ANALYSING SPORTING PERFORMANCE

STEAMTEACH AUSTRIA PDF

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PROJECT

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REPORT DETAILS

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1 PROJECT JUSTIFICATION Analysing Sporting Performance

Analysing Sporting Performance movement asks students to work in groups capturing and analysing sporting performance using video capture mobile phone or camera, importing this to Tracker movement capture for display and analysis and using this real life data for GeoGebra software simulations. This offers an opportunity for students to engage in *collaborative learning and for teachers to engage in multidisciplinary, supportive, collaborative groups/networks within school and outside*. It offers a *Project and Problem based approach supported by appropriate scaffolding and best practice, proven "plug-and-play" modules, notably Tracker software and Geogebra* which can be easily inserted into the integrated STEAM approach and used in other STEAM activity, for example on-line games and flight . Above all, by looking at various sporting activities chosen by students and also real-life sporting heroes, it provides a focus on *affective factors for students and teachers* (learning that relates to the learner's interests, attitudes, and motivations)."

1.1 Project Overview

Participant age: 14-16 year-old-students	*No. of participants:* Groups of 4-6	*Duration:* 8 hours
Level of knowledge: None	*No. of teachers:* 2	*Type of venue:* Regular classroom Outdoor space
Learning methodologies: Collaborative learning Problem-based learning Project-based learning	*Involved disciplines:* Mathematics Technology Sport	*Technological needs:* Computer Mobile phones Internet Portable cameras
Most emphasised learning methodology: Collaborative learning Problem-based learning Project-based learning	*Main addressed topics:* Analysing sporting performance	*Estimated project cost:* 0 €

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2 CURRICULAR CONTEXT

2.1 Key competences

PISA and EU2020 all recommend that children's education should foster enjoyment, self-belief and the stamina to address complex problems and situations in STEAM subjects (OECD, 2018). This is also a requirement of the International Baccalaureate: "Educational approaches should feature creative problem solving challenges including societal factors/needs." and at least one interdisciplinary unit with at least two subject groups (IB, 2020). The following shows extracts from the English National Curriculum for key stage 3 (age 11-14) and stage 4 (age 15 upwards), in particular Computing, Mathematics, English, Science, Design and Technology, and Art and Design:

Computing programmes of study: key stages 3 and 4 National curriculum in England September 2013

Undertake creative projects *that involve selecting, using, and combining multiple applications, preferably across a range of devices,* ***to achieve challenging goals****, including collecting and analysing data and* ***meeting the needs of known users***

Mathematics programmes of study: key stage 3 National curriculum in England

Develop fluency; mathematical reasoning and competence in ***solving increasingly sophisticated problems****... apply their mathematical knowledge* ***in science, geography, computing and other subjects****.*

English programmes of study: key stage 3 and 4 National curriculum in England September 2013

Are competent in the arts ***of speaking and listening, making formal presentations, demonstrating to others*** *and participating in debate...speak confidently and effectively in a range of formal and informal contexts,*

*Supporting a point of view by referring to evidence...****recognising the possibility of and evaluating different responses****... making an informed personal response that derives from analysis and evaluation*

Science programmes of study: key stage 3 National curriculum in England September 2013

Present reasoned explanations*, including explaining data in relation to predictions and hypotheses*

Design and technology programmes of study: key stage 3 National curriculum in England

Critique, evaluate and test their ideas *and products and the work of others,* ***take into account the views of intended users and other interested groups***

Art and design programmes of study: key stage 3 National curriculum in England

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Analyse and evaluate their own work, and that of others, *in order to strengthen the visual impact or applications of their work*

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2.2 Content

DISCIPLINE	CURRICULAR CONTENT ADDRESSED
Science	Flight: gravity, acceleration and equations of horizontal and vertical motion of projectiles
Technology	Video capture technology, Tracker and GeoGebra software
Engineering	
Arts	Various sporting activities
Mathematics	Statistics, analysis and simulation using real-life data

2.3 Expected learning results

We expect students to develop technology, communication and collaboration skills, gain experience and confidence in technology activities that include video–capturing and movement analysis using Tracker and GeoGebra mathematical software and gain a better understanding of gravity, acceleration and equations of horizontal and vertical motion of projectiles all of which they can apply to other STEAM activities.

Above all, by looking at various sporting activities chosen by students and also real-life sporting heroes, we hope to stimulate the learner's interests, attitudes, and motivations for STEAM.

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3 STEPS TO BE EXECUTED

The generic steps can be stated: Identifying the problem, Generating ideas, Exploring the Science and Maths, Designing and Constructing the Model, Evaluating and Refining the Model, Presenting the Project.

In “Analysing Sporting Performance” this cycle is done on an iterative basis in four workshops. The main focus of the first workshop is Identifying the problem and Generating Ideas, with workshops two and three developing the solution leading to workshop four presenting the project:

Identifying the problem, Generating ideas	**Exploring the Science & Maths, Designing & Constructing the Model**	**Evaluating & Refining the Model**	**Presenting the Project**
Workshop 1Focus ←----------			
----------Workshop 2 Focus←----------			
----------Workshop 3 Focus ←----------			
----------Workshop 4←-			

Table 1 Iterative Cycle with changing focus

Here is an example 4-workshop agenda. Note the transition from the first very structured, time-intensive teacher-led workshop to the later progressively less-structured student-driven workshops.

We set the students a very open-ended problem challenge. We 'teach' them some tools, then it's up to them to work together, project plan their activity and present. We (both students and teachers) provide iterative feedback for continuous improvement - up to presentation of their solution. Believe it or not, students find it...fun!

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Further detail can be found at:

https://sites.google.com/site/cciteasp2/resources/hothouse-challenge

Workshop 1: Identifying the problem, Generating ideas

In workshop 1, the focus is on identifying the challenge, generating ideas working in teams, receiving introductions to the technology (video capture, Tracker & Geogebra) and recording a real-life sporting activity of their choice (Netball clip reversed , Bloodhound test run 420fps ruler 1 5m1 , ballbouncecommented) culminating in group presentations 'selling the idea' , receiving feedback and discussing their experience.

10.00 – 10.10 Welcome and Objectives

10.10 – 10.20 Challenge: How can we analyse sporting performance?

10.20 – 10.40 Group work

Students split into groups of 5 to address the challenge (teachers stand back). :-)

3 minutes of discussion, then present first ideas for 60 seconds!

10.50 – 12.30 Group work

Bouncing Ball Video Capture, Tracker & GeoGebra Taster: Discussion and agreement on "who does what," research, expert interviews, development of solution and plan, practice presentation

12.30 – 12.50 Group 60–second presentations/demonstrations

Receive feedback, discuss team–working experience

12.50 – 13.00 Next Steps and Close

Workshop 2: Exploring the Science and Maths, Designing and Constructing the Mode

In workshops 2 and 3, we move to progressively less-structured student-driven workshops. Tracker movement recording (Tracker - cciteasp2) and GeoGebra simulation (GeoGebra - cciteasp2) are introduced in more depth:

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Welcome and Project Objectives

Video capture, Tracker, and GeoGebra re–cap

Discussion and play with real–life examples

"Do your own" activity—students develop their own ideas with help, as/if requested

Presentation preparation

60–seconds Presentation: YOUR activity, ideas, and next steps

Workshop 3: Evaluating and Refining the Model

Welcome and individual project presentation update—feedback and suggestions from pupils and experts

Pupils work on their individual projects and are visited by our various experts receiving support as and when needed

Tracker and GeoGebra Help in developing project—from GeoGebra experts

GeoGebra on–line communication and collaboration including getting content on GeoGebra during the day

Individual project presentation update and agreement on next steps and meeting

Workshop 4: Presenting the Project

The final session is essentially a celebration event where students present their work, assess each others work (with or without a winner or prize). The presentation "KIKS Kids Inspiring Kids in STEAM UK" illustrates the presentation aspect (both physical and on-line) throughout the process culminating in an event engaging other children, parents, experts and community:

https://prezi.com/jnd6nez1oz11/kiks-kids-inspiring-kids-in-steam-uk/?present=1

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4 EVALUATION

This presentation features a variety of evaluation examples - these can be tailored to, or might form part of, or be in addition to, a specific organisation's assessment and evaluation requirements:

https://sites.google.com/view/tony-houghton/evaluation

Below are three examples featured in the presentation relating to:

PLTS Skills

PLTS (Personal Learning Thinking Skills) evaluations, both paper and on-line get students to THINK about their work and receive feedback from peers and teacher.

Perceptions

PISA International best practice tells us that self-belief and High PERCEPTION of the value of education is a key differentiator of the best international educational systems. Accordingly, we can measure Self Perception (eg self-esteem, aspirations and respect), and enhanced Perception of eg Education, STEM and Technology careers.

Ratings

We can also find out a lot about how students and teachers enjoyed and benefited from the activity by looking at how many completed the process and their ratings of the activity. This in turn allows us to determine cost benefits. We can mix qualitative and qualitative to evaluate the activity and also identify enhancements.

5 MATERIALS AND ROOMS

Classroom, mobile and/or mobile cameras, computers and LAN access, school playing areas

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6 CONCLUSIONS: RECAP & REFLEXION

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