Learning with the Arts

Erasmus+ School Cooperation Project 2017-2019

Gefördert durch Erasmus+ Schulbildung

Subject: Biology and Art

Topic of the module: **Evolution and Metamorphosis**

Age of students: 11,12

number of students: one class (up to 30 students)

Required prior knowledge: none, but it helps if students have been introduced to the basic biological concept of evolution

Objectives

At the end of the module the students are able to

- name and describe different cranial bones of the human and animal skull and recognize the respective mammal e.g. according to the layout of its teeth
- draw three-dimensional objects applying different artistic techniques
- understand evolution and metamorphosis as a general concept of life-forms and as a fascination for artists
- appreciate different pieces of art in which artists have used nature and metamorphosis as a basis for their works
- conduct a short individual research to investigate and compare with the help of different methods (drawing, organizing) in order to express assumptions and conclusions

Opportunities - Other things students might also learn although it's not the main goal:

At the end of the module, students are able to

- work together closely with a partner and stay focused on the task for an extended period of time
- appreciate the concept of metamorphosis as a parallel between biology and arts
- trust their own creativity in experiencing different art forms

Arts involved: drawing, collage, body sculpture,

Resources: paper, pencils, pictures from (nature) magazines, oversized elastic clothes

Time frame: three to four 45-minute lessons

Methods of work: individual, pair work, group work, classroom discussion

Procedure / steps

1st lesson: Evolution: Drawing Cranial Bones/Skulls

(Cranial) Bones are fascinating and at the same time a little scary für students. It is hard to imagine that they really are to be found inside our bodies. It is always exciting when children find a bone or a part of a skull in the forest.

Resources: Various skulls from the collection of the biology department (human, monkey, horse, rodents, cat etc.), black cloth, drawing paper, drawing materials
We place the white skulls of different sizes on black cloth like in an arts exhibition so that there is a clear contrast.
Activities:

1. Gallery Walk: Students quietly walk around the skull exhibition and take in everything they see.
2. Sharing first impressions: Class discussion about similarities and differences, teeth, striking recurrent shapes/characteristics (e.g. eye sockets)
3. Introduction to different drawing techniques by the arts teacher (pencil, ink, charcoal, graphite)
4. Students choose one skull and copy it on drawing paper. Depending on the size of the cranial bones, they choose the appropriate paper size and drawing technique. For this activity close scrutiny of the object is essential. A very concentrated and focused work atmosphere develops.

2nd lesson: Evolution: Comparing the Development of Skulls and Sets of Teeth of Different Mammals

Resources: Different skulls from the collection of the biology department, worksheets, animal postcards, pencil and paper

Activities:

1. Drawings from the last lesson are presented and analyzed together with the biology teacher


2. Palpation of our own skulls: Quietly students scan their individual heads and feel the shape of their cranial bones, forehead, temple, eye socket, cheekbone, nasal root and bone, chin, neck, different joints, upper and lower jaw, using their tongue they feel for front teeth, molars and canines.

3. Research assignment: On the basis of your drawing from the last lesson, describe the skull of your mammal and copy/draw its set of teeth as exactly as possible. Take notes about your observations. Choose the appropriate postcard of your mammal and work on the worksheets in teams.




4.Gallery walk: We place the students' drawings and notes, skulls, postcards and the information of the worksheets on the tables. Teams present their findings. In a class discussion we share our findings on similarities, differences and specializations and reasons for these. We discuss what can be concluded about feeding habits/diets of animals on the basis of theirs sets of teeth.



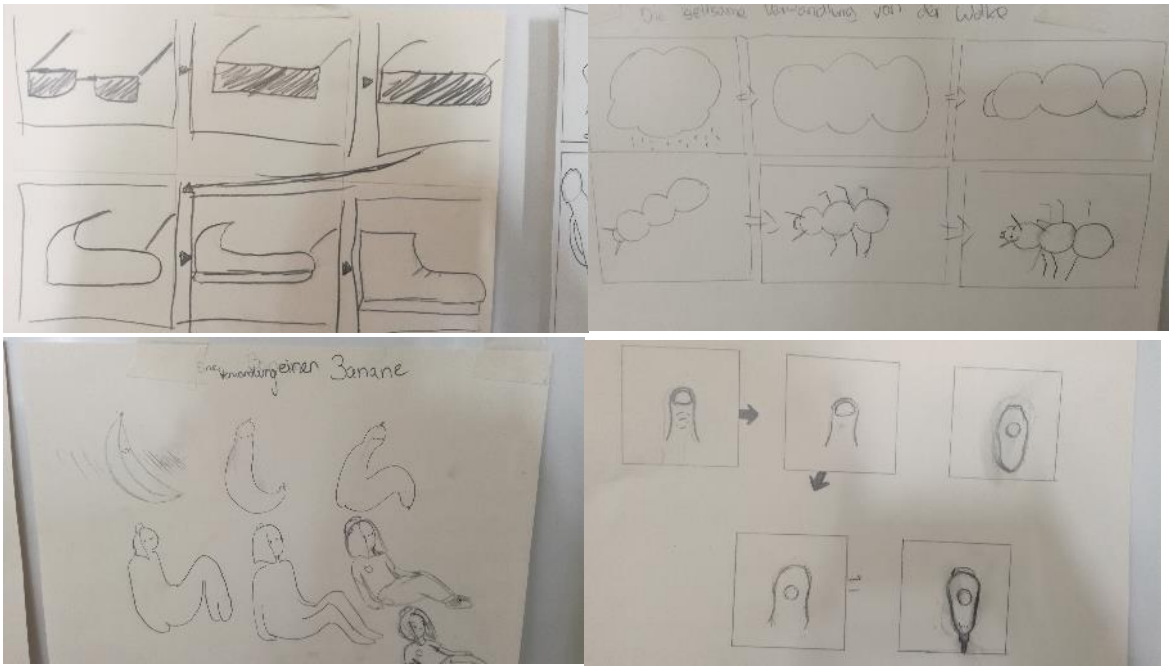
3rd lesson: Evolution: The concept of Metamorphosis/ Transformation in Arts and Biology

Resources: drawing paper, pencils, several puzzle parts of Jan Paul Schutten's "Evolution or the puzzle of every living being", power point presentation "Evolution"

Activities:

1. Pantomime: The term "metamorphosis" is portrayed in different pantomimes. Students guess what is meant here, terms are collected on the board: change, transformation, evolution, growth, development, deformation, life, etc.

2. Artistic activity: Students are given the heading "The strange transformation of…" and are encouraged to draw a picture story of 5-7 pictures in which one object transforms into another one (sunglasses into boot, cloud into ant, banana into woman…)



3. Biological activity: Every pair of students receives 12 different puzzle parts (Jan Paul Schutten's "Evolution or the puzzle of every living being") and organizes them in a sensible way.

4. Classroom discussion: What was difficult, easy, why? Which parallels can be found in the development of a living being?
5. The Biology teacher then presents other examples of metamorphosis in Biology (tadpole-frog, caterpillar-butterfly, embryo-baby) and artists who have used this phenomenon as a starting point for their work (Ernst Häckel, Maria Sibylla Merian)

from: Ernst Haeckel, Kunstformen der Natur. Leipzig und Wien. 1904

"Granatapfel und Schmetterlinge"
Kupferstich von Maria Sibylla Merian

4th lesson: Metamorphosis in Art

Resources: paper, ink, straws, brushes, pencils, magazines with colourful pictures, glue, fineliners, hair dryer,

Activities: Students work at 4 different stations and swap after 10-15 minutes:

1. **Experimenting with Perception and Coincidence**
   Task: Imagine it is summer and you are lying on the grass and looking at the passing clouds that are constantly changing. What do you see in them? Perhaps a face, an animal, a dragon….?
   Use ink to create accidental drops, stains and spots. You can also use a straw to blow them in different ways or hold the paper in a slanting position so that the paint flows. Dry the paint quickly with a hair-dryer. Now try and recognize figures or shapes (they can be real or from your imagination). Trail and emphasize the contours with a black fineliner (one famous artist who applied this technique was Max Ernst).

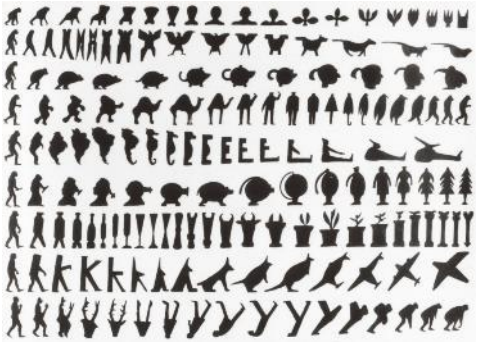
2. **Changing Contours**
   Students work together as a group. Everyone has a piece of (drawing) paper in front of them and a pencil. They all draw a small outline/shape at the same time on their paper and then hand it over to the student on the right. Then you copy the other student's outline but apply a slight change to it and so forth, so that every member of the group applies a small change to the drawing before. The outlines may overlap (one famous artist who applied this technique was Nanne Meyer).

3. **Body Sculptures**
   Students choose a piece of clothing and experiment with it. They use the different ways of covering oneself up with it and moving inside them. After this they go into pairs and play "sculptor and sculpture". The sculptor forms his partner in a piece of clothing into a sculpture. They try to do this without speaking. They find a title and take a picture. (you can find interesting pictures by the artist Erwin Wurm, who also used this technique).

4. Collage
5. Students cut out pictures from magazines and combine them in an unusual manner (artists who have also worked in this way are René Magritte, Salvador Dalí and others).

Examples from the world of art:

Meret Oppenheim: Le déjeuner en fourrure, 1936




Nanne Meyer: Wandlungen 1990-96



Erwin Wurm: 59 Stellungen, 1992

Salvador Dali: Hummer oder aphrodisisches Telefon, 1936

Marcel Marien: L'introuvable, 1937

Evaluation summary and comments about how the module went: engagement of the students, difficulty, effectiveness, improvement suggestions …)

Our first evaluation focused on the topic of (cranial) bones. The module, however, developed to be more complex and so in the end covered many more aspects than just knowledge of and about the skeleton of mammals. It was interesting that most of the students stated they found the topic difficult and hard to remember. This indicates that they seldom draw parallels to other topics or even to their own bodies.

In the final evaluation, many students mentioned, they would welcome more interdisciplinary work at school because it was fun and made them understand subjects better.

During the module the students surprised us by their focus and interest. The fascination and mystery of our skeleton and bones was palpable during all lessons and the children engaged happily in any artistic activity relating to metamorphosis.
All students said they thought they would be able to remember the topic better in the future.
For my colleagues and me it was a pleasure to team teach and we learned many things from each other and from the different subjects.