OPTICAL ILLUSIONS

1. Name of the project:

OPTICAL ILLUSIONS

2. Subjects covered from STEAM areas:

Science,
Arts,
Mathematics

3. Target group (age range and size of the group):

- Age group: 7-10 years
- 25 students

4. Duration of the activity:

4 lessons

5. Key words:

- Optics
- Eye
- Brain
- Processing
- Angle
- Measure
- set square

6. Key sentence describing context of the activity, followed by short description (200 words):

Various optical illusions are shown and examined. First impressions can be disproved by measurements. In addition, biological explanations for some optical illusions can be found. The surprise effect can be used again and again to show the different optical illusions, which refer to different functions of the eyes and the brain. Reference is made to optics, for example regarding light and dark and the perception of shadows. In addition to the consideration of light and shadow, the small functions of the eyes should also be addressed, e.g., the perception of colors or small eye movements, which we do not perceive ourselves but can be made visible through such optical illusions. On a mathematical level, the illusions can be described and explained by using the geo triangle and concepts such as parallelism. This involves measurement and reference to

the recognition of patterns. Some optical illusions can possibly be extended by continuing the patterns. In relation to art, optical illusions can be addressed in distinction to other types of images. Optical illusions can also be discussed in relation to well-known works of art. A possibility of the art lessons is also the production of own optical illusions, as far as this is already possible. Digital devices can also be used for this purpose.

7. Description of the activity environment, including the list of materials and tools needed:

- Various pictures of optical illusions (examples below)
- Set square/ruler

8. Step by step, detailed description of the activity, including teaching and learning strategies:

1st lesson: different optical illusions are shown, and first impressions are discussed -> Why do we see different things?
2nd & 3rd lesson: background information on different optical illusions at stations -> mathematical explanation, biological explanation etc.
4th lesson: reference to art and conclusion -> how can optical illusions be discovered and explained? optical illusions be discovered and explained?

9. Learning objectives/competencies:

Math:
- Students can recognize and continue patterns
- Students can examine and name plane figures and use technical terms to describe them
- Students can use symmetry properties to describe optical illusions
- The students can measure lengths with measuring instruments in a factually appropriate way and compare and order them.

Science Subject for elementary (Sachunterricht):
- The students can identify and describe the performance and tasks of individual sensory organs describe them, especially with regard to the eye.
- The students can discover the properties of light and shadow in experiments

Art:
- The students can distinguish between objects and types of images in the everyday world, art, advertising, media, etc.
- The students can discover in pictures and objects suggestions for their own
    - for their own design possibilities and desires

10. Evaluation/Assessment guidelines:

- Observation sheets
- Learning diary

11. Lessons learned:

- Observation sheets
- Learning diary

12. Additional information/Links:

(All german)
The curricula for mathematics, “Sachunterricht” and art for elementary school in NRW:
https://www.schulentwicklung.nrw.de/lehrplaene/upload/klp_gs/GS_LP_M.pdf
https://www.schulentwicklung.nrw.de/lehrplaene/upload/klp_gs/GS_LP_SU.pdf
https://www.schulentwicklung.nrw.de/lehrplaene/upload/klp_gs/GS_LP_KU.pdf
Internet pages on various optical illusions that are suitable for teaching suitable:
https://www.panoptikum.net/optischetaeuschungen/ (Last accessed: 05/03/2022)
https://lernarchiv.bildung.hessen.de/sek/biologie/menschenkunde/neurophysiologie/sinnesorgane/sinnestaeuschung/index.html (Last access: 03.05.2022)
https://docplayer.org/42394062-Optische-taeuschungen-lehrerinformation.html (Last Accessed: 03.05.2022)
https://michaelbach.de/ot/index-de.html (Last access: 03.05.2022)
https://www.blickcheck.de/auge/funktion/optische-taeuschungen/ (Last access: 03.05.2022)
https://www.geo.de/geolino/mensch/10494-rtkl-optische-taeuschungen-so-kann-man-%20sich-taeuschen (Last access: 03.05.2022)

13. Contact person:

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