



## Solutions inspired by nature

SIBN promoted basic skills, especially STEM and foreign language skills and increased students' environmental awareness and prepared them to study, act and work in their home countries and abroad. This was achieved by following the methodology of problem-based learning, cooperative learning, Content and Language Integrated Learning (CLIL) and visible learning.

It focused on biomimesis, a branch of science which develops sustainable technological solutions using nature as a model. It relies on the facts that nature is an infinite source of inspiration and that natural models are resource- and energy-efficient. So it leads to technologies that harmonize with nature rather than destroy it and meets the challenge of living within the limits of our planet (=> topic: energy and resources).

SIBN encouraged participants to actively shape scientific development. They came up with their own ideas to solve problems, e.g. How to create stable hooks with a minimal amount of material (LTT1). As corona struck just before LTT 2, we adapted the topic to "resenting the corona situation in our different countries and giving hope to people" and cooperated digitally. This was followed by digital meetings focusing on the international language app especially designed for SIBN and keeping SIBN visible at our school with the speech bubble activity.

Just in time the corona rules became more lenient and allowed us to realize our LTTs- in a changed order: LTT2: How the build models of bioclimatic buildings, LTT3: How to water a garden efficiently and LTT4: How to allow energy-efficient mobility in water by using aquatic organisms as a model. Different workshops, activities and field trips to nature reserves, museums and companies broadened the students' knowledge base and promoted the skills they needed to solve the problems. In doing so they acquired the confidence that they too can contribute to scientific progress.

Their products were the basis of exhibitions to inform and inspire other members of the school community and to spark off discussions. This promotion of science skills at our schools is necessary because science subjects have the reputation of being demanding and are less popular. Follow-up tasks in form of displays at schools, connected the LTTs and encouraged long-lasting impact on the curricula and the use of technological tools in our schools. Displays presenting SIBN as a whole were prepared and organized in the months after LTT4 to disseminate the results but to encourage students to take part in future Erasmus activities at our schools.

We supported the Erasmus+ project SIBN with an eTwinning project to prepare the LTTs, to disseminate the results and to increase the impact.

However the participants used the eTwinning platform reluctantly and often chose different means of communication.

Four schools across Europe participated in the project. We collaborated using local features and the special expertise of each school to learn from each other and to add value to the project => methodology and innovative technologies, which we shared in staff training events. These were the contributions:

Germany: Teaching biomimesis, Computer Aided Design (CAD), 3D Printing and Content and Language Integrated Learning (CLIL).

Sweden: Following the methodology of visible learning, problem based learning and teaching marine ecology.

Spain: Using eTwinning projects for successful European cooperation and communication and teaching investigations with the help of microcontroller kits and programming them.

Greece: Teaching programming and coding to create and use apps and computer simulations and setting up websites.

84 students between 14-18 years travelled and hosted in short-term mobilities and many more contributed. The results are the exhibitions and the multi-lingual dictionary app. Participants learnt to feed useful terms into it and use it. Other results were teaching instructions developed by the teachers e.g. "Following the pathway to biomimetic inventions" and using modern tools like CAD, 3D-printing, the dictionary app and microcontroller kits. All results were disseminated on the eTwinning Platform, on the Erasmus+ Project Results Platform and on the projects website.

SIBN was a very demanding project because skills and knowledge from different STEM areas are required as well as foreign language skills for successful communication. This is why we supported the learning process by employing CLIL methodology and by using self-evaluation sheets. These included the European Language Passport but also specially adapted sheets following the methodology of visible learning.

Summing up the expected potential long-term benefit were the participants' improved science skills and basic skills which inspired fellow-students on the one hand and new perspectives for teachings science lessons which encourage the students' activity and creativity and employment of modern technological tools.