formative quiz to evaluate how well the student is learning the course content** (see [2.2.4](#) for further information on the design of quizzes/ forms of assessment).
11. **Consider the following accessibility guidelines for course content and activities in addition to the points covered in Figure 2** (for more guidance on accessible material development, see the OpenLearn course 'Accessibility of eLearning'⁸):
 - a. Each video or audio will require a text script that can be shared for accessibility purposes.
 - b. Ensure diagrams and schemas are explained in the text, and each image must use the alt-image tag to provide alternative description. Slides and material should be provided in accessible PDFs.

- c. The writing style for the material should pay attention to guidelines for writing for the web: use short sentences and style, use a conversational style that guide the reader to the course and remember that generally, each page should not contain more that 250 words to read (for a slow/non-native reader this is about two minutes, while for an average reader it will be about a minute). Do not use more than 500 words in one section. Avoid making sentences too long as this reduces their readability and accessibility, especially in an online setting when long sentences and paragraphs need to be broken into more manageable lengths.
- d. In quizzes, use drag and drop questions with care as they can be problematic on some devices and for participants who have dexterity limitations (e.g. tablets).

Do...	Don't...
Use a combination of colour, shapes, and text to convey meaning 	Use colour alone to convey meaning 
Align all text left and use 1.5 line spacing 	Justify text or align to centre or right 
Use headings in sentence case, sub-headings, and bullets to break up information 	Make complex or cluttered layouts and menus 
Use heading styles in online text boxes and Microsoft Word documents <h1> AaBbCc	Rely on text size and layout for structure 20pt, bold IHeader
Add alternative (alt) text to images and transcripts for videos <alt>	Provide rich media content without a text alternative 
Use good colour contrasts and a readable font Aa	Underline words, use italics, or write in capitals <i><u>DON'T DO THIS</u></i>
Use a textbox to increase contrast between images and text clear	Use text over images or patterned backgrounds 
Write descriptive and meaningful headings and hyperlinks Contact us	Write uninformative links and headings Click here
Add captions to audio and video content Captions are important	Automatically play audio and video content 

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2.4.3. Module assets (i.e. resources used in the module that are stored on other platforms)

While developing the module material, you will probably want to use various ‘assets’ (e.g. resources from the EU-Citizen.Science platform, videos on YouTube etc.). As long as their copyright status has been clarified and, ideally, unless they are available on a very stable platform such as YouTube, they should be copied and stored on the EU-Citizen.Science Moodle platform to avoid deterioration of the course if the linked website disappears. Where necessary, indicate clearly that an external link is provided. In the template, you will find a space to plan and register the assets that will be used in a training unit. Before adopting an asset, ask yourself the following questions - Is it suitable for the audience? How complex is it? Is it answering your stated learning objective? How? Level of details and explanation? Anything missing that should be explained in text?

The table (see Table 1) in the template for an asset register is taken from the Open University OpenLearnCreate course, and we provide here an explanation on the details you’ll need to log.

Table 1: Asset register

Item	Explanation
Asset title	A description of the asset and its purpose
Long description	Used to describe diagrams, pictures, etc (useful for writing the visual description)
File type	e.g. PDF, jpg, doc ... This is to ensure that files are organised and stored on the system
File name	e.g. “CitizenScienceIntro.doc”
Source URL	Where the asset was found/is hosted online
Location in course	Which subsection of the course, e.g. in Introduction, Topic 1, Summary

Rights/third party	Who owns the copyright - this can be useful for future update of the course
Clearance approved to release asset	E.g. Creative Commons license
URL in the course	Where the asset will appear in the course. It may be found on Google searches, even by a non-student.
Acknowledgements to be included in the course	What needs to be mentioned about this asset on the course acknowledgements page if the item belongs to a third party, or the organisation releasing it wishes to retain "All Rights Reserved" rather than using a Creative Commons license

2.4.4. Quiz/ assessment design

Well-designed online assessment activities such as polls, quizzes, questionnaires, reflective exercises and self-assessment questions can provide very effective consolidation and evidence of learning. In the EU-Citizen.Science training and educational modules we will use two forms of evaluation: formative and summative. Formative evaluation provides the learner with scope for self-reflection as they progress through the module - it can be a short quiz, for example, or a case study to consider and write about, followed by reading a "model answer" which reveals some points to think about. A formative quiz will not count towards the learner's grade but is aimed at providing the learner with a way to check that they understood the section. The formative quiz should have 2-4 questions, and the time that it takes to carry it out should be counted in the overall course plan. As noted, the end of the course is based on a well-constructed quiz covering material from the whole course is one method of conducting summative assessment in this situation.

The final quiz should be made up of 10 questions. If the learner passes 50%, they can receive a certificate of completion of the course. The questions should be written bearing in mind Bloom's taxonomy (see p39) and aim to be 30% on knowledge of issues covered in the course, 30% comprehension, 20% application and 20% analysis/synthesis. In the final quiz, the results are shown for the whole exam.

When designing the quiz questions, follow the Open University's checklist for quizzes:

- a. Identify the topics you want to cover in the quiz and write them down, you may do this as you are writing the course and the material is fresh in your mind.

