



Rollercoaster Design

STEM4inclusive schools
WP2 – Toolbox

Paderborn University



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Structure of the activity

A Introduction

about robotics in Schools

hint/ link to learning outcome matrix
name of the topic, hint to worksheets,
intergration of video link

B Training phase

about the training

Small group work to the topic
hint / link to H5P tasks

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Rollercoaster Design



The funfair is in town. This means not only lots of fun, but also physically astonishing things.

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Rollercoaster Design

“These rotating swing rides involve beautiful physics, often surprising, but easily observed, when brought to attention. They can be used for a number of student assignments of different degrees of difficulty, across a number of math and physics topics. Theoretical investigations for the classroom can be based on ride data, photographs, movies or accelerometer datasets” (PENDRILL 2015, p. 61)

PENDRILL, Ann-Marie (2015): Rotating swings – a theme with variations. PHYSICS EDUCATION, VOLUME 51, NUMVEER 1. DOI: 10.1088/0031-9120/51/1/015014



Not all rollercoaster are the same



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What types of rollercoaster exist

- Inverted Coaster
- Suspended Coaster
- Stand-Up Coaster
- Flying Coaster
- Floorless Coaster

The rollercoasters are a great way to illustrate subjects such as

- Physics
- Math
- Technology
- Art



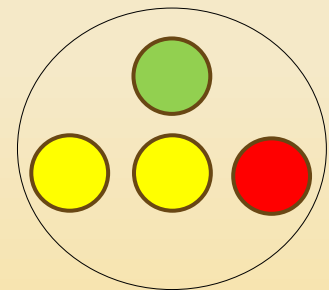
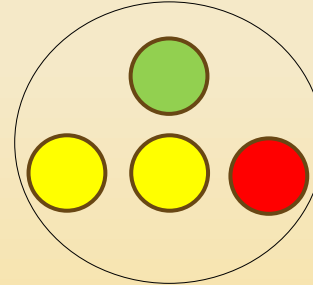
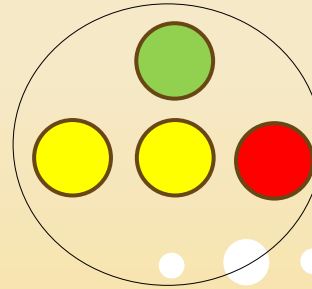
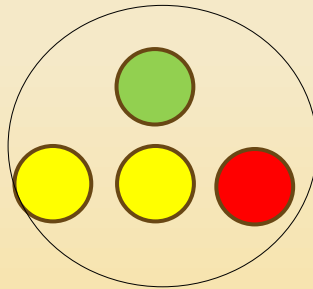


Inclusive STEM education

One measure for inclusive work is the use of heterogeneous groups. The pupils are divided into four groups.

- Within each group, one high-achieving pupil (green)
- Within one group there are two average pupils (yellow)
- There is one low-achieving pupil in a group (red)
- Due to the group dynamics, the low-achievers learn from the high-achievers and the high-achievers can deepen their function as 'trainers'.

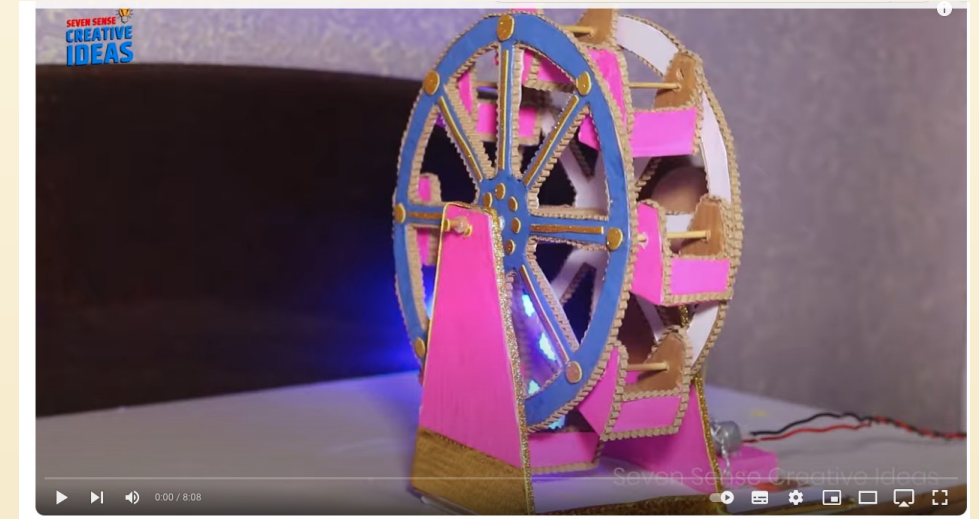
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Rollercoaster Design



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<https://www.youtube.com/watch?v=U7XYzPfutBs>

<https://www.youtube.com/watch?v=1iYwvIW8qcM>

Rollercoaster

Feriss wheel



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How to create a paper roller Coaster

Task:

Design a Rollercoaster with your group. After that, there are four tasks regarding the rollercoaster. First contribute the task to each group member, Secondly, present your Task and your solution to the group.,

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<https://www.youtube.com/watch?v=U7XYzPfutBs>



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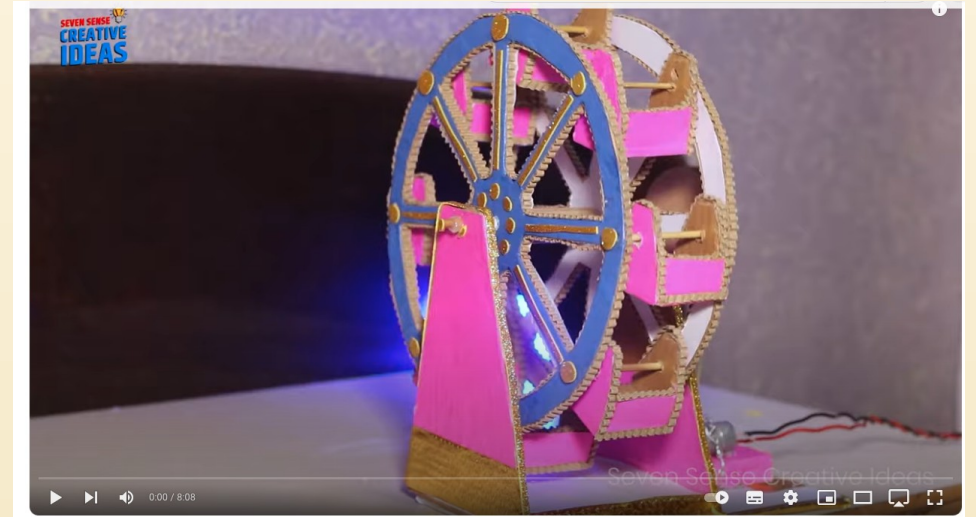


Ferris Wheel

How to make a cardboard Ferris Wheel

Task:

Design a Rollercoaster with your group. After that, there are four tasks regarding the rollercoaster. First contribute the task to each group member, Secondly, present your Task and your solution to the group.,



<https://www.youtube.com/watch?v=1iYwvIW8qcM>

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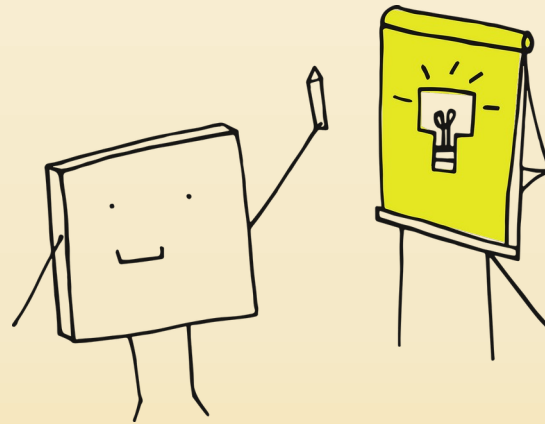


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B: About the training



Training phase



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Task 1:

- Get together in your assigned group
- Decide in your favour of the Big Wheel or the Rollercoaster
- Build your prototype together with the help of the materials and the YouTube instructions.
- Work on the 4 respective tasks
- Present them to each other



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H5P- Tasks:

Rollercoasters and Ferris wheels are ideal for demonstrating physical forces

- True (X)
- False

The teaching unit outlined can be carried out in the following subjects

- Maths (X)
- Physics (X)
- religion
- geography

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Congratulation!

You mastered the activity on Robotics in School!

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