Funded by
the European Union

Pythagoras
2021-1-RO01-KA220-HED-000032258

WORK PACKAGE 1

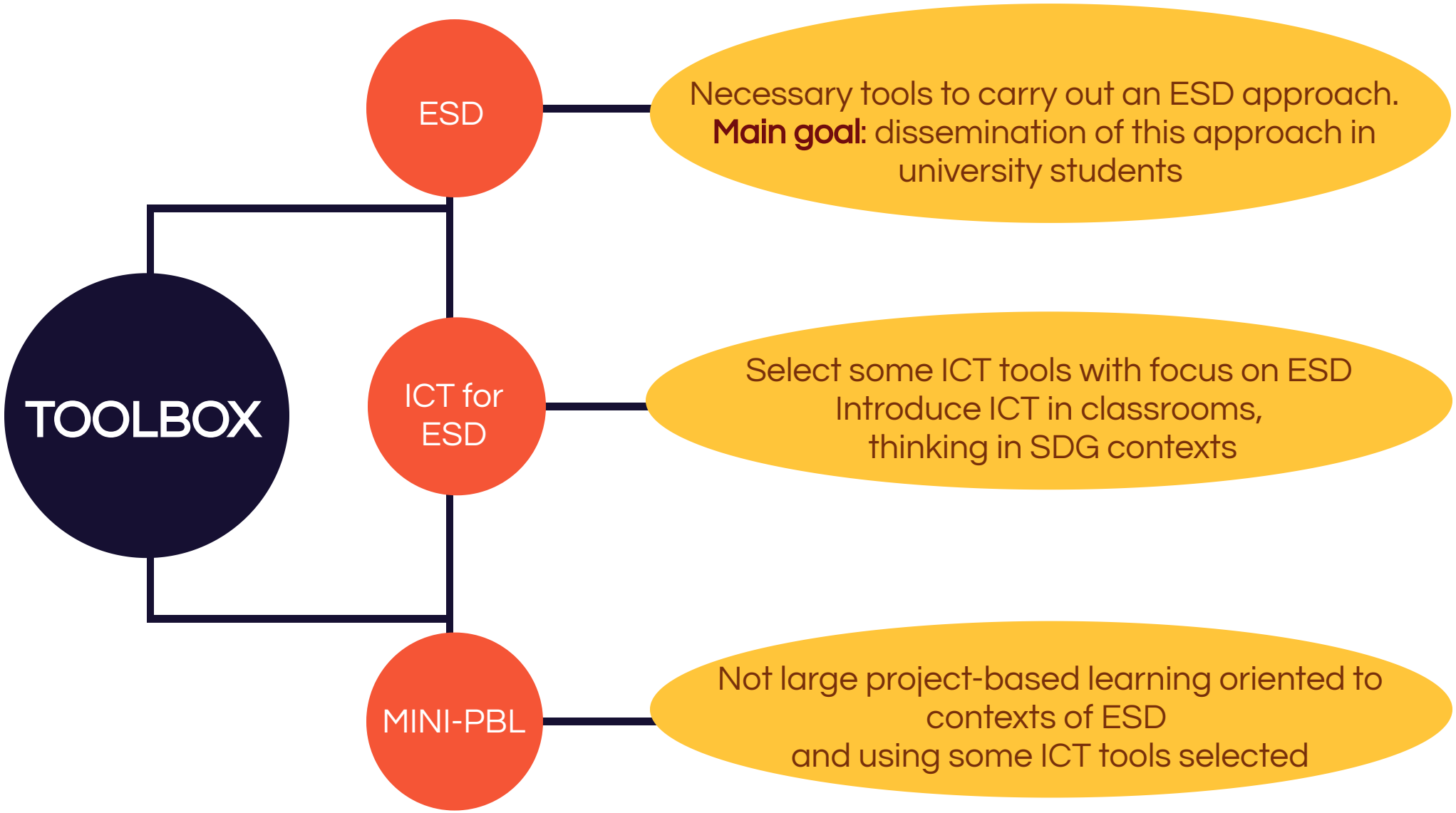
TOOLBOX FOR TEACHERS ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

ISRAEL GARCÍA-ALONSO
DIANA SOSA-MARTÍN
RODRIGO TRUJILLO-GONZÁLEZ
28/04/2022

Universidad de La Laguna

WHAT ULL IS RESPONSIBLE FOR...

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258



Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

TOOL 1:

EDUCATION FOR SUSTAINABLE DEVELOPMENT

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

WHY

We are living in a complex, interconnected and interdependent world.

GLOBAL CITIZENSHIP

To manage all that, learners need to be equipped with **relevant skills, knowledge, attitudes, and values**.

SUSTAINABLE DEVELOPMENT

It is relevant to understand the individual and collective **decisions** impacts on the world and around the individuals

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Sustainable development

Development that meets the needs of the present without comprising the ability of future generations to meet their own needs

Brundtland Report, 1987

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

SDG +

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Ensure inclusive and equitable quality education and promote lifelong learning opportunibites for all

Target 4.7

By 2030, ensure that all learners acquire the **knowledge** and **skills** needed to **promote sustainable development**, including, among others, through education for sustainable development and sustainable lifestyles, **human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity** and of culture's contribution to sustainable development

SDG +

United Nations (2015)

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

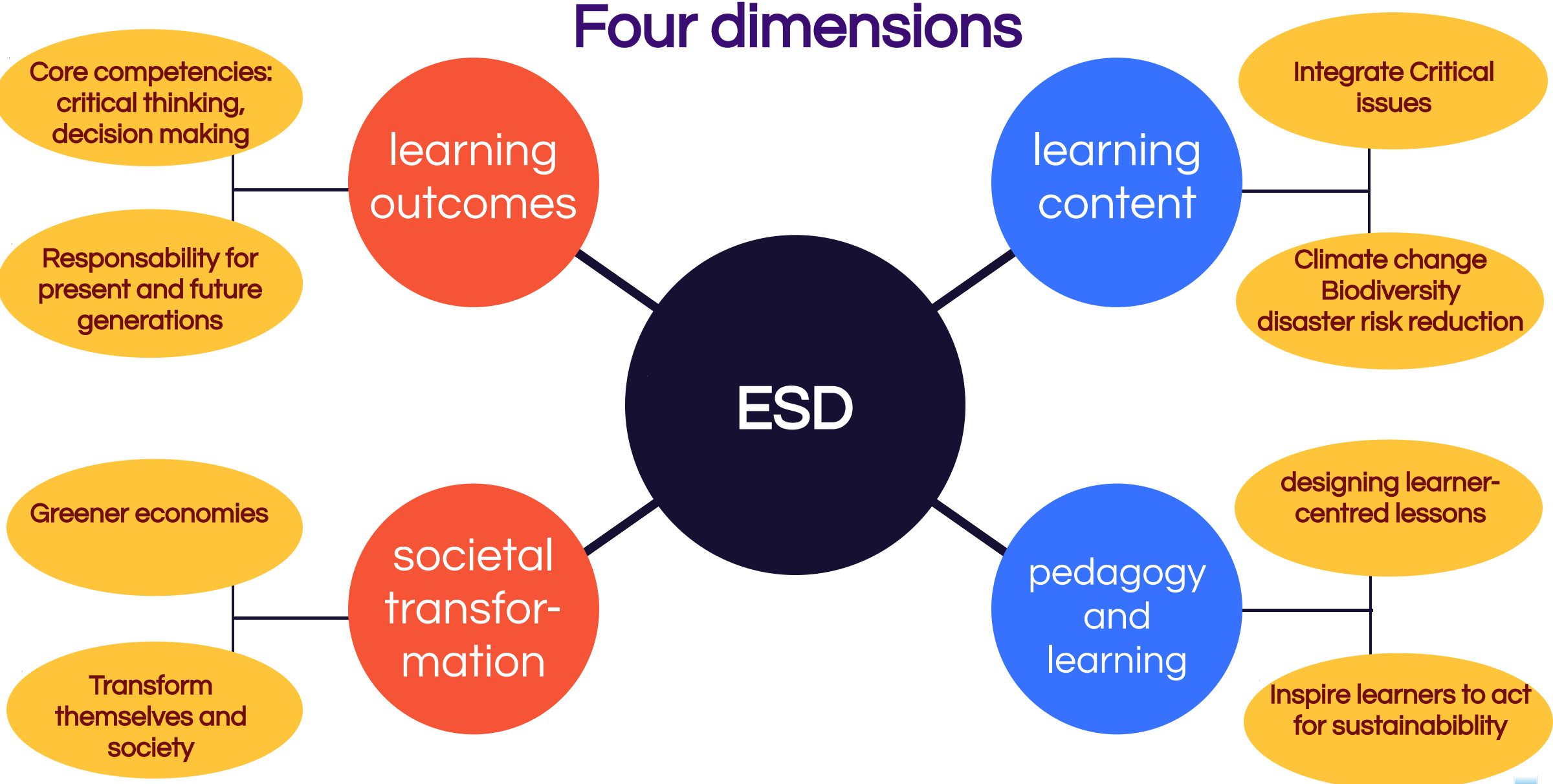
EDUCATION FOR SUSTAINABLE DEVELOPMENT

Empowering learners to know how to play an active part in the local community in shaping a more just and sustainable world globally

Balance the demands of the environment, society and economy

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

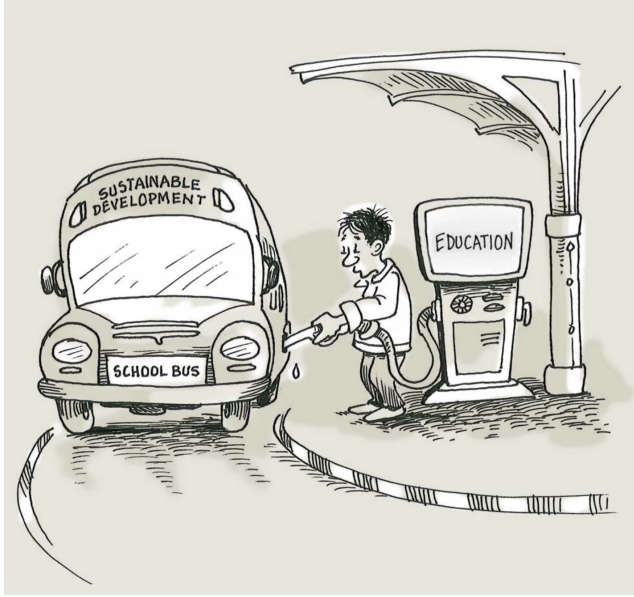
Four dimensions



UNESCO. (2016). Schools in action. Global citizens for sustainable development. A guide for teachers.

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

HOW TO DO THIS IN OUR CLASSESS?



Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Education for Sustainable Development (ESD) needs to be **reflected in the content** of what teachers must teach **and the pedagogy** they implement.

Embedding ESD into core subjects is one of the most **effective and efficient** ways to achieve SDG targets (as 4.7)

Embedding means to **incorporate ESD as an integral element of curricula** and other aspects of formal education, not as an "add-on".

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Embedding

In the **built-in** place: Important enough to integrate it in all we do

Responses to the challenge of sustainable development			Corresponding ESD mainstreaming strategies
(a)	**Denial**	It's a hype that will go away	No action
(b)	**Bolt on**	Add a 'green aspect' to a curriculum or a programme	Adding on
(c)	**Built in**	Important enough to integrate in all we do	Embedding
(d)	**Whole system redesign**	We need to rethink the very foundations of what we currently do	Infusion

Deeper integration

Source: Responses to the challenge of sustainable development, adapted from Sterling 2004 as cited in Lotz-Sisitka et al (2015) p.73

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

HOW TO EMBED ESD IN OUR PROGRAM?

Some initial ideas...

Mgiep, U. (2017). *Textbooks for sustainable development: A guide to embedding*. Mahatma Gandhi Institute of Education for Peace and Sustainable Development India.

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

1. Developing Competency-Based learning units

Develop units that make learners to show their knowledge and apply them in different situations

Teachers should be trainned in pedagogies that lead them to create those interesting situations

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

2. Selecting themes, topics and issues

Teachers should use some criteria for selecting ESD topics. This topics should:

- Be meaningful and significant for leaners (real life)
- Explore possibilities of sustainable solutions
- Encourage to investigate and discuss interconnectivity between local, global issues
- Address fundamental challenges facing humanity
- Fostering ESD competencies

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

3. Making issues matters to students

Meaningful learning in opposition to mechanistic absorption of information.

Teachers should encourage student participation by prompting learners to act on the results of their inquiries

ESD "entails more than simply knowing things about the environment, economic or equity and social justice issues, but rather involves a willingness and ability to engage intellectually and personally with the tensions that are created by the interconnectedness of these systems"

(Nolet, 2009, p. 421)

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

4. Assessment aligns with the ESD

In this sense, the assessment may include:

- Tasks where learners demonstrate their ESD competencies
- Tasks to apply ESD competencies to real-world situations
- Tasks that make learners to address the relation subject-ESD
- Peer review and self-assessment to be critical on the progress and their partners'
- Use rubrics or competence grids known by learners in advance

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

WHICH IS THE ROLE OF MATHEMATICS?

Mathematicas - EDS relation

UNESCO (2022). *Mathematics for action. Supporting Science-Based Decision-Making*. . Paris

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Mathematics

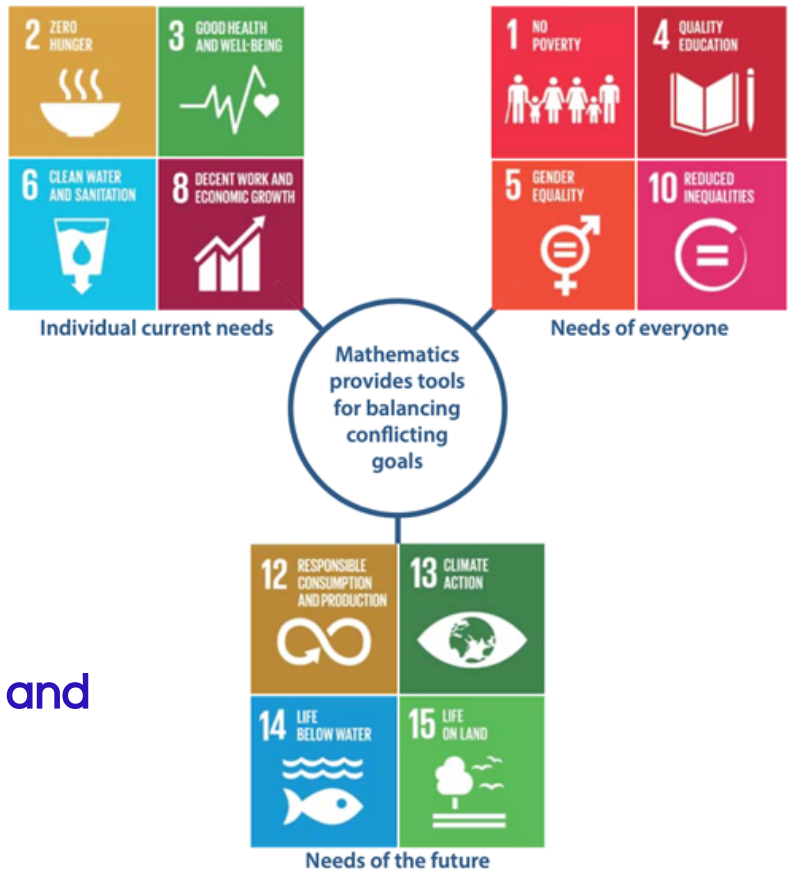
are useful for...

Develop critial thinking, alternative thinking

Informed decision making

Solving problems

Balance current needs from future needs, and individual needs from needs for everyone



Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Collection of some ideas to develop in the Mathematical classes

Three types of topics:

- Success stories: solutions to everyday problems
- Mathematics illuminated: Math concepts to understand and describe real-world processess
- Grand challenges and opportunities for Mathematics

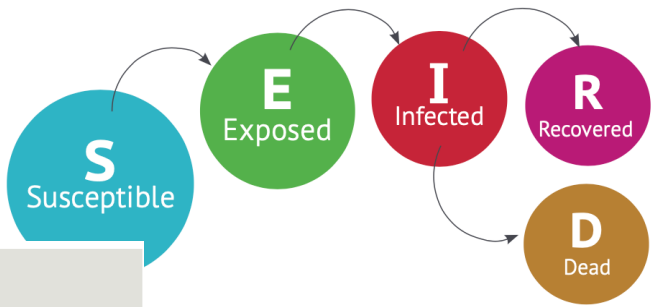
Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Modeling infectious diseases

KEY MESSAGES

- ☑ Mathematical models provide invaluable tools for public health decision-making, both by forecasting the likely impact of an epidemic and by predicting the effectiveness of measures of disease containment and prevention.
- ☑ When a pathogen's basic reproduction number (R0) falls below 1 in a given place, infection spread slows and the epidemic can be controlled in that area. Physical distancing measures have proven to reduce the value of R0.
- ☑ When most of a population is immune to an infectious disease, those who are not immune are provided indirect protection, or herd immunity. Depending on how infectious the pathogen is, 70% to 90% of the population would need to be immune to establish herd immunity.

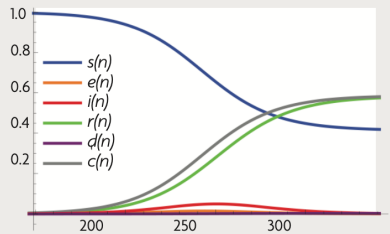
SEIRD MODEL



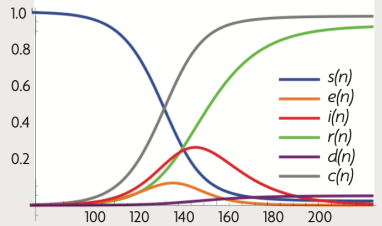
3 GOOD HEALTH AND WELL-BEING

INFECTIOUS DISEASE GROWTH SIMULATIONS

INFLUENZA



COVID-19



Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

WHAT IS NEXT?

Developing *Toolbox for teachers*

Funded by the European Union

Pythagoras

2021-1-RO01-KA220-HED-000032258

Move forward to university perspective ...

Make a guide selecting topics oriented to develop ESD in mathematics at university

Motivational video about ESD and the role of the university to spread all the competencies for Sustainable Development

Start to develop tool 2: ICT for ESD. How to improve EDS using ICT

Prepare Mini-PBL integrating ICT and focusing on SDG contexts. Of course, about mathematics

Funded by the European Union
Pythagoras
2021-1-RO01-KA220-HED-000032258

Funded by
the European Union

Pythagoras
2021-1-RO01-KA220-HED-000032258

WORK PACKAGE 1

TOOLBOX FOR TEACHERS ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

ISRAEL GARCÍA-ALONSO
DIANA SOSA-MARTÍN
RODRIGO TRUJILLO-GONZÁLEZ

Universidad de La Laguna