

DEUTSCHES MUSEUM, MÜNCHEN, GERMANY

Ships: energy and propulsion

Traudel Weber

Part 1 Basic information

Institutions involved

Deutsches Museum, Museumsinsel 1, D-80538 München, Germany. Contact person: Traudel Weber +49 089/2179-462.

Primary schools

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- Grundschule an der Berg-am-Laim-Str. 142, Ulrike Apfelbacher, D-81673 München, +49 089/432138.

Aims

- Find out that there is a variety of ships and boats.
- Find out that there are different ways to propel ships/boats.
- Recognise the types of power used and name them.
- Use the correct terms for the different kinds of ships and build sentences.
- Enjoy the exhibits at the museum and develop understanding of technological evolution.
- Recognise the different kinds of energy used to move the ships and boats in the exhibition.
- Build a ship model in order to find out more about movement.
- Discuss problems related to the propulsion of the models.

Materials

- Models of boats, toy boats, books about shipping.
- Worksheets.
- For the model building workshop: hot glue, knives to cut and shape it, wire, pliers, ruler, wooden pearl, empty yoghurt cup, cork, tooth-pick, elastic bands, balloon, film, coloured paper.

Part 2 Description of the project

Preparation of the visit

- Building a small exhibition in the classroom. Pupils bring toy boats, ship models, books about shipping to the classroom, talk about that material, tell what they already know about ships and boats, build a small exhibition.
- What are the different kinds of boats? Working in groups the children try to find names for different types of boats. How do experts name those various boats?
- There are different ways to propel ships/boats. Pictures lead the children to discover the different kinds of energy used to propel boats/ships (muscle power, wind power, steam power, internal combustion engine). They talk about these types of energy and boats using technical terms, building sentences with the new information and new words.
- Talk about the visit to the museum: when, where, how long, what to bring with you.

Visit to the museum (ca. 3 hours)

Organisation

- Introduction (15 min). The museum guide welcomes the whole group and explains the program. A quick tour through the department of shipping presents the children the four areas they are going to explore with the worksheets.
- Work in the department of shipping. Working in groups with 4 different worksheets, tell each other about new discoveries (1 hour).
- Building a ship model in a workshop. Working in groups with 4 different worksheets (1/2 hours).
- Test the ship models with a race in the water channel (20 minutes).

Contents and activities

Activity 1 Exploring the department of shipping with worksheets

There are four areas covered by the questions on the worksheets: rafts and boats, rudder and sail, steam ships, comparison of a sailing boat with a steamboat. Depending on the number of children in the class, each topic is studied by one or two groups. The children are asked to take only few notes and then try to report about what they discovered with their own sentences, using the technical names.

- Rafts: pupils can see that there is a variety in material and shape and get to know two special kinds of boat building.
- Rudder and sail: compare old boats and ships built in Northern Europe with those from the Mediterranean sea. Develop understanding of technological evolution from ships moved by rudders to those moved by sail. Famous discoveries by people travelling with sail boats.
- Steam ships: principle of steam propulsion, advantages and disadvantages of the early steam boats, a technological "highlight": fast steamboat.
- Comparison steam-sail: the two most impressive exhibits in the ship department are the sailing fisher-boat "Ewer Maria" and the steam tug "Renzo". The children are asked to compare: when were the boats built? Which material is the main body built with? Where were the ships used, what was their task? How are they propelled?

Activity 2 Workshop building a ship model

There are three different types of ship models among which the children can choose: one moved by the air led by a balloon (based on the action/reaction principle), one moved by an elastic band "engine" working on a screw and one working on a waterwheel. The pupils work with a partner, each group should do two (if possible, different) boats. There are instruction sheets on how to build the boats and the teacher and the museum educator are ready to give advice. In a basin with water pupils can find out, whether their boat moves or not and why. They can try to improve the movement of their boat. If there is some time left, pupils can add colour, flags and decorations to their boats.

Activity 3 Testing race

In the water channel of the shipping department the boats start two by two. Which one travels furthest, which one is the fastest? Which are the reasons for the good result or for the bad result?

Follow-up work in classroom

The follow-up work concentrates on possible improvements of the ship models. Some children even work at home to make their boat travel straight and not in a circle. Talking about the visit to the museum is useful both for reviewing the new information gained and for practising giving reports in free speech.

Conclusions and evaluation

Three kinds of ship models between which to choose are too many, there should be only two types. The follow-up work in the classroom should be more structured and there should be a result visible also to other pupils who have not been to the museum. Classes from other schools, who tested the learning unit, did some follow-up work writing a kind of protocol and collecting some material to be published on the internet in order to give other children the opportunity to know about their project.

Facilitators and innovative aspects

Closer co-ordination between school teaching and museum visit. Thus the visit to the museum is better integrated with work at school and the museum gathers information about the needs of school classes coming to the visit.

Appendix

- Activity sheets.
- Background information for teachers.