

# iTEC Cycle 4

## Learning Stories & Activities

### I. Instructions

This cycle Learning Stories and Activities focus on “real world” challenges, that is, challenges related to the sociocultural context of the students and are personally meaningful to them. Students work with realistic problems, selecting personally meaningful challenges or addressing the challenges of an audience they can relate to. To give future stories stronger stronger grounding in personal learning goals, please add your personal experiences as comments to the blog or as entries to the iTEC planning tool [“Composer”](#).

The activities focus extensively on extending the role of the teacher. Each activity provides teachers with suggestions for developing their expertise, including digital and pedagogical competence. Teachers are also challenged to adopt different roles and to support learners on various levels. Teachers are, first and foremost, invited to act as a provider of inspiration. Further, they are asked to carefully listen to students, to shape activities to address the individual needs and interests of the students, and to coach the students through the activities by questioning the underlying assumptions in relation to project work to cultivate the students’ critical thinking skills and their ability to reflect in and on their action. The activities further solicit challenging students to think further and supporting them to collect evidence that could strengthen or weaken their claims, essentially preparing the students for situations that require them to defend a cause. Lastly, the teacher’s role is to expand learning beyond the walls of the school by coaching students to connect to and collaborate with people outside of school. Through these connections, students can discuss their prototypes and concepts with people who have an in depth understanding of the challenges the students’ work relates to, and may receive meaningful suggestions or constructive criticism.

## Overview of teacher roles

- **Develop** – To expand the expertise and competence of the teacher.
- **Inspire** – To evoke shared experiences and the feeling of being part of a meaningful endeavour.
- **Coach** – To offer advice and guidance to the students.
- **Listen** – To carefully consider students’ interests and needs in shaping classroom activities. **Question** – To challenge students’ assumptions by asking open ended questions.
- **Support** – To step in and offer practical, hands-on support.
- **Assess** – To evaluate students’ achievements based on collaboratively designed criteria.



The Learning Activities respects teachers’ expertise in developing pedagogically sound experiences that support the personal development of young people. They are inspirational material that suggest ways of performing parts of a Learning Story. Teachers can change the Activities to better suit the performance of a learning story to their classroom context. The activities are inspirations, not prescriptions. Only through receiving comments and modifications, we can reshape the activities to accommodate European school settings even better. We recommend active engagement with other iTEC teachers and partners through various online channels. This cycle consists of a total of four Learning Stories and nine Learning Activities. The illustration above shows the flow of Learning Activities to perform a Learning Story.

## Overview of the Learning Stories

1. **Tell a Story** – Narrating an academic topic through audiovisual means.
2. **Create an Object** – Developing a tangible design.
3. **Create a Game** – Constructing a playful activity.

## Overview of the Learning Activities

1. **Dream** – Introducing, understanding and questioning a design brief
2. **Explore (Benchmark/Observation)** – Collecting information in relation to the design brief
3. **Map** – Creating a mindmap to understand relations between the collected information
4. **Reflect** – Recording audio-visual reflections and feedback
5. **Make** – Creating a design
6. **Ask** – Performing workshops with people who may represent future users of the design
7. **Show** – Publishing and presenting designs to an audience
8. **Collaborate** – Forming ad-hoc collaborations with learners of other schools

It is possible to choose to perform one of three learning stories. Further, There is no one correct or best way to perform an activity. It is possible to select different tools and practices for performing learning activities. For example, if you are in a hurry, it is possible to abridge learning stories and only perform the Dream, Explore, Map and Reflect activity, essentially skipping the production aspect of a story while focussing on planning. If you are very motivated, learning stories can also be combined. For example, a rendered 3D modeled object created in the story “Create an Object” can be featured as a sequence of a digital film created in the story “Tell a Story”.

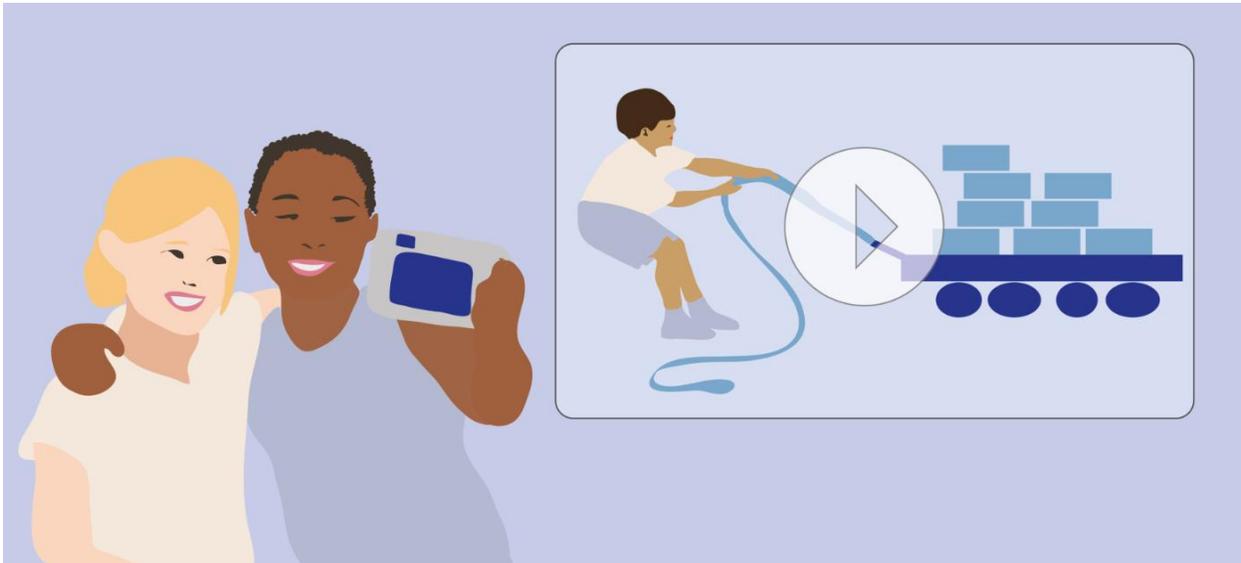
iTEC has been working on developing several digital tools to support teachers in performing the learning activities. These tools are [TeamUp](#), [ReFlex](#) and the [iTEC Widget Store](#). It is highly recommended to explore and use these tools during the pilot. The times at which the tools can be used are mentioned in the pilot material.

## II. Cycle 4 Learning Stories

### 1. Learning Story 1: Tell a Story

This story's unique quality is its focus on narration and digital storytelling. Learning how to tell a story, to eloquently convey a point or to convince an audience, for example parents or other adults, can be considered a general expert skill, relevant to all areas of interest. This learning story will convey storytelling as a meaningful learning experience and answers the question of how storytelling and narrative relate to all subject areas. Using digital storytelling may motivate students and allow for non-traditional tasks and activities.

**Storytelling design brief** – Create an engaging short video story that relates a scientific phenomena to a personal experience and is no longer than 5 minutes. Select an audience and be sure to tell the story in an engaging, factually correct, yet understandable way for your audience.



**DREAM** – I am a science teacher and with the media studies teacher, I am challenging my students to create engaging short video stories about the concept of friction. I give them the design brief and suggest they think of their peers as the target audience. I show a few inspiring video stories to them and we proceed with discussing the potential of each method of communication, thus developing their digital media literacy at the same time as their science understanding. The media studies teacher and I agree that this will support the students' ability to narrate and to deeply engage with a scientific concept. In the first lesson, I ask my students to dream up what their video stories could be about. **REFLECT** – Each student uses ReFlex to

record their first reflection as well as their dreamed achievement as a time capsule, dated at the end of the course.

**EXPLORE** – I ask the students to find, view and review engaging science videos to gain inspiration for their own videos as home work, for example at home, after school clubs or public libraries. They will also deeply engage with their science story, trying to figure out the mechanics involved, how to experiment with them and how to explain them in their story.

**REFLECT** – Students reflect on what they've found and what their initial ideas for their stories are.

**MAP** – Back in school, all students create mind maps of their findings and start creating storyboards for their video stories. Pairs of students comment each others' plans. The storyboards show sketches of scenes and video transitions, and describe shooting locations, sound information and descriptions of the actors dialogue, expression and movement. After the storyboards are completed, the students, the media teacher and I develop criteria based on which the video stories will be evaluated. **REFLECT** – Teams reflect on the activity, their challenged and their plans for the upcoming make activity.

**MAKE** – The students start their video production using their mobile phones and digital cameras. They share tips, ideas and media files. To edit their stories, they are using free web-based software. Some of the clips have to be filmed outside of the school. The media teacher is providing tips about the narrative structure of the videos, while I am mainly mindful about the scientific accuracy of the content. I remind the students to prepare for PD workshops with media professionals. **REFLECT** – Students reflect on their data gathering progress and their plans for the upcoming PD workshop.

**ASK and COLLABORATE** – One student showed his reflections to his mother, who works for a children's television programme and offered that she and her colleagues could tour the students around the television studio and comment on the first draft of the student videos. Although I planned on using the iTEC people and events network to locate a screenplay writer or fiction author who might be interested in supporting the students, this seems to be a much more interesting connection. During the workshop with the television staff, the students are filled with exciting ideas and are energized to add the received suggestions to their video stories, although this means for some of the students to put in a few more hours than expected. **REFLECT** – PD workshop participants comment on the reflection and development of the students work.

**SHOW** – At the end of the course, the students upload their video stories to an online video sharing platform, such as [YouTube](#) and [Vimeo](#), and link to them through the [iTEC facebook group](#). For this, each student has to collect permission of their parents. The students view and comment the videos created by other iTEC students across Europe. As all videos include subtitles, the videos communicate easily across the language borders of European countries. We are also asking parents to view the videos and comment on them. Some of the videos are really interesting, so I decide to bookmark and use them in my teaching in the future. **REFLECT** – I am using the accumulation of comments, the reflection recordings of my students, their



documentation as well as the feedback I recorded throughout the Learning Story to assess their work. We discuss my assessment in the following lesson. Throughout the discussion, students get the chance to argue for or against my assessment. Some of them bring up strong grounds that make me re-evaluate their work.

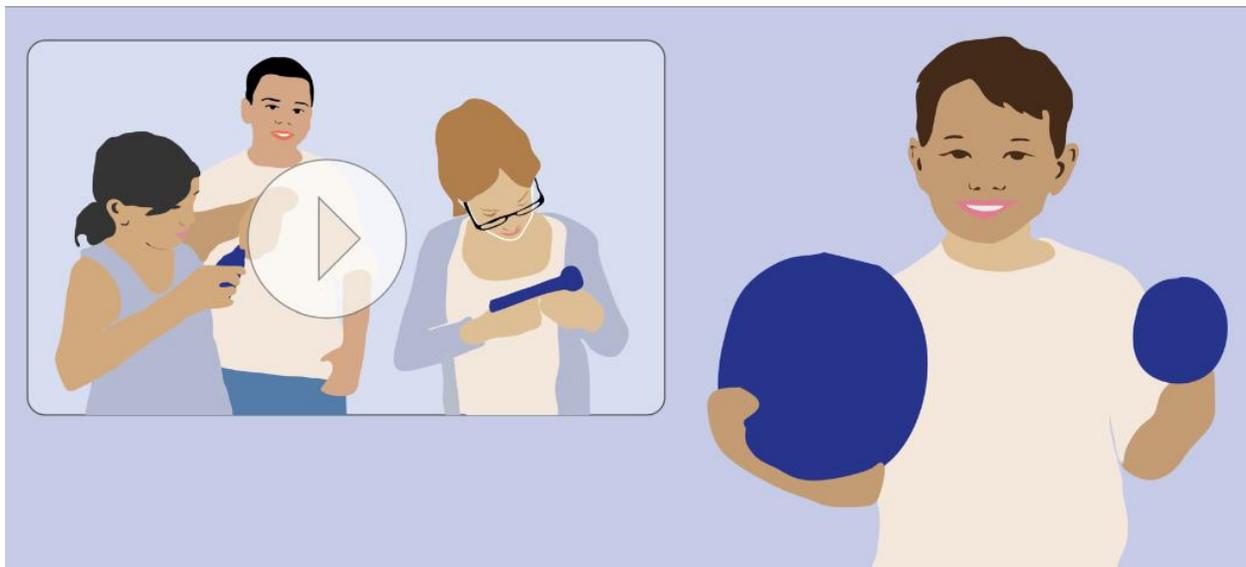
**Exciting examples** – MIT Blossoms videos: <http://blossoms.mit.edu/>

**Support material** – [UNESCO Young Digital Creators](#) is a guidebook for digital production at school.

## 2. Learning Story 2: Create an Object

This story's unique quality is its relation to hacker and maker cultures that are finding their way from hobbyist environments to formal learning spaces. Opening up schools to maker cultures and fabrication practices may foster entrepreneurial and inventor spirits in students, and may expose teachers to possibilities for developing, for example, pedagogical, technical and organizational competences. Students will learn about mass customization and its potential impact on current economic and environmental practices. This learning story encourages to build connections to national Fabrication Laboratories and Hackerspaces as a way of connecting schools with other aspects of society. The connection to workshops outside of school can give access to expert builders and makers whose support can save you time.

**Object design brief** – Create an object that addresses a challenge they recognize in their community. Select an appropriate audience for your object and ensure that it is meaningful and usable for that audience.



**DREAM** – My idea is to ask the students to create their objects in relation to an issue in school, environmental awareness, engaging people to exercise, or to promote well-being. I present my idea to the students and ask them to form teams and to choose an area that interests them most. **REFLECT** – Students reflect on their design brief, their plans for the next session and the challenges they may foresee and what.

**EXPLORE** – The teams are asked to observe after school. They take pictures and interview people that they are creating their object for. As an extra task I ask them to search and collect examples of the kind of objects they would like to create. **REFLECT** – Teams reflect on what they observed, the challenges they encountered and how they are planning to analyse their collected information.

**MAP** – As all teams decided to work with “Wellbeing and fitness”, we draw a large mind map to the interactive whiteboard that includes the ideas and examples of all teams. Although many teams collected similar examples and media files, after the lesson, each team has chosen a distinctly different challenge that they are aiming to address. Some try to tackle workplace wellbeing, others chose to address low quality of sports equipment in schools. **REFLECT** – Teams record their experience of the activity, including their major findings and how they could imagine using the activity in the future.

**MAKE** – The teams start planning their objects through sketches and paper models. They then use design software such as Google SketchUp, InDesign, PhotoShop, and others, to develop their ideas. We are using the tips on the local Fabrication Laboratory website to create models and digital files the machine can read. While the teams are creating their initial prototypes, I discuss with them who they would like to test their models with. As most students are interested in learning how to actually build their objects, I contact the local Fabrication Laboratory and arrange a class trip with the crafts teacher to their facilities. The Fabrication Laboratory director is telling me that a group of university students is visiting the lab at the same day and adds that they might be interested in helping my students. **REFLECT** – The students record individual reflections about the making process, their role in it and the challenges they encountered. They further reflect on what is still left open in their designs. They also record comments, questions and suggestions for other student teams.

**ASK** – At the Fabrication Laboratory, each of my student teams gets help from university students and the crafts teacher. After a short discussion and a few changes to the initial designs, the university students explain the 3D printers and laser cutters to my students and even print and cut objects. Also the the staff of the fabrication laboratory is genuinely friendly, they welcome questions and are motivated to help. I am surprised, but no previous knowledge about the machines was required. After the trip the students record feedback into their TeamUp spaces. **REFLECT** – The teams reflect on the main comments they received from their participants and how this may affect the redesign of their object.

**RE-MAKE** – Based on the progress that was achieved during the Fabrication Laboratory visit, my students finalize their objects. **REFLECT** – The teams report on how they achieved their re-design plans, the challenges they encountered and what further steps they would have taken if only there was more time.

**SHOW** – It is too complicated to organize a certified Mini Maker Faire at my school (<http://makerfaire.com/mini/>), and unfortunately there is no mini maker faire organized around my school during the time I am performing the story (<http://makerfaire.com/map.html>), but it is easy enough to arrange a few tables in the hallway, print flyers and mobilize three parents to support an informal presentation day at the school for my students to show they objects. The event is open for the public, the families of the students and some of the university students attend. During the event I create a video, which I upload to an online video sharing site tagged with “iTEC”, “Make”, “Maker movement” and “Student Projects”. To show more people what my



class did, I email the link to the video to the Maker Educational Initiative (<http://makered.org/>) at: [Info@MakerEd.org](mailto:Info@MakerEd.org). To get even more recognition, I also ask the students to document their design process and design results and to post step-by-step documentation to the Fabrication Laboratory we collaborated with. Including a short video in which you tell what makes your design unique and what it does. **REFLECT** – The students reflect on their design and documentation process by relistening to all of their recordings and by recording a last reflection. They also listen to the recordings of other teams and record a final comment for them.

### Accessing a Workshop

**Your School** – If your school has a 3D printer or laser cutter, ask the workshop facilitator to teach you and the students how to use the machines. 3D printers are relatively affordable, comparable to that of an iPad. Acquiring one to the crafts shop of your school might be feasible.

**Other Schools** – You may contact a school whose crafts shop has modern fabrication tools such as 3D printers, milling machines and laser cutters. You could also ask students to initiate this collaboration.

**Universities** – You may contact a design university and ask students to support your class.

**Fabrication Laboratories** – A [list of fabrication labs](#) around the world.

**Hackerspaces** – A [list of hackerspaces](#) around the world.

**Parents** – A parent might work at a place where access to a 3D printer or a laser cutter is given. This would of course be another way of accessing the machines.

**Construction kits** – If access to proper facilities is missing, you may consider DIY kits, such as Legos, Lego Mindstorm, Scratch boards, Arduino, play-dough, air-dry earthenware, polymer clay, cardboard.

**EVERYDAY OBJECTS** – If none of these facilities listed above are available, you may ask the students to be even more creative and to hack everyday objects, they would normally throw away, to implement their designs. This should be stated to the students in the beginning of the class. They can still create digital models, but need to think of the material they will use to develop the tangible aspects more thoroughly.

### Exciting examples

- [Maker Education Initiative](#)
- [Make Blog for Kids](#)
- [Make Projects](#)

### Book examples

- [Readymade - How to make \(almost\) everything](#) by Shoshana Berger, Kate Francis, Jeffery Cross, Grace Hawthorne
- [Handy Dad](#) by Todd Davis
- [Make Electronics](#) by Charles Platt
- [Papercraft Design Art](#) by Sonja Commentz, Robert Klanten, Sven Ehmann, Birga Meyer
- [Kinetic Contraptions](#) by Curt Gabrielson
- [Industrial Revolution in 25 projects](#)
- [The New Way Things Work](#) by David Macaulay

### 3. Learning Story 3: Create a Game

With a striving, highly explorative game industry and the topicality of gamification, this learning story provides students with the unique opportunity to identify game design concepts in the games they play at home, to explore what it would mean to be employed in the game industry, to apply game design concepts by designing their own game, and to deeply reflect what gamification of school and educational activities would mean.

**Game design brief** – Explore the environment around our school and design an engaging game that utilizes geolocation technologies. Select an audience for your game and ensure that your game presents an engaging educational experience for them.



**DREAM** – I present my class with a design challenge that is directly related to their community: Explore the environment around our school and design an engaging game that utilizes geolocation technologies. The topic of the game can focus on either the local culture or local natural environment. I prompt the students for topics: cultural monuments, historical streets, bird ecosystems, and so on. Before we get started, I add that the game should ideally not focus too much on puzzles but rather aim to address a challenge they observe in their community, such as a lack of awareness of culturally relevant institutions or about the decline in bird species. I use TeamUp to form teams based on the topic interests of the students. I hand out a design brief to each team, that suggests that the geolocation game should be suitable for students that are one grade lower than the students of my class. Each team has the rest of the class to brainstorm the rules of the game. I present a few easy-to-use game platforms the teams can use for their games. **REFLECT** – Teams reflect about the changes they introduced to the



design brief and what they are planning to do next. They also discuss the challenges they foresee.

**EXPLORE** – Each team has as homework to find and test several games, making note of their game mechanics and what in their opinion works and what does not. I remind the teams that each team will present their game idea to experts and the younger students in the middle of the course. Each team record a reflection about their findings. **REFLECT** – Students record individual reflection about the games they tested and initial ideas for their own game.

**COLLABORATE** – After class I liaise with my colleagues, the biology and history teachers of the school. We agree on how the teams can use our expertise in this project. I also ask them to come up with ideas about outside experts that might be willing to participate in a two hour workshop with our students.

**REFLECT** – As the lesson starts, I listened to each team's 1 minute update and checked their online documentation of relevant game examples they found. This presents me with the opportunity to develop my digital competence to be able to evaluate the examples students found based on quality and relevance. I don't recognize many of the titles, so I perform a quick google search and read game critiques on [GameStop.com](http://GameStop.com), [gametrailers.com](http://gametrailers.com), [metacritic.com](http://metacritic.com), [eurogamers.net](http://eurogamers.net), [boardgamegeek.com](http://boardgamegeek.com) or [gameinformer.com](http://gameinformer.com). I also ask my students to tell me their favorite game review pages. Through my reading I am receiving the overview about the topic that I need to evaluate the examples the students found. I am recording questions and comments to the students who seem to have explored games that are not relevant to the kind of game they were planning to design.

**MAP** – During the class the teams go through their findings and start planning their games. They use post-it notes on a wall to mind-map concepts and relations. One team wants their game to open new locations on the map as old ones are reached, and have students race each other to reach the new spots in time. I could probably talk to our physical education teacher about this. Another team's game will be more strategic, and award players who think first and plan their route properly. I ask them to make a concrete plan for gathering materials and media for their game. I take pictures of each team's mind maps and share the images with the teams so they can access them from home. Each team records a reflection about what they did, what they plan to do and what challenges they had. **REFLECT** – Teams record short reflections about their findings and how these may affect their game designs.

**EXPLORE** – During the next lesson each team goes outside to gather media and other findings. Many teams have already done part of this on their own. **REFLECT** – The teams record what they found and what challenges they encountered when collecting media files.

**MAKE** – The following lesson is used to visualize the game, draw hot-spots on maps, and test the rules by playing through the games as simulations. Some of the teams use Scratch to develop their games into interactive digital artifacts. **REFLECT** – Each student records an



individual reflection about their role and contribution in the creation process, what they learned thus far during the project, and what they considered most challenging.

**ASK** – I have now contacted relevant outside experts using the iTEC people and events network, so I have 2 people for each team’s participatory design workshop. I give their contact information to the teams and ask them to negotiate a suitable time for the workshop. I also go through the general idea of the workshop with the students and give them material that supports their preparation.

**REFLECT** – I follow each team’s workshop preparations and results through TeamUp. One team is clearly trying to get their game to be ready for the workshop, so I record a comment to their team space reminding them that presenting paper sketches of their ideas is more useful than showing a finished product. I also see that some of the PD workshop participants commented on the work of the teams using TeamUp.

**RE-MAKE** – Once the PD workshops are over, the teams revise their designs, some quite dramatically. They continue their design work, creating the actual tasks for each location in the map. I follow their work in Google Docs and check that the tasks they create, such as embedding map data as widgets, are suitable and match the curriculum of the previous grade level. **REFLECT** – The students reflect individually on the implemented changes. How did everything work out?

**SHOW** – At the end of the course, teams present their games to an audience of their peers, lower grade students, and the experts they have spoken to before. One of the games is so well developed that it will be used in an upcoming course with the lower grade students. Using the iTEC widget store, we generate a widget out of that game and promote it to teachers and students at our school.

### **Exciting examples**

- **Go!** – A Portuguese mobile learning game utilizing geo-caching and GPS.

### III. Cycle 4 Learning Activities

#### DREAM



You present a design brief to your class that ties to the curriculum and the local community, but leaves room for interpretation. You inspire the students by providing them with the motivation for giving their best and by telling them about the ownership and freedom over the task. You present the learning activities process and your schedule, and negotiate the assessment criteria with the class. Students form teams, discuss, question and familiarize themselves with the design brief. The teams refine their design brief, particularly in relation to whom they are designing for, initial design challenges and possible design results. Students record reflections and document their work online. Classroom time: Approximately 1 lesson

#### Ideas for using technology:

- **functionalities:** 1. reflection. 2. team formation, collaborative editing, publishing. 3. Blogging
- **tools:** [TeamUp](#), [ReFlex](#), [Google Sites](#), [Blogger](#), [Corkboard.me](#)

#### You may look forward to...

- motivate students by letting them shape their own task
- motivate students by giving them a certain degree of freedom and ownership of their work
- using unfamiliar tools

#### Your students may learn to...

- seriously commit themselves to thoughtful design
- negotiate on goals and assessment criteria
- question and improve given tasks

#### 1. Prepare / Listen

- Prepare a design brief, by choosing a Learning Story and adjusting it to match curriculum requirements and school schedule.
- Plan and schedule the Learning Activities of the entire design process. Design activities can cause unexpected delay. Include a buffer lesson to the course schedule.
- Through preparation you have the opportunity to expand your competence and expertise, for example, by locating concrete examples that show why it is important to design thoughtful outcomes. See: <http://bit.ly/design-inspiration>.
- Prepare an initial list of assessment criteria that reflect the curriculum requirements.

## **2. Inspire**

- Present your design brief, examples, all activities and your schedule to your class.
- Ensure that everyone is on board by rendering the design brief as a shared goal that relates to the students' personal context.
- Discuss your assessment criteria with the students and agree on them.
- Form teams of 4 to 5 students. You may ask the learners to define initial roles. More info: Learning Activity "[Teamwork](#)". Careful consideration of team formations to prevent free-riding.
- You may reach people beyond the classroom by being proactive about sharing your design brief with other teachers through the [iTEC facebook group](#) and the iTEC teacher community.

## **3. Coach / Question / Support**

- As the student teams discuss what they will design and how to refine the design brief prompt individual teams with questions that support them to elaborate their choices.
- Encourage students to question your design brief. Ask them open ended questions, such as (a) Who is the design for? (b) How can you find out about the people you are designing for? (c) What challenge are you addressing and how? (d) Who is responsible for what? (e) How would you present your creation process and your design?
- Initial confusion is part of the beauty of design. There is no need to answer all questions right away. You and the students will figure out the answers as you go along.
- Coach the teams to find a specific audience for the designs they plan to create.
- Exercise your educational expertise, and push students beyond their comfort zones, if you notice that the topic is not challenging enough.
- Support the students with examples in case they get stuck.
- Encourage experienced students to share their knowledge across all teams. For example, asking them to record messages for others using TeamUp, or assigning experienced students to perform the role of assistant teachers, who help others.
- Students record a reflection (see reflection activity). Explain that the recordings play an important role in their assessment and in receiving feedback from you, other teams, parents and the people they are designing for.
- Beyond school: Each team sets up a project blog (or comparable service) and send the URL to you and to the [iTEC facebook group](#). On the blog, the teams describe their project and refined design brief. They post initial sketches of what they are planning to design.

## **4. Assess**

- Review the work of each team, their reflection recordings and blog entries, then record audiovisual feedback for them. Your feedback might include suggestions and questions.
- You could assess the students' ability to question the task provided to them, in particular their grounds for introducing changes.

## EXPLORE



Student teams explore the context of their design either by observing relevant practices or environments using digital cameras, notebooks and microphones, or by searching existing works that relate to their design brief by collecting examples similar to that which they are intending to design. The object of observation depends on who they are designing for, what they are designing and the initial challenges they want to address. They share their collected media files on their blogs and record a reflection. You guide their search and support them in the qualification of their material. Note that viewing and qualifying video material can be time consuming. Spending time viewing videos that contain inaccurate information, can be a detour from which a pedagogically meaningful conversation may arise, and may provide students with a first-hand experience about the appearance of an invalid source. Some students, for example younger ones, may need more guidance in performing this activity. Classroom time: Approximately 1-2 lesson(s)

### Ideas for using technology

- **functionalities:** 1. web browser. 2. bookmarking, collaborative editing. 3. media recorder, camera, note taking equipment. 4. collaborative editing
- **tools:** [TeamUp](#), [ReFlex](#), [iTEC Widget Store](#)

### You may look forward to...

- finding dozens of innovative designs from around the world
- using novel tools
- connecting school and students with their community sending them to observe outside of school
- engage students to use all of their senses

### Your students may learn...

- find and evaluate designs of various fields
- identify real world design challenges
- question and improve given tasks
- observe and record natural phenomena and/or people
- empathize with others

### 1. Prepare / Listen

- Listen carefully to the student comments, and shape the activity according to their needs and interests.
- Expand your competence and expertise, by identifying online resources, locations and events where observation can be carried out, or people that could be interviewed for each team. See: [‘Design Inspiration for School’](#)

### 2. Inspire

- Describe the activity to the students and inspire them by showing online resources that they could browse through.
- Ensure that all teams know what kind of examples they are looking for, what to observe and where.
- Describe the activity to the students and inspire them by showing locations where observations can be carried out.
- Check that each team is equipped with cameras, notebooks, microphones etc.

### 3. Coach / Question / Support

- Teams plan how much time they want to spend searching, evaluating and comparing. Coach them by remind them about time management.
- Teams search for comparable designs and discuss them. They select the 10 examples that are most relevant to their project. Support them with resources and relevant examples in case they get stuck.
- Students perform observations in teams or individually. Coach and support them to find meaningful observations.
- The learning activities culminate towards a design. Some students may be overwhelmed by the multitude and quality of benchmarked examples and find it difficult to proceed productively. Remind them that many examples they see are made by companies with large budgets.
- Slow Internet connection? Try to schedule the use of the Internet for each team to avoid Internet traffic congestion. See if some teams could perform their activity beyond school, using the Internet connection of their homes, after school clubs, or public libraries.
- Teams view and annotate their collected media files.
- Teams record a reflection. This reflection can be used for sharing their ideas with other teams.
- Beyond school: Teams post their findings to their blogs, including drawings of design ideas. Teams may identify more relevant information, for example by visiting a library or by browsing the Internet.
- Teachers found that this activity presents an opportunity for reflecting about the pros and cons of using ICT tools in school. Why not try the same with your students? Ask your students to critically assess the activity and their value to school learning. Then, the students record a reflection.

#### 4. Assess

- Review the work of each team, their reflection recordings and blog entries, then record audiovisual feedback for them. Your feedback might include suggestions and questions.
- You could assess the breadth of identified examples and the teams' ability to identify examples that are related to their design briefs.

**Support material** – To learn about the possibilities to reuse online material, view and provide sources for learning about copyright and creative common licensing.

- Introductory video: [Building on the past](#)
- [Find openly licensed content](#) you can remix and reuse.
- [Choose a license](#) when you want to publish openly.

## MAP



Teams analyse their findings using mind-mapping techniques. They identify relations, similarities and differences between the examples and/or media files they collected. Based on their collected information and analysis, the teams refine their design brief, especially the design challenges, design results and audience. Then the teams record a reflection. Open ended questions can be challenging for students to answer initially. However, after passing the initial threshold, students are likely to have inspiring ideas. Classroom time: Approximately 1 lesson

#### Ideas for using technology:

- **functionalities:** 1. mind mapping
- **tools:** post-it notes, Bubbl.us, CmapTools, Popplet, Mindmeister, Freemind, [TeamUp](#), [ReFlex](#)

#### You may look forward to...

- hands-on active and visual engagement with collected information and data
- progressive data analysis
- using novel tools

#### Your students may learn...

- to professionally analyze information collaboratively
- more in-depth understanding about their topic
- to recognize relationships between findings

### 1. Prepare / Listen

- Listen carefully to the student comments, and shape the activity according to their needs and interests.
- Expand your competence and expertise, by exploring digital mind-mapping tools and ensuring students can easily add their media files to the tool.
- Arrange pens, paper, post-it notes, tape, scissors and glue. Set up the space by arranging walls or large papers for students to group and stick their paper notes on.

### 2. Inspire

- Engage in a pedagogically meaningful conversation with the students about the data they collected: What did they collect, and how is the information meaningful for their project?
- For easy access, ask the students to move all of their information and data into one location and share it with everyone.

### 3. Coach / Question / Support

- Students write all information and data in the form of headlines, short sentences or figures on post-it notes or small pieces of paper, and group their notes. Alternatively they may use the digital mind-mapping tool you set up. Coach them how to best represent some of their findings by drawing the initial notes or making supportive suggestions.
- Support the teams to visually present relationships between the notes when grouping the data, for example, by drawing lines between information, placing notes hierarchically, or other spatial arrangements.
- View and discuss the relations with the students. Ask open ended questions to challenge their assumptions, for example, (a) what are the similarities and differences between the examples they found? (b) What additional challenges can you recognize?; (c) what would you like to adopt or try out? (d) what would make your design unique? (e) Does the design brief need refinement? How does it need to be refined?; (f) How does the exploration relate to the design? (g) What design decisions would result from the exploration? (f) What are emerging project ideas?
- A more full-body involvement of mapping ideas can be achieved through spatial grouping of ideas and collected information. This can support learners to focus, as they can stretch their arms to place a post-it note to a specific location dedicated to e.g. challenges
- Teams list identified similarities and differences, and update their design briefs, particularly in relation to design challenges, design results and audience.
- They document their findings on their blog, including sketches of emerging project ideas and record a reflection. You can record a reflection for each team providing feedback and evaluative comments to each student work. Their reflections can be used for assessment and for staying focussed on the task.

#### 4. Assess

- Review the work of each team, their reflection recordings and blog entries, to ensure everyone explored and collected examples and/or media files. Then record audiovisual feedback for them. Your feedback might include suggestions and questions about how successful the technique was implemented, how it could be used for future projects, and how it could be done better next time.
- You could assess the teams' ability to identify design challenges, to draw relationships between observations and examples
- You could also ask the students to grade their teammates' contributions, using the student grades to help form your own assessment.

## REFLECT

Students and the teacher record, post and share audio-visual reflections and feedback of project progress, challenges and future steps. The students slowly build a shared collection of ways to tackle challenges, which can be used after the project ended. Classroom time: Approximately 10 minutes

#### Ideas for using technology:

- **functionalities: 1. audio/video reflection.**
- **tools:** [TeamUp](#), [ReFlex](#), Redpentool, Voicethread

#### You may look forward to...

- reviewing team progress quickly and comfortably at any time and anywhere
- providing personal feedback to teams
- a more fair distribution of support beyond the classroom
- spending less time recording feedback for students
- providing students with personal feedback through gestures, tone of voice, background information (your home, garden etc.)
- using the recordings to better communicate with parents about school activities
- developing a collection of comments to your students
- building a resource of reflections made by students
- using novel tools
- develop technical, organizational and pedagogical competences
- acquire a repertoire of using reflection for multiple purposes

#### Your students may learn...

- to summarize, communicate, present and plan their work in progress at anytime and anywhere
- to reflect on their work
- to provide and receive criticism

### **1. Prepare / Listen**

- Develop your competence and expertise, by exploring how often and by whom reflection and feedback could be used in the learning story and by decide on the reflection tool that you would like to set up and use.
- Before recording another feedback or reflection listen to the previous one.

### **2. Inspire**

- Motivate the students to reflect on their work by expressing the benefits and reasons for reflection, for example easier review of the last steps, catching up after an absence, receiving direct feedback from the teacher.
- Tell your students that in design related learning projects, regular reflection can support letting go of initial, not very good, ideas and to develop the feeling of ownership.

### **3. Coach / Question / Support**

- Teams reflect on what they did, what they plan to do and the challenges they encountered or can foresee.
- The first reflections may be difficult to record smoothly. Coach students to overcome initial feelings of frustration or inconvenience. Be assured, after recording a few reflections, you will start to recognize the value of your investment.
- Teams listen to the recordings by others and record questions and tips for them. Coach and support them in doing so.
- Listen to the recordings and adopt your teaching to the needs of the students.
- Record audio-visual feedback for the teams, including questions and suggestions that may inspire the teams to think further, based on the student reflections.
- Experts may be invited to record feedback to the student teams. Their feedback is may become ubiquitous, and a source of inspiration for the students in the years to come.

### **4. Assess**

- You may assess based on the student's ability to listen and react to your constructive comments, or based on the depth or relevance of their reflections.

**\*\*\* For abridged stories that ends after the first reflection activity \*\*\***

#### **Assess**

- Review all work. Compare everyone's progress updates with their presentations to see if all important steps are included in the presentation.
- Review all reflection recordings and discuss the process with the students. What was their experience like? What have they learned? What would they like to explore further?
- Student work can be used for open feedback and reflection sessions.
- You could assess the documentations for their value as resources for exam preparation.

## **MAKE**



Based on their refined design brief and design ideas, student teams start making. They create their first prototype, and discuss it afterwards. The discussion especially relates to how well the design address the identified design challenges. They then record a reflection and document their activities. Careful guidance through the learning activities and the process of creation is indispensable for students to keep their minds on learning potential curricular requirements. Highlight the reflection after this activity and ensure that everyone focuses on addressing the needs of an audience. To avoid free-riders or unequal workload division, carefully divide tasks and roles within teams. Classroom time: Approximately 2 lesson(s)

### **Ideas for using technology**

- **functionalities: 2. media editing, diy kit, programming environment, construction kit, 3d editing, 3d printing**
- **Tools:** Prezi, Sketchup, Scratch, [TeamUp](#), [ReFlex](#), [iTEC Widget Store](#)

### **You may look forward to...**

- inspiring students to be creative and imaginative in their use of digital technology
- stepping beyond your comfort zone and guiding students to do the same
- seeing different projects emerge from the same initial assignment
- using novel tools

### **Your students may learn to...**

- transform their ideas into concrete prototypes
- identify new ways of addressing challenges
- do paper prototyping
- use digital authoring tools
- it is rewarding for students to complete a project.

### **1. Prepare / Listen**

- Listen carefully to the student comments, and shape the activity according to their needs and interests.
- Expand your competence and expertise by preparing the material, software and technology needed for making.

## 2. Inspire

- Inspire students to create prototypes that could be used by their audience and that address the identified challenges.
- Team building exercises, such as playing games, solving puzzles or having ice-cream together, can support cooperation and collaboration towards a shared goal.

## 3. Coach / Question / Support

- Teams develop prototypes. Coach them to address the identified design challenges and to take all collected information into consideration by reminding them of their plans.
- Remind the teams that the activities cumulate towards the creation of an artifact. If you notice teams stalling and debating for too long, step in and support them with hands-on suggestions towards a decision.
- Teams set up their prototypes in the classroom and discuss them with other teams, in particular how and if their prototypes address the identified challenges.
- Teams add the documentation of their design prototype(s) to the blog and describe it, using drawings, videos or digital photographs of their prototypes. Then, they record a reflection. You listen to their reflections and prepare comments for each team.

## 4. Assess

- Review the work of each team, their reflection recordings and blog entries, to ensure everyone explored and collected examples and/or media files. Then record audiovisual feedback for them. Your feedback might include suggestions and questions.
- Good prototypes illustrate how a design could be used or how it could work. Prototypes can be rough and unfinished, as long as they help in communication. A simple, yet well thought out concept can be as much of a learning experience as a technically intricate execution. Be careful in your assessment of prototypes.
- You could also ask the students to grade their teammates' contributions, using the student grades to help form your own assessment.

## ASK



Teams meet with 2–4 people, who could be future users of the prototypes, and communicate their prototypes and design ideas using prints, drawings or models. These participating people are considered to have an expert understanding of the domain the student designs are framed within. Expertise may be interpreted broadly, for example, a construction site worker can be considered to offer deep insight into the everyday practices of people on a building site. The

expert participants are encouraged to use pens and post-it notes to modify and comment on the prototype. After the workshop the students analyze the comments and decide how to interpret them for their re-design. They then refine their design brief, especially in relation to the design challenges, context and added value of the result, record a reflection and update their documentation. This activity can happen more than once at varying time investment. Students can collect feedback on their work by asking experts, potential future users as well as from other student teams and the teacher. Classroom time: Approximately 2-3 lesson(s)

**Ideas for using technology:**

- **functionalities:** 1. **media recorder, note taking**
- **tools:** audio recorder, video recorder, post-it notes

**You may look forward to...**

- let students be in charge of facilitating a workshop
- get to know your students better
- thoroughly consider the appropriate participants for the workshop
- building collaboration with outside experts
- connecting school to other parts of society
- providing students with the opportunity the learners how their personal interests matter
- Taking advantage of the opportunities reality may provide and acting creatively with the context.

**Your students may learn to...**

- empathize with others and work with different people
- contact experts and ask for collaboration
- present ideas to people who have not followed the project progression
- discuss and negotiate with teachers and experts
- receive criticism and incorporate expert views into their project
- create paper prototypes

**1. Prepare / Listen**

- Listen carefully to the student comments, and shape the activity according to their needs and interests.
- Develop your competence and expertise by using the insights you learned from listening to the reflection recordings for identifying suitable people to ask to comment on the prototypes.
- People working in academia often have a flexible schedule and find it motivating to pass their expert knowledge on to young learners. You may also consider to contact and invite university students.

**2. Inspire**

- Introduce the activity of facilitating a workshop to the students.
- Teams brainstorm possible experts to invite and open ended questions to ask them. In case they cannot think of anyone, make a few suggestions.

- Each team invites 3–4 people to their workshop and arranges a place and time for it. It is important to thoroughly and seriously consider appropriate participants, and to be able to say how each participant can inform the project. The workshops may happen outside of school, for example at the office of a non-governmental organization, an elderly home etc.
- It might be exciting for the students to contact the experts. Practice with the teams how to approach potential participants.

### 3. Coach / Question / Support

- Coach the teams by practicing the workshop and providing them with the [workshop guidelines of the iTEC project](#) as an example of this activity within a large scale European project. Support students that exhibit difficulties.
- Ensure that each team has access to workshop material (cameras, notebooks, microphone, post-it notes and pens) and their prototype (or a representation of it).
- Students present their design brief and prototype design to the participants and ask for their comments and ideas. The people may alter the prototypes or draw on them to express themselves better. Students take notes and pictures of the activities and the discussion.
- The teams analyse their notes and the drawings of the people. They may use the MAP activity for this. Prompt them with open ended questions and coach them to go beyond the obvious.
- The teams decide how their prototype and design brief should change based on the analysis.
- The teams record a reflection and document their progress online. Prepare students for receiving constructive criticism and to deal with potentially arisen negative emotions and accepting of criticism as constructive feedback. Questions for that this reflection session could address include: (1) What in our results was good? (2) What needed improvement? (3) What in our way of working needs improvement?

### 4. Assess

- Review the work of each team, their reflection recordings and blog entries, to ensure everyone is on the right track. Then record audiovisual feedback for them. Your feedback might include suggestions and questions.
- In case the expert followed the progression of the teamwork, their expert view on the learners' performance should be considered. The expert may be involved in defining the assessment criteria. The participants may be asked to record an audio-visual message to the students after redesign their prototypes with the suggestions of the participants in mind.

## SHOW



Students create a video with English subtitles presenting their design results and process, as well as learning achievements and possible future steps. They share this documentation with other iTEC students across Europe, their parents and their identified audience to transfer their learning, to communicate the background of their project, to let others know about the possibility to remix their work, and to receive feedback for improvement. Classroom time: Approximately 1-2 lesson(s)

### Ideas for using technology

- **functionalities:**
  - 1. video editing, media recording, video publication
  - 2. media sharing
- **Tools:** [iTEC Widget Store](#)

### You may look forward to...

- students stepping into the role of experts
- feedback and reflection sessions between people using the student work as reference
- learning about well performed activities and activities students need to practice more
- illustrating school learning activities to colleagues and parents
- receiving material to inspire future courses and your colleagues
- showcasing prototypes designed by your students

### Your students may learn...

- multimedia editing skills
- collaboration on a project
- to prioritize aspects of information
- to document, communicate and summarize learning process, results and the importance of a topic to others
- about the projects, data, and topics others have been working on

### **1. Prepare / Listen**

Develop your competence and expertise by researching the benefits and drawbacks of different forms of documentation, e.g. animation, video etc. and by preparing a presentation for your students. Also get familiar with different video sharing platforms.

### **2. Inspire**

Inspire the students to create a presentation that documents their learning process and results using a diverse range of media, by pointing out the different ways their project can reach impact this way. Speak with the students about the production process, planned steps, and requirements.

### **3. Coach / Question / Support**

- Coach the students in choosing a purpose, an audience, and a medium for their presentation
- Teams set up their prototypes in the classroom and demonstrate them to others.
- Individual students or teams create storyboards to plan the narrative of the presentation, and decide which collected files, such as photos, video clips, voice recordings of interviews, geotags, or animations to use to represent their conclusions and process in a meaningful way. Support them by presenting the benefits and drawbacks of different media to students, and discuss speech and performance techniques, as well as ways of convincing an audience.
- Students create a video with English subtitles presenting their design results, and documenting their learning achievements and possible future steps. They upload their video to a video hosting page online and share the link with the [iTEC facebook group](#), their parents and ASK activity participants. Support them by providing sharing platform options. You can use the videos to communicate the task to other students in the future.
- Additionally, you may organize an informal Maker event, to which parents, ASK activity participants and other students are invited.
- At the end of the pre-pilot, also share the modified design briefs of your students with the itec community, by posting them to the [iTEC Participate blog](#) or asking the students to post them there.

### **4. Assess**

- Review all presentations. Compare everyone's progress updates with their presentations to see if all important steps are included in the presentation (see activity 'Reflection').
- Review all reflection recordings and discuss the process from "dream" to "show" with the students. What was their experience like? What have they learned? What would they like to explore further?
- Student work can be used for open feedback and reflection sessions.
- You could assess the documentations for their value as resources for exam preparation.

## COLLABORATE

Students collaborate with students from other iTEC schools. Ad-hoc and serendipitous collaboration, driven by the students is encouraged. Classroom time needed: 1 lesson(s)

### Ideas for using technology

- **functionalities: 1. online discussion, media publication, publication. 2. blogging**
- **tools:** [iTEC students collaborate facebook group](#), iTEC teacher community are potential networks for sharing outcomes and for establishing collaboration beyond the walls of a school and borders of a country.

### You may look forward to...

- support international collaboration
- broaden your cross-curricular understanding
- share responsibility with students
- guide students to make meaningful choices

### Your students may learn to...

- contact, encounter and collaborate with students outside of their social circle
- appreciate the interconnectedness of knowledge areas

### 1. Prepare / Listen

- Review the work of each team, their reflection recordings and blog entries, to ensure everyone is on the right track. Then record audiovisual feedback for them. Your feedback might include suggestions and questions. Listen carefully to the student comments, and shape the activity according to their needs and interests.
- Expand your competence and expertise by preparing and testing digital tools to use, possibly ask students to demonstrate tools to you.
- Collect examples of how collaboration may look and what it may afford.

### 2. Inspire

- Inspire students to step out of their comfort zone and to contact students they never met before, by presenting benefits or networking, peer-learning and online collaboration.
- Be mindful of online privacy and safety issues.
- Demonstrate the digital tools the students may use to contact others.

### 3. Coach / Question / Support

- Students search for related work and share their own, they follow and comment on other student's posts.
- Students discuss their experience of participating in the project with students from other classes online.



- Occasionally, videoconferences are set up or emails are exchanged between the collaborators.
- You coach students to post questions to the channels you set up for them.

#### **4. Assess**

- Be open to let personal interests shape your assessment. It may not be the frequency of the students' engagement with others, but rather the depth of their engagement. How apt were the students to utilize the experience of others outside of the classroom?

## IV. Use of Learning Activities

	<b>Telling a Story</b>	<b>Creating an Object</b>	<b>Creating a Game</b>	<b>Abridged Story</b>
<b>Dream</b>	Storytelling brief	Object design brief	Game design brief	Choose a design brief
<b>Explore</b>	Benchmark: Find and view good videos	Observation: Interview people, take pictures, view reports	Benchmark: Play and analyse good games	Choose a Contextual Inquiry
<b>Map</b>	Mind map the narrative and create a storyboard	Mind map challenges and opportunities, then write them	Mid map of elements and topics to make a game about and create an initial plan	Choose a Mind Map activity
<b>Reflect</b>	Create 1 minute audio recordings	Create 1 minute audio recordings	Create 1 minute audio recordings	Create 1 minute audio recordings
<b>Make</b>	Video production	Object production	Game production	
<b>Reflect</b>	Create 1 minute audio recordings	Create 1 minute audio recordings	Create 1 minute audio recordings	
<b>Ask</b>	same for all	same for all	same for all	
<b>Reflect</b>	Create 1 minute audio recordings	Create 1 minute audio recordings	Create 1 minute audio recordings	
<b>Make again</b>	Video production	Object production	Game production	
<b>Show</b>	Present the videos	Present the objects	Present the games	
<b>Collaborate</b>				