



Title of the STEAM Unit: Developing a New Sport

AUTHORS:

TAMARA COENRADI, GIJS HUIJSKES, ANINE GOOSSENS / 2COLLEGE COBBENHAGENLYCEUM / THE NETHERLANDS
THOMAS VAN DER AA / 2COLLEGE JOZEFMAVO, TILBURG / THE NETHERLANDS

RELATED SUBJECTS	GRADE RECOMMENDATIONS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
The settings of the subject of the topping are Math, Music, Physics, Art, Language, Economy	The grade recommendation is 2e grade. 1 st and second year (12-14 years)	The time for this project will be about 10 weeks (3 x 90 min p/wk)	Introduction to learning objectives during the lessons (short-term)	Introduction to learning Objectives after the lessons, e.g. goals for follow-up (long-term)

OVERVIEW: TOPIC & PURPOSE

In this project the student learning goals are to develop a new sport they can play on the playground of the school during the breaks. They learn to collaborate in the team, and to communicate effectively with each other. They learn to combine the skills they have acquired by Art, Math and Music. There will be an overlap between the different subjects.





ACTIVITY PREREQUISITES

Content knowledge needed for the activity:

- Basic knowledge about sports and games
- Math: Making calculations of the field size (measurements in m/m²)
- Physics: Basics about speed and force quantities
- Music: Some experience with music and tunes during sports or games
- Art: Besides some drawing skills, knowledge of basic elements and the design circle

STEAM ELEMENTS

<p>ELEMENT 1: context presentation</p>	<p>Real-world / scientific / artistic context of the unit. Because smartphones will be banned from school grounds soon, we would like the children to design their own games / sports they can use / play / do in the time they get free.</p>
<p>ELEMENT 2: creative design</p>	<p>Summary of creative activities in the unit. Being creative in thinking and problem solving of new sport ideas, with all the components involved (new ball / bat / racket / field/ rules / scoring system etc. We'll start the project with a play session by giving the students 3 'random' materials. The students need to play and design a game within a short time. How to win?</p>



<p>ELEMENT 3: emotional and social learning</p>	<p>Summary of emotional and social skills development in the unit.</p> <p>To collaborate in design teams.</p> <p>To appreciate and communicate your opinion about design and art.</p> <p>To present your ideas and concepts.</p>
--	---

STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	ARTS	MATHEMATICS
<p>SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS</p>	<p>Physics: involves choice of material, speed and weight of objects (ball, bat, racket, field, etc.)</p>	<p>Depending on the sport students should include a technological component. E.g. a digital scoreboard.</p>	<p>Sports equipment must be engineered as a model or prototype.</p>	<p>Students design logos, clothes, sports materials and 'playfield'. FB Dance could be seen both as art and sports.</p>	<p>There are calculations involved in making the game fair and playable. Then students need to work out how many players can participate in a certain area.</p>

SYLLABUS

LESSONS (of 45 min)	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAMCOMPETENCIES
<p>Phase 1</p> <p>2 weeks</p> <p>8 lessons R&D</p>	<p>Kick-off</p> <p>Arts</p>	<p>Play!</p> <p>Basic elements of designing</p>	<p>Color, form follows function, composition</p>	<p>To be able to think creatively and</p>





<p>4 lessons Art or Music</p>	<p>Music</p> <p>Engineering</p>	<p>Sport Tunes</p> <p>Brainstorming</p>	<p>To connect sports tunes and discussion about the impact Create a list of (un)possible new sports! (At least a top 3.)</p>	<p>differently, to awaken curiosity.</p>
<p>Phase 2 2 weeks 8 lessons R&D 4 lessons Art or Music</p>	<p>Physics</p> <p>Math</p> <p>Arts</p> <p>Crafts</p>	<p>Speed, Force, Aerodynamics</p> <p>Area calculation and ratio (tables)</p> <p>Research of Logos</p> <p>Research of different materials</p>	<p>Students describe the relation between speed and force.</p> <p>Students recognize different effects on different shapes by moving objects.</p> <p>Students calculate areas of different playgrounds and are familiar with using a ratio table</p> <p>Students do some logo-research (what, why, how)</p> <p>Research of different functional materials (for creating the equipment of the play/game)</p>	





<p>Phase 3</p> <p>2 weeks</p> <p>8 lessons R&D</p> <p>4 lessons Art or Music</p>	<p>Engineering</p> <p>Arts</p> <p>Music</p>	<p>Skills development</p> <p>Flyer-website-poster</p> <p>Soundscaping</p>	<p>3D modeling (paint 3D / Tinkercad / SketchUp)</p> <p>2D presentation in Canva</p>	
---	--	--	--	--





INSTRUCTIONAL PLAN BY LESSON

Developing a new sport

Thomas Fischer

Developing new sports with associated equipment

Orientation towards sports
Play with three different materials and think of a way to win.
variation for 1 vs 1/ 2 vs 2 or team with more than eight players

Thomas Fischer

Math:
* Make calculations of the field size.
*

Thomas Fischer

Physics:
* Aerodynamics
* Theory of forces
* Gravitation
* Acceleration theory
* Material properties

Thomas Fischer

Language:
* Professional language
* Game terms
* spelling technique
language

Thomas Fischer

Economy:
* Business plan
* Marketing
* Investment
* Costs and benefits

Thomas Fischer, Anine Goossens

Art:
* Playground designe (3D)
* Material design
* Logo
* Cloths (brands)
* flyer/poster (PR)

Thomas Fischer

Music:
* sports related music
* game signal
* game tune (how do you know the sport music)
* volume of game play





EVALUATION PLAN BY LESSON

Phase 1: Exploration and Initial Design

- Group Evaluation: Assess each group's ability to brainstorm and conceptualize a new sport using the provided materials.
- Individual Evaluation: Monitor each student's contribution to the creative process and their understanding of the design principles.
 - **Evaluation Methods:**
 - Concept Mapping (Individual Activity): Students individually create concept maps that detail their understanding of sport design incorporating art and music influences.
 - Group Presentation (Group Activity): Groups present their top three sport ideas, focusing on creativity and feasibility.

Phase 2: Research and Development

- Group Evaluation: Evaluate the application of physics and math in designing the sport, particularly how these calculations affect the fairness and playability of the game.
 - Individual Evaluation: Assess understanding of material properties and their implications on sports equipment design.
 - Evaluation Methods:
 - Calculation Sheets (Individual Activity): Students perform area calculations and create ratio tables to ensure the playfield is well-designed.
 - Material Research Presentation (Group Activity): Each group presents their findings on suitable materials for their sport, explaining choices based on speed, force, and aerodynamics.

Phase 3: Finalizing and Marketing

- Group Evaluation: Review the final designs and promotional materials (flyers, websites, posters) to gauge marketability and appeal.
 - Individual Evaluation: Analyze individual ability to utilize technology tools for design and presentation.
 - Evaluation Methods:
 - 3D Model and 2D Presentation (Group Activity): Groups use software like Tinkercad or Canva to develop and present their sport's equipment and promotional materials.
 - Peer Review (Individual Activity): Peer feedback on the usability and creativity of the 3D models and promotional materials.





Final Evaluation

- **Prototype Testing:** Groups will have the opportunity to build a prototype of their sport and test it on the playground. This practical test assesses the sport's functionality and adherence to the designed rules.
- **Sport Fair:** A sport fair where groups present and demonstrate their new sport to other students and teachers, receiving feedback on various aspects like enjoyment, complexity, and innovation.
- **Reflection and Feedback Session:** Each student writes a reflective essay on what they learned, challenges they faced, and skills they developed.

Additional Components

- **Continuous Feedback:** Regular feedback sessions provide guidance and support throughout the project, helping students refine their ideas and improve their designs.
- **Collaborative Skills Assessment:** Regular assessments of teamwork and communication skills during group activities to ensure effective collaboration and mutual respect among students.

NOTES

-

ACTIVITY SHEETS TO BE LINKED

-

EVALUATION MATERIALS TO BE LINKED

-

REFERENCES / SUPPORTING MATERIALS TO BE LINKED

-

