

EMPOWER

**Empowering Teachers for Science Learning
Through Modelling-Based Approaches**

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Co-funded by
the European Union

Erasmus+

Enriching lives, opening minds.



Empowering Teachers for Science Learning
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Modelling-Based Learning as a Method for Science Education and Professional Development

Since the early 2000s, modelling-based learning has proven to be an effective and innovative approach to support students' understanding of scientific concepts and processes. Compared to traditional methods of science teaching, modelling-based learning emphasizes the active construction, use, and evaluation of models as central tools for reasoning, explanation, and prediction in science. It promotes inquiry, reflection, and conceptual change by engaging learners in authentic scientific practices.

For modelling-based learning to be effectively implemented, teachers need not only a solid understanding of scientific models and modelling but also the pedagogical skills to guide students in developing, using, evaluating, and refining models. All these require a learning environment that fosters curiosity, inquiry, collaboration, and reflection—where teachers encourage students to explore ideas, test hypotheses, and communicate their reasoning.

The successful integration of modelling-based learning in science education depends on sustained professional development opportunities that empower teachers to design, adapt, and apply modelling activities in diverse classroom contexts. As important, training and support for teachers are necessary to build confidence in facilitating modelling-based inquiry and to connect scientific models to real-world phenomena.



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Project EMPOWER Empowering Teachers for Science Learning Through Modelling-Based Approaches

The Erasmus+ project *Empowering Teachers for Science Learning Through Modelling-Based Approaches (EMPOWER)* focuses on strengthening science education by equipping teachers with the knowledge, tools, and training to implement modelling-based learning effectively in their classrooms.

As part of this project, researchers and teacher educators from universities and educational institutions in four European countries (Germany, Cyprus, the Netherlands, and Spain) collaboratively develop a scientifically grounded framework and resources that support teachers in integrating modelling practices into their science lessons. Building on this framework, the project designs modular training materials and digital learning resources to promote inclusive, inquiry-based science teaching.

The project will offer freely accessible online modules, teaching materials, and examples of good practice, available in several languages (Dutch, English, German, Greek, and Spanish). The progress of the project will be continuously shared through the project website, social media channels, and at dissemination events such as webinars, conferences, and multiplier events.

With its results, EMPOWER contributes to enhancing inquiry-based and modelling-oriented science education, developing teachers' professional competences, fostering innovation in STEM teaching, and ultimately improving students' understanding and engagement in science learning.



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