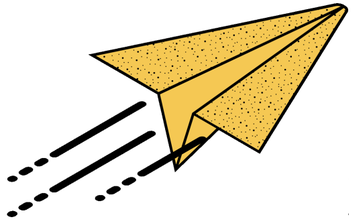
Presented by Šimčíková Tereza



STEM LEARNING TASKS' DATABASES

FOCUS ON GEOGRAPHY, MATHEMATICS AND MODERN TECHNOLOGY

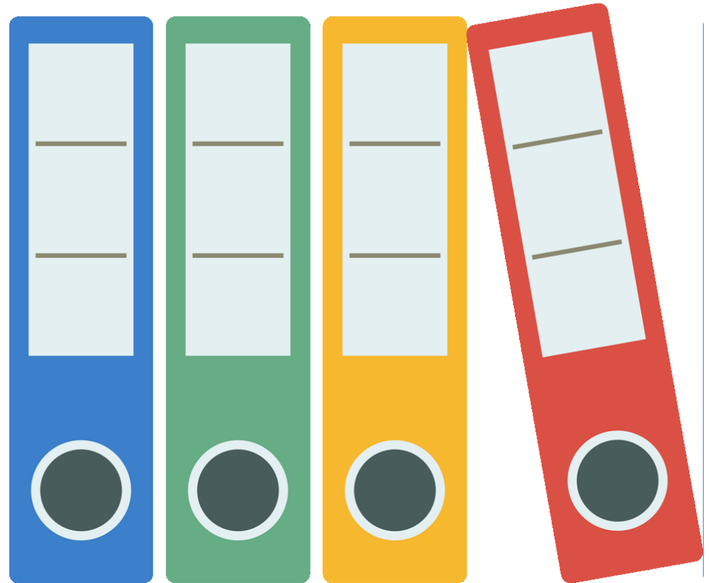


TABLE OF CONTENTS

INTRODUCTION

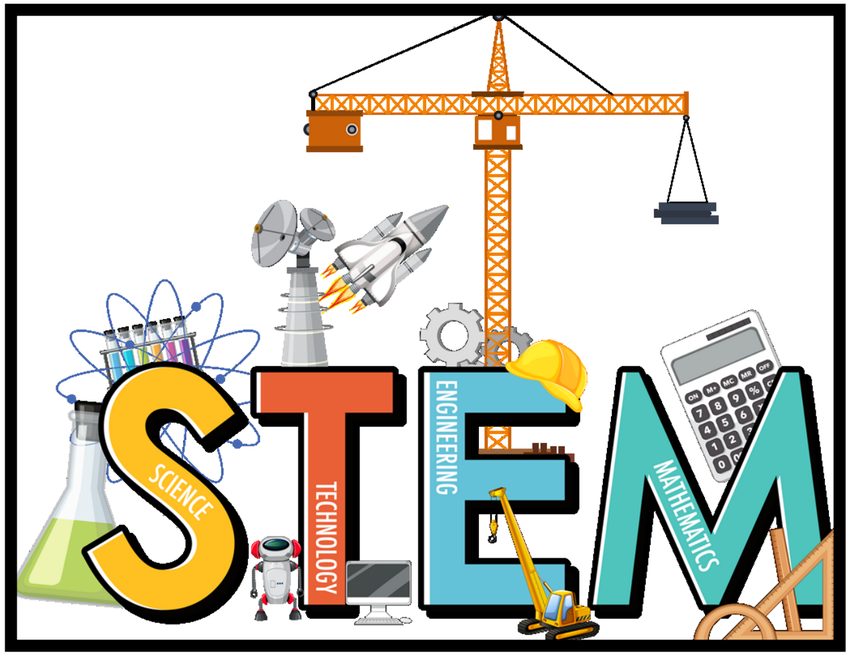
What am I actually going to talk about?

How and why did I choose this topic?

THEORETICAL PART

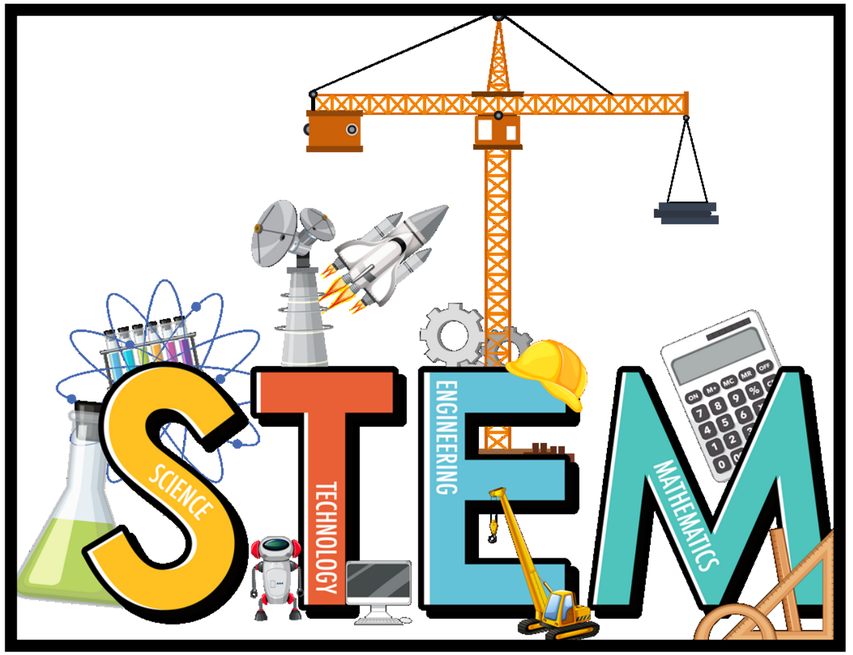
STEM EDUCATION

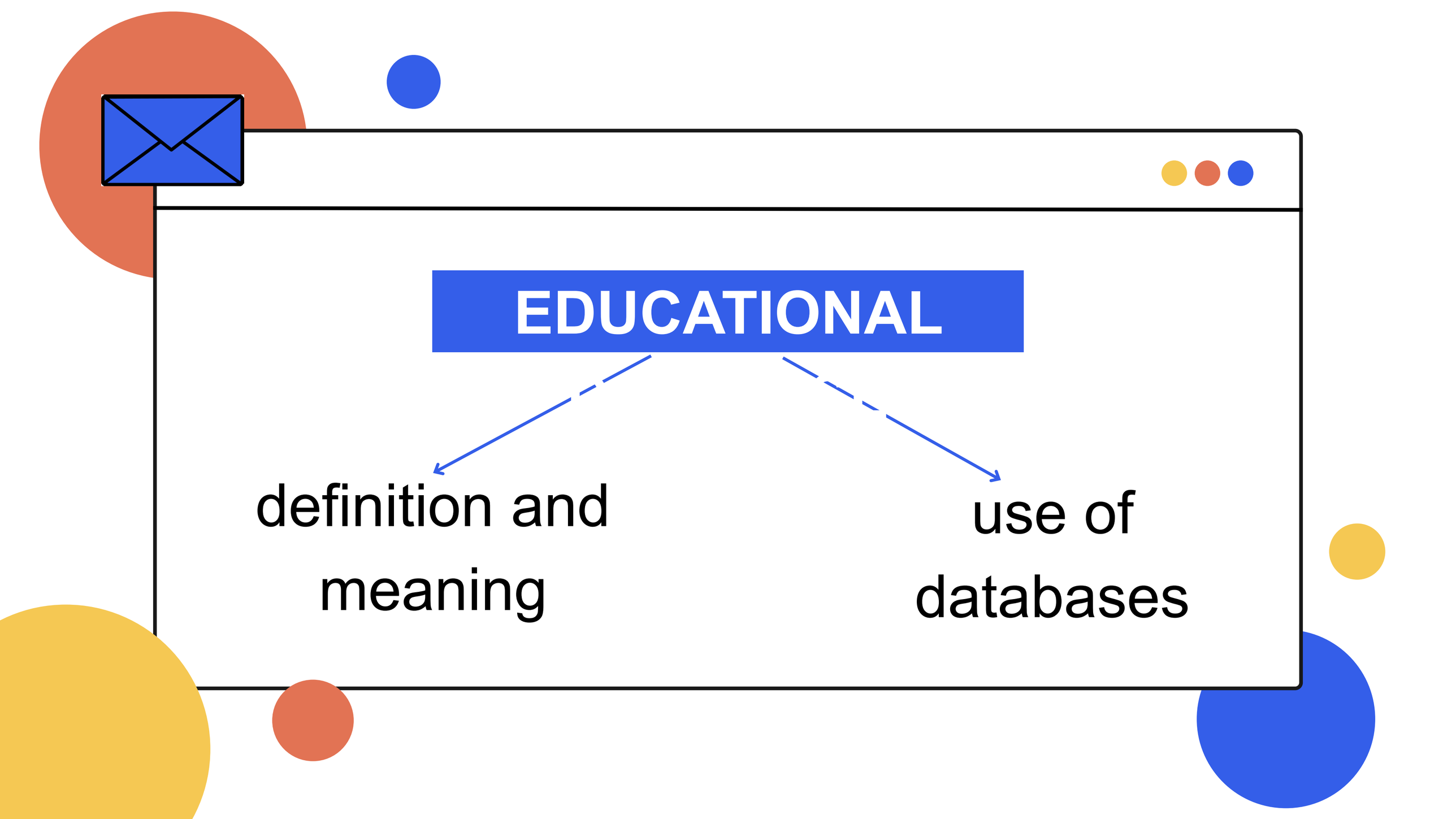
- History and origin of STEM
- Different perspectives on STEM
- Expansion in the world



STEM EDUCATION

- The Role of Geography in STEM
- The Role of Mathematics in STEM

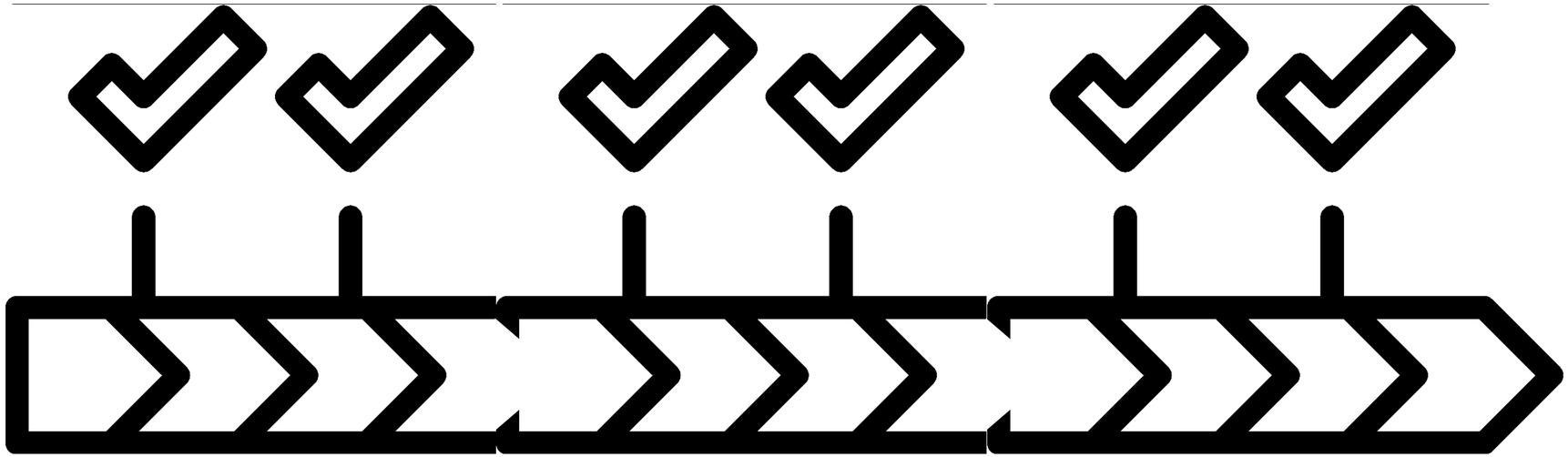



EDUCATIONAL
definition and meaning
use of databases

MODERN TECHNOLOGY IN EDUCATION

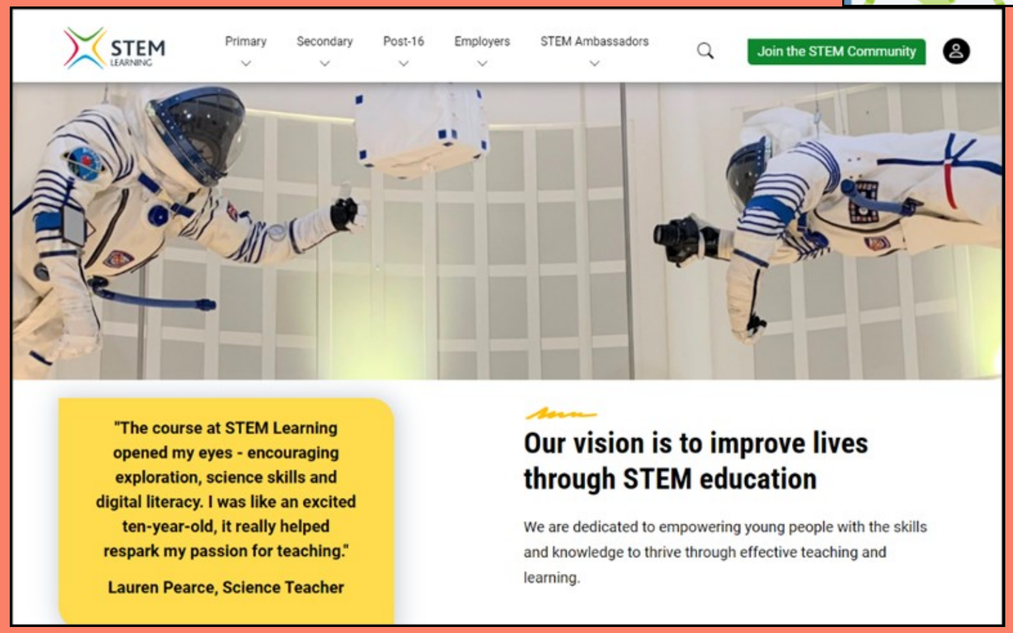
- the importance of MT
- ways of using MT
- integration of MT

METHODOLOGY

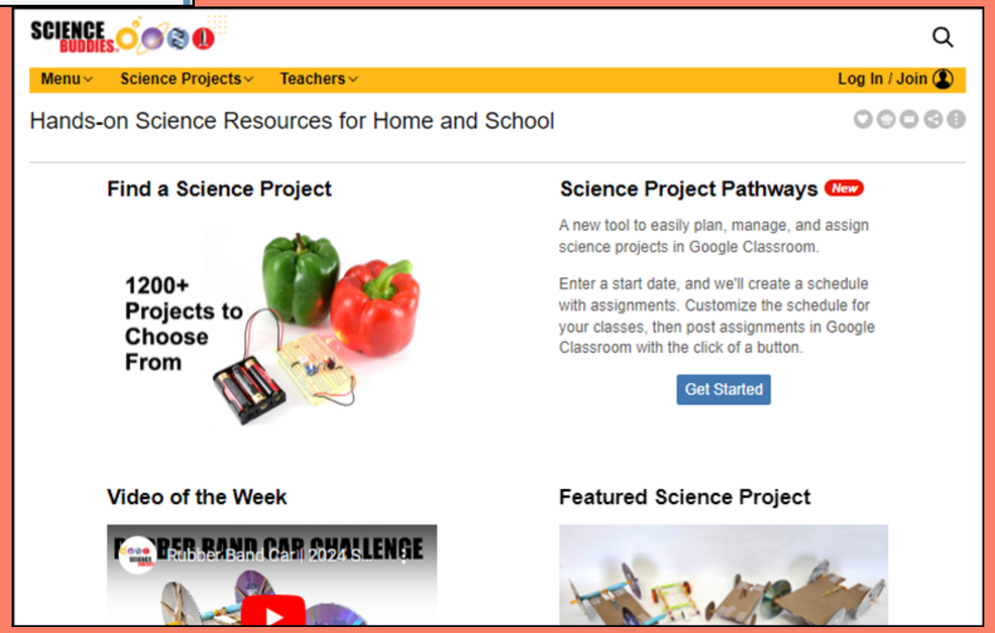


TEACHENGINEERING

STEM LEARNING



SCIENCE BUDDIES



RESULTS

RESULTS

Common features of databases

RESUL

TS

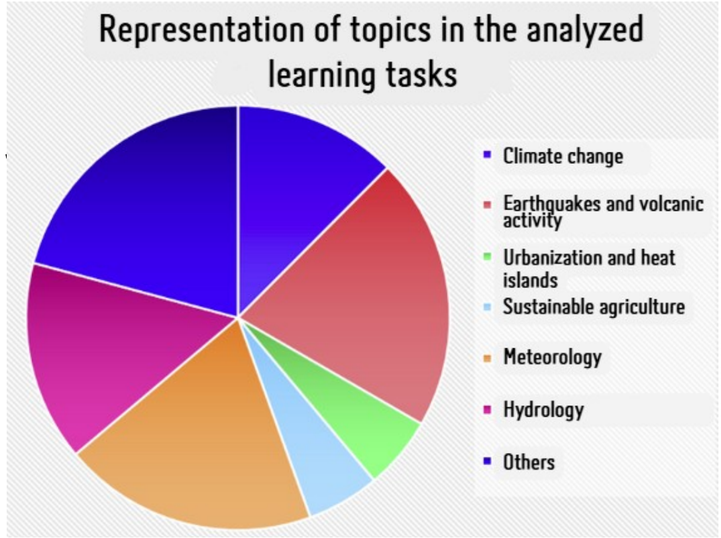
Common topics of tasks

What topics were most used in the analyzed learning tasks?

RESULTS

Common themes of some ta

- Climate change
- Earthquakes and volcanic activity
- Urbanization and heat islands
- Hydrology and water resources
- Sustainable agriculture
- Meteorology



RESUL
TS

Typical task structure

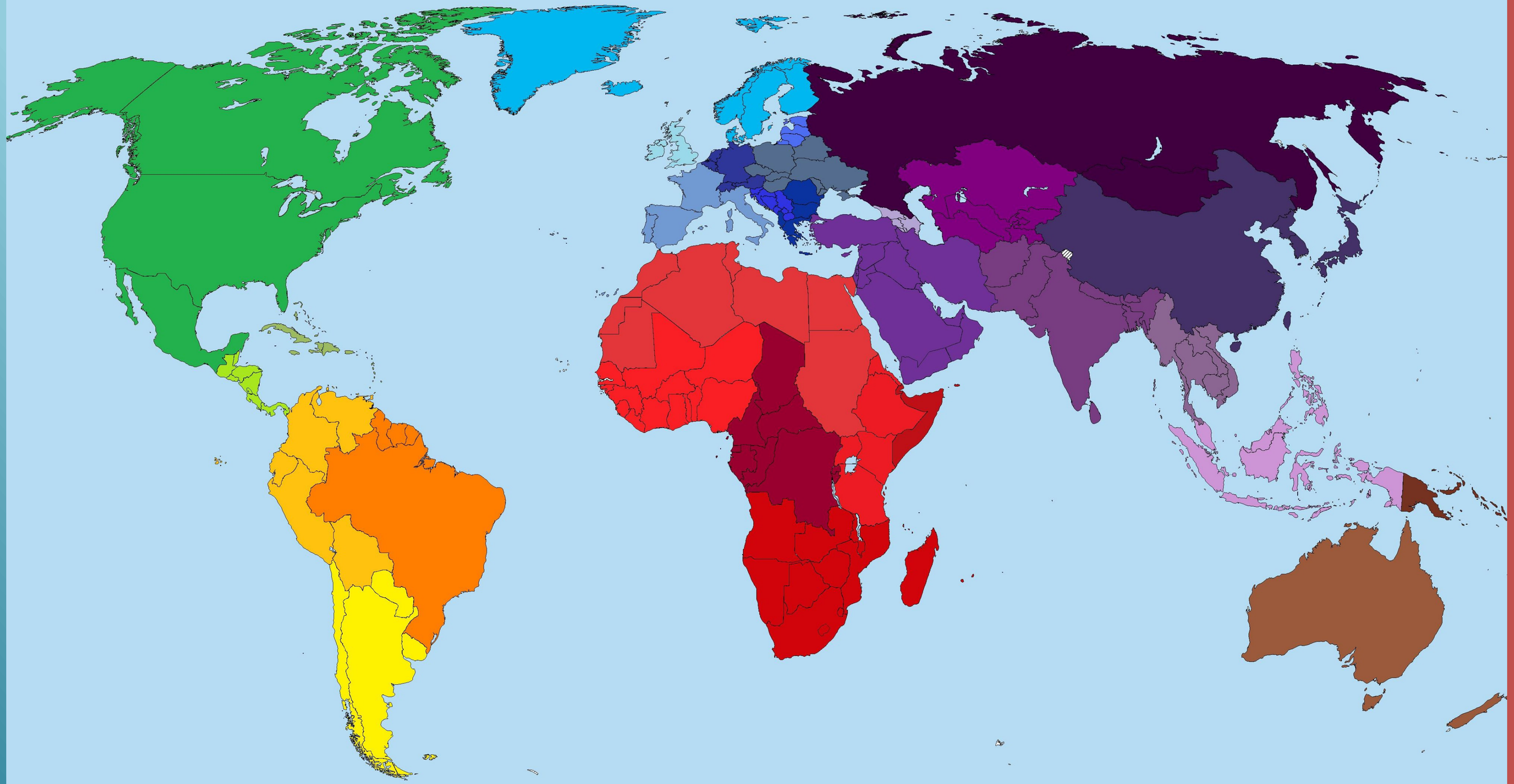
Introductory part - presentation of the topic, motivation

Main part - theoretical basis, practical activity, data analysis

Final part - presentation of results, discussion

Trying out the task

Let's try to solve one of the analyzed tasks!



1.Engage:

- Complete the *Engage* section of the worksheet. Identify the continent you live on and think about how it has changed over time.

2.Explore:

- Access the *Earthquakes Living Lab* online and explore seismic activity in four regions: Chile, Southern California, Japan, and San Francisco.
- Choose Southern California region
- Compare the real-time earthquake map with a map of tectonic plates. Look for correlations and note observations on why earthquakes occur along plate boundaries.

Earthquakes Living Lab

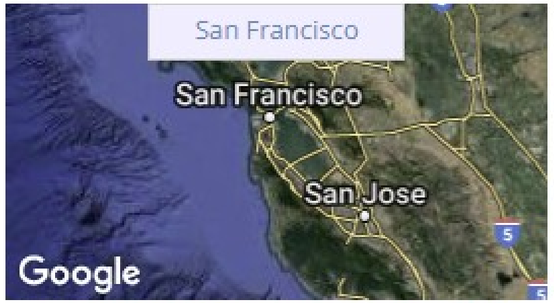
The Earthquakes Living Lab offers you a chance to investigate earthquakes all around the world. You will find that many earthquakes have happened this week! What instruments, methods and data do scientists and engineers use to measure and locate earthquakes? How do scientists use evidence to explain the theory of plate tectonics? What are some effects of earthquakes that influence how much damage they cause? What are the best designs for buildings located in earthquake-prone regions? This Living Lab uses four focus areas (Chile, San Francisco, Japan, and Southern California) to help guide you toward answers to these questions—and many more. Rock your world by looking at real data from around the globe!

Examine these four active seismic areas to inquire about different aspects of earthquakes!

Measuring and locating earthquakes

Plate tectonics

Effects and consequences of earthquakes



Geology and design in earthquake prone areas

Want more info on recent earthquakes? Visit the USGS Real-Time Earthquake Map!

USGS science for a changing world
Data provided by USGS

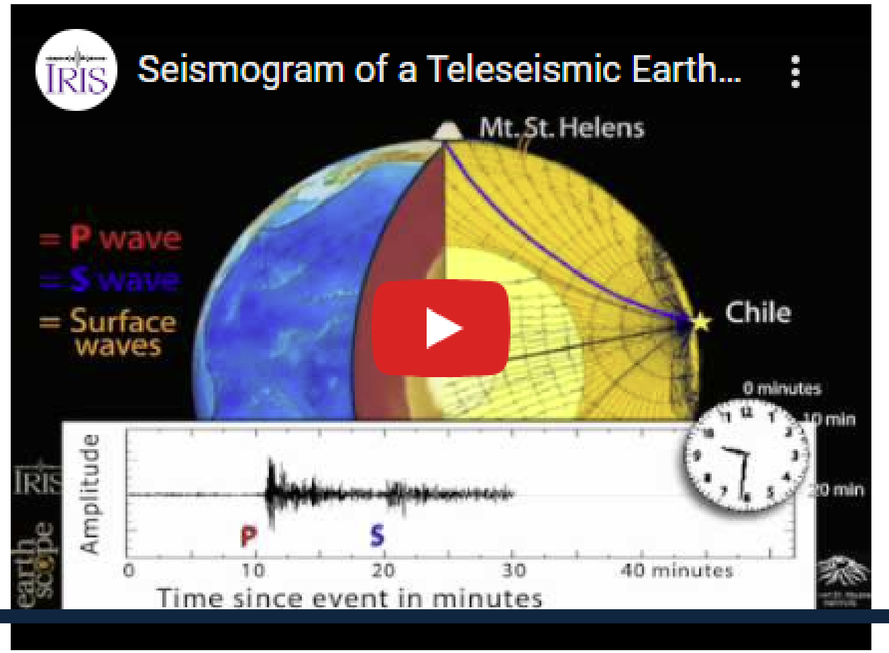
RESOURCES
Additional Resources

offer students and teachers a chance to practice analyzing data to solve a problem or answer a question, in much the same way that scientists and engineers do every day. For example, can you use the data in the Renewable Energy Living Lab to decide if your school can be powered with solar energy? How close is your house to a recent earthquake? Science is most fun when you work with others, so be inquisitive and share what you learn. And most importantly, remember to have fun!

Renewable Energy Living Lab

Renewable energy comes from natural resources such as wind, plant material, water (rain or tides), geothermal, or sunlight and is naturally replenished. The United States right now relies heavily on coal, oil, and natural gas for its energy. These fossil fuels are nonrenewable, which means that the sources will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve. Renewable energy technologies have a much lower environmental impact than conventional energy technologies. Enter the Renewable Energy Living Lab to learn about available energy resources in the United States.

Earthquakes Living Lab



Earthquakes occur nearly every day, and they occur around the world! The U.S. Geological Survey estimates that about 500,000 detectable earthquakes occur in the world each year. Of those, 100,000 can be felt and 100 of them cause damage. Earthquakes occur as a result of geology—when two blocks of the Earth's crust suddenly slip past one another along a fault or fault plane. The release of energy takes the form of seismic waves, sort of like ripples on a pond. The seismic waves shake the Earth as they move through it, and when the waves reach the Earth's surface, they shake the ground—and us! Enter the Earthquakes Living Lab to learn more about where and why earthquakes occur, how scientists and engineers determine where and how big earthquake are, and how engineers design for earthquakes.

Explain:

- Return to the Earthquakes Living Lab and investigate the theory of plate tectonics. Use the information provided to answer questions about the causes and evidence supporting continental movement.

Elaborate:

- Find and record evidence of how continents have moved. Look into sea floor spreading, fossils, earthquakes, and volcanoes using the provided resources.
- Relate this information to how engineers design buildings in earthquake-prone areas.

Evaluate:

- Write a two-paragraph essay supporting or refuting Alfred Wegener’s hypothesis of continental drift based on the evidence gathered.

Task evaluation

How would you rate the difficulty of this task?

- Which parts of the assignment were the most difficult and why?

- Do you think that the students of the specific age group would be able to handle this task without much difficulty? If not, what would need to be changed?

How long did it take you to complete the task?

- What would be the estimated time your future students would need to complete this task?

- What factors might affect the time required for this task (level of knowledge, access to technology, motivation)?

How well was the task linked to individual subjects?

- Was all subjects represented in a balanced way, or did one dominate?

- How could the assignment be modified to reflect all subjects better?

What would you change about this assignment if you were to give it to your students?

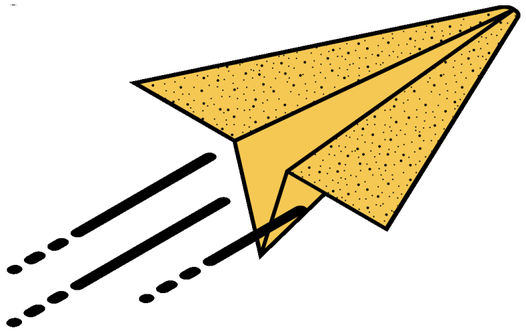
- What adjustments would you do to make the task more suitable for the students you will be teaching?

- How would you motivate students to complete the task?

How would you rate your own readiness to assign and guide students in this task?

- What would you need to develop further to feel more confident in assigning similar tasks?

- What kind of support would you seek (from colleagues, professional literature, digital resources)?



THANK YOU!