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3D STEAM

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3D STEAM Lesson Planner Tool for Teachers

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Leading organization: University of Jyväskylä (FIN)

Partner organization: Johannes Kepler University Linz (AT)

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UNIVERSITY OF JYVÄSKYLÄ
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Lesson Planner Tool for Teachers

Transforming your ideas into educational projects with 3D modelling and 3D printing

Welcome, educators!

This template guides your subject-based lessons into exciting, multidisciplinary STEAM (Science, Technology, Engineering, Arts, Mathematics) projects using 3D modelling and 3D printing. Whether you're working solo or as part of a dynamic teaching team, this tool will help you create engaging, hands-on learning experiences for your students.

Summary and Instructions for Teachers

This is a guide to simplifying the transformation of your ideas into a lesson plan.

This document consists of two parts. Part 1 offers a general guideline, and Part 2 guides you in creating your individual lesson plan.

Part 1: Get Started

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1. **General Information**: Please give general information about your lesson, including its primary goals, related subjects, grade recommendations, and total activity time. The first part should involve the utilisation of 3D modelling and printing predominantly by the educator. The teacher generates instructional materials for visualisation, game engagement, or other educational activities, particularly when scarce resources require an original design. The second part encompasses 3D modelling and printing as a student-centred endeavour to fulfil specific learning objectives through various pedagogical strategies and methodologies, such as project-based and inquiry-based learning.
2. **Recommended student age**: specify the target age group for which the activity is designed.
3. **Learning Objectives**: Clearly define what you want your students to learn during and after the lesson. Focus on the short-term goals for the lesson itself and the long-term goals that extend beyond it, especially those involving 3D modelling and printing.
4. **Overview**: Introduce the topic and purpose of your unit. Include any prerequisite knowledge your students need. This section should capture their interest and explain why the activities are relevant.
5. **3D Modelling and 3D Printing Integration**: Describe the tools and software you will use for 3D modelling and the steps involved in the 3D printing process. Specify the learning objectives related to these technologies and ensure they align with the overall goals of your project.
6. **STEAM Elements**: Break down your unit into its STEAM components, explaining how each subject area is integrated and contributes to the overall learning experience. Highlight how 3D modelling and printing play a role in each element.
7. **Syllabus**: Outline the lessons in your unit, specifying the subjects, topics, and learning objectives for each one. Emphasise how 3D modelling and printing will be used to achieve these objectives.
8. **Instructional Plan by Lesson**: Provide a detailed plan for each lesson that includes time allocation, teaching and learning activities, materials needed, and specific learning objectives. Make sure to include dedicated sections for 3D modelling and printing activities.
9. **Evaluation Plan by Lesson**: Define each lesson's evaluation criteria and methods, focusing on assessing your student's understanding and skills in 3D modelling and printing.
10. **Additional Resources**: List any extra notes, activity sheets, evaluation materials, and references that can support your lesson.

Part 2: Dive In and Get Creative:

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Following this template, you'll create structured, engaging lessons that transform traditional subject-based teaching into dynamic STEAM projects. Use 3D modelling and printing to inspire your students and foster a deeper understanding of integrated STEAM concepts. Let's bring those ideas to life!

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Title of the STEAM Unit

AUTHORS (NAMES / SCHOOL / COUNTRY):…….

RELATED SUBJECTS	GRADE RECOMMENDATIONS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
What are the school subjects that focusing on the topic? E.g. Mathematics, Physics, Music … ?	*What is the targeted age / grade?*	*Total time needed to complete the activity (in minutes).*	*Introduction to learning objectives during the lessons (short term)*	*Introduction to learning Objectives after the lessons, e.g. goals for follow-up (long term)*

TOPIC & PURPOSE:

(A short introduction to the unit's design content, learning goals, structure, and purpose. Insert a motivational picture to call attention to the unit.)

ACTIVITY PRE-REQUISITES:

(Content knowledge needed for the activity)

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3D Modelling and 3D Printing Integration

3D MODELING TOOLS AND SOFTWARE:	*(List the software/tools used for 3D modelling in the unit)*
3D PRINTING PROCESS:	*(Describe how 3D models will be printed, including the steps and tools required)*
LEARNING OBJECTIVES RELATED TO 3D MODELING AND PRINTING:	*(Specify the skills and knowledge related to 3D modelling and printing that your students will acquire)*

STEAM Elements

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	*Which parts of the unit are connected to science learning?*	*Which parts of the unit are connected to technology learning?*	*Which parts of the unit are connected to engineering learning?*	*Which parts of the unit are connected to arts learning?*	*Which parts of the unit are connected to mathematics learning?*

Syllabus

LESSONS	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES
1				
2				
3				
4				
5				

Instructional Plan by Lesson

(Copy this section as many times as needed for each lesson)

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS (SOFTWARE, HARDWARE)	LEARNING OBJECTIVES
INTRODUCTION (X MINUTES)			
LEARNING ACTIVITIES (X MINUTES)			
3D MODELLING ACTIVITIES (X MINUTES)			
3D PRINTING ACTIVITIES (X MINUTES)			
WRAP-UP & EVALUATION (X MINUTES)			

Evaluation Plan by Lesson

LESSON	EVALUATION CRITERIA	EVALUATION METHOD	3D MODELING AND PRINTING ASSESSMENT:
1	*E.g. Does the student understand / know ... ?*	*E.g. Making concept map*	*(Criteria and methods for evaluating students' 3D models and printed objects)*
2	*E.g. Did the student make ... ?*	*E.g. Observation, comparing products*	
3	*E.g. Is the student able to present ... ?*	*E.g. Observation, peer-review of presentation materials*	
4	*E.g. Is the student able to implement ... ?*	*E.g. Creating a project for recontextualizing and adapting the idea*	
5	*E.g. Did the students cooperate ...?*	*E.g. Observation, self-evaluation of groups / students.*	

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Additional Resources

NOTES:

ACTIVITY SHEETS TO BE LINKED:

EVALUATION MATERIALS TO BE LINKED:

REFERENCES / SUPPORTING MATERIALS TO BE LINKED:

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