PISA 2022 MATHEMATICS FRAMEWORK

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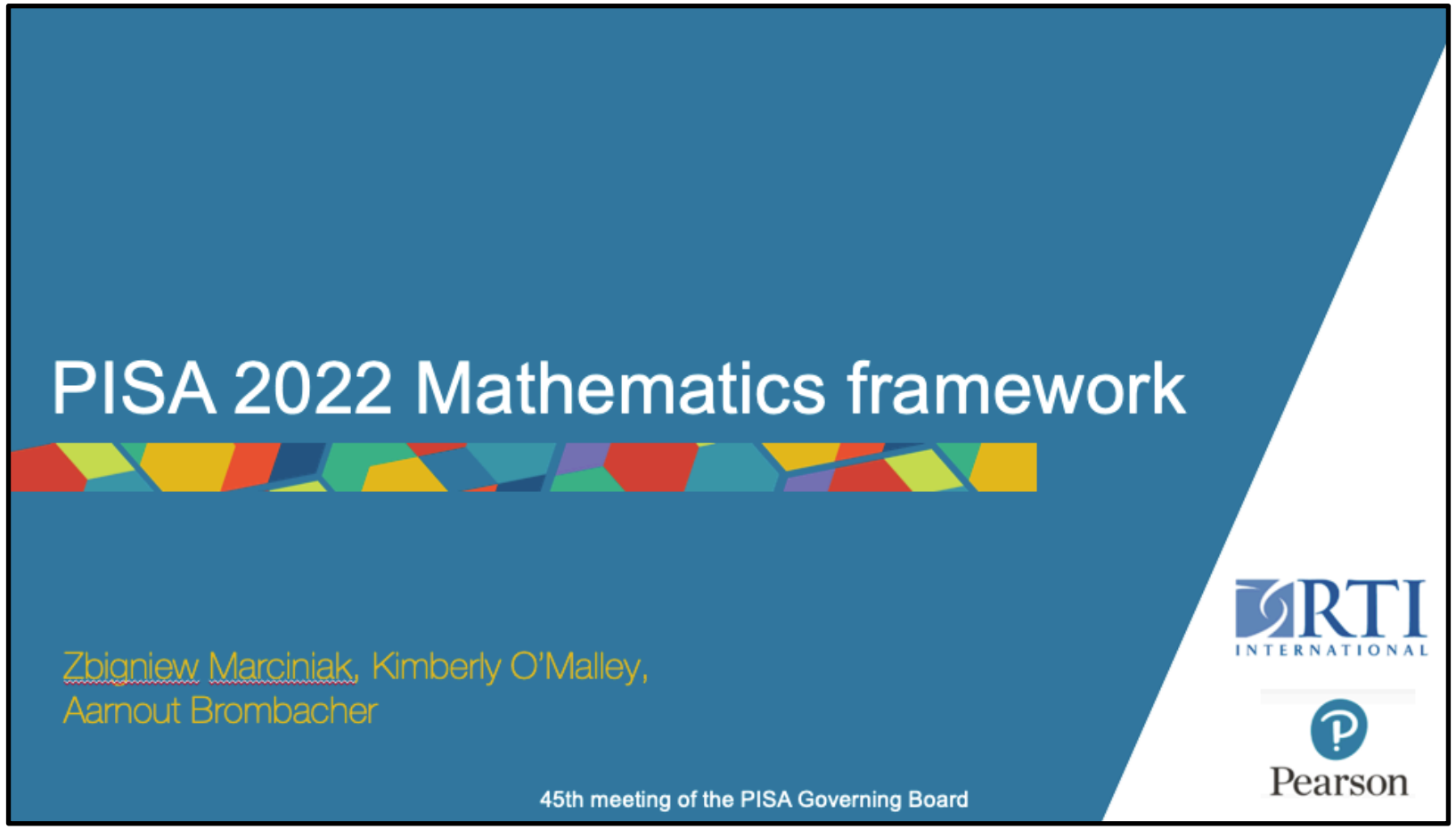
Presentation for: *Middle school mathematics in Israel – looking ahead*

Session: Goals of mathematics teaching in Israeli middle schools and possible consequences of the PISA 2022 framework on these goals.

https://pisa2022-maths.oecd.org/

August 19, 2020

Slides adapted from:



PISA 2022 Mathematics Framework

The Purpose of PISA 2022

The PISA assessment measures how effectively countries are preparing students to use mathematics in every aspect of their personal, civic and professional lives, as part of their constructive, engaged and reflective 21st Century citizenship.

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PISA 2022: Mathematical Literacy

Mathematical literacy is an individual's capacity to reason mathematically and to formulate, employ and interpret mathematics to solve problems in a variety of real-world contexts. It includes concepts, procedures, facts and tools to describe, explain and predict phenomena. It helps individuals know the role that mathematics plays in the world and make the well-founded judgments and decisions needed by constructive, engaged and reflective 21st Century citizens.

PISA 2022 Mathematics Framework PISA

PISA 2022: Mathematical Reasoning

The ability to reason logically and present arguments in honest and convincing ways is a skill that is becoming increasingly important in today's world. Mathematics is a science about well-defined objects and notions that can be analyzed and transformed in different ways using "mathematical reasoning" to obtain certain and timeless conclusions.

In mathematics, students learn that, with proper reasoning and assumptions, they can arrive at results that they can fully trust to be true in a wide variety of real-life contexts. It is also important that these conclusions are impartial, without any need for validation by an external authority.

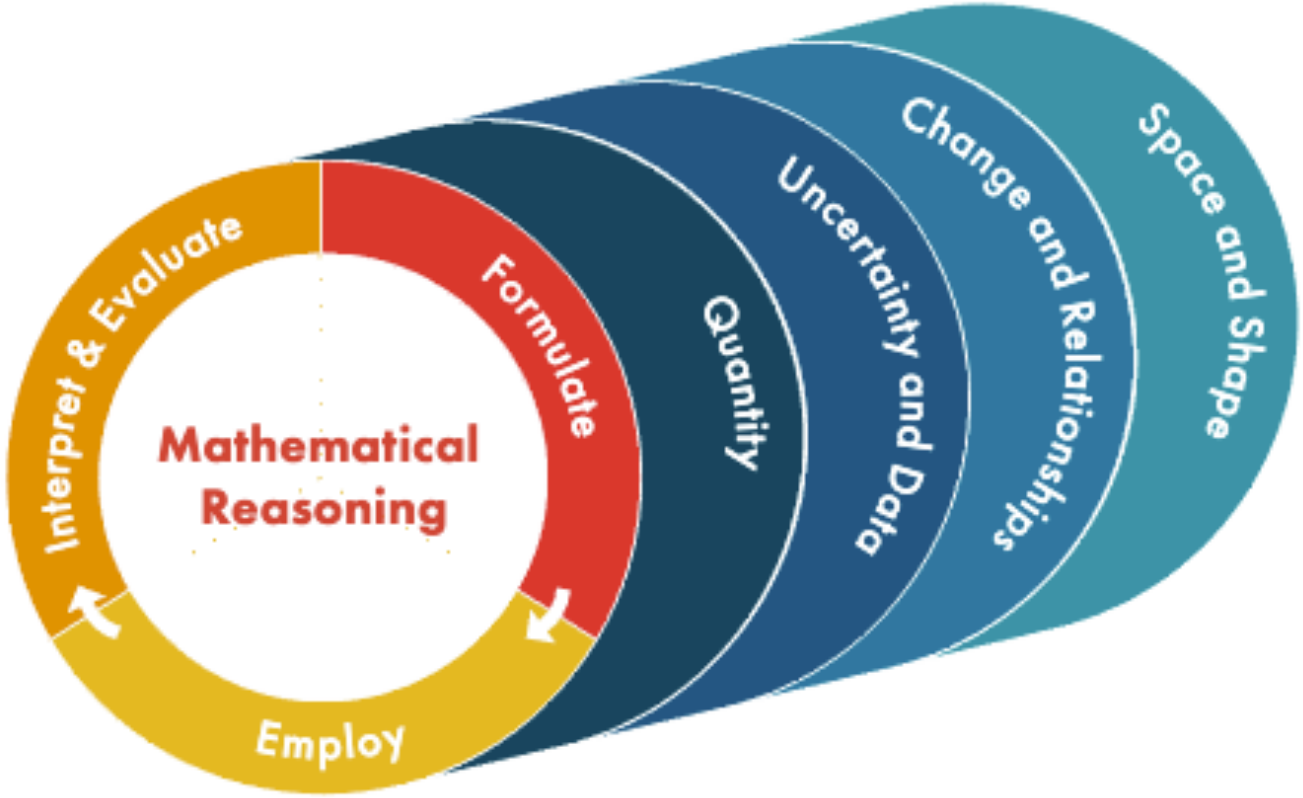
PISA 2022: Key Understandings

- understanding quantity, number systems and their algebraic properties
- appreciating the power of abstraction and symbolic representation
- seeing mathematical structures and their regularities
- recognising functional relationships between quantities
- using mathematical modelling as a lens onto the real world (e.g. those arising in the physical, biological, social, economic and behavioural sciences)
- understanding variation as the heart of statistics

PISA 2022 Mathematics Framework

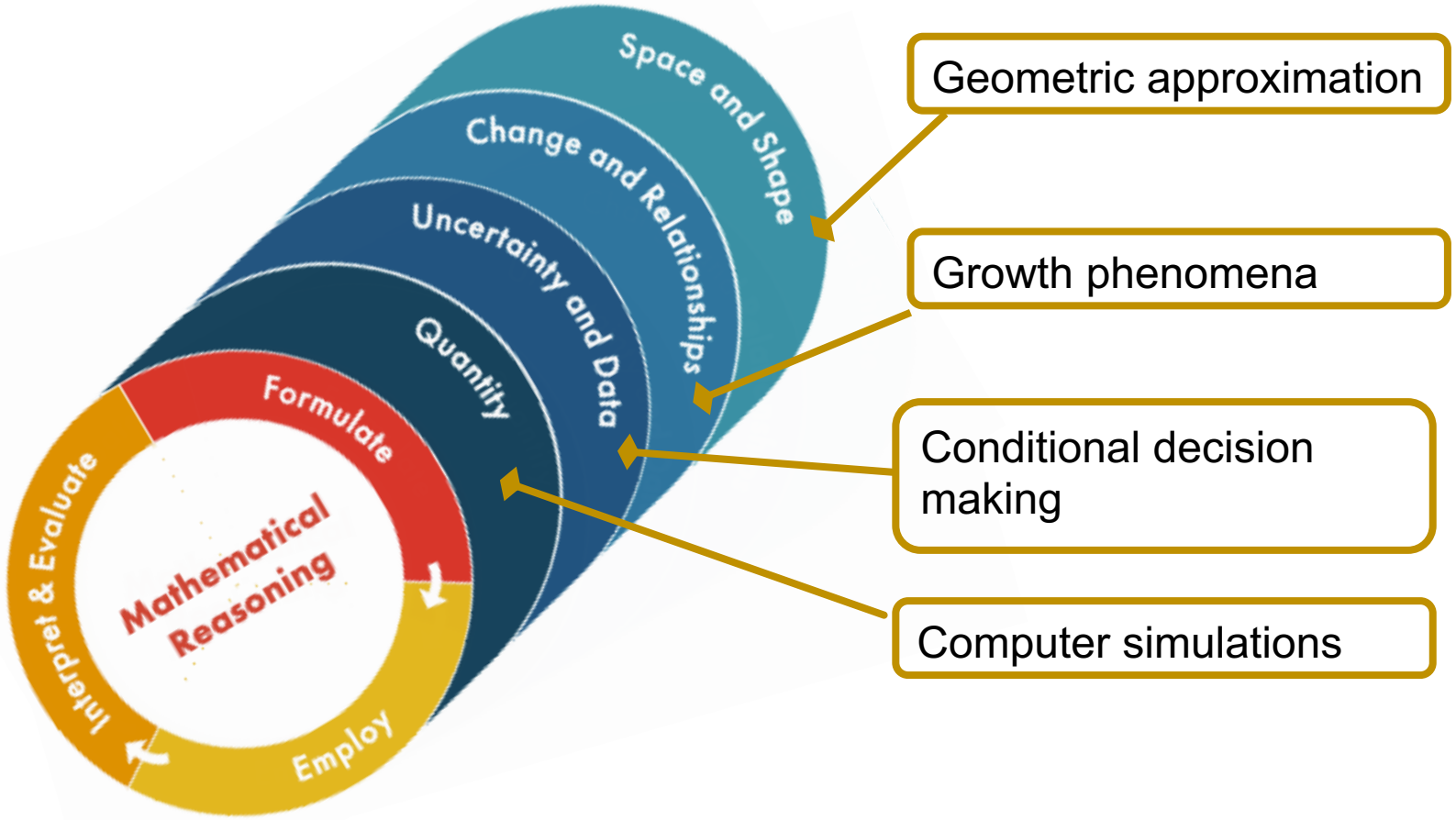
PISA 2022: Content Knowledge

- change and relationships
- space and shape
- quantity
- uncertainty and data



PISA 2022 Mathematics Framework PISA

PISA 2022: Special Emphasis Topics



- Geometric approximation
- Growth phenomena
- Conditional decision making
- Computer simulations

Four topics have been identified for special emphasis in the PISA 2022 assessment. These topics are not new to the mathematics content categories. Instead, these are topics within the existing content categories that deserve special emphasis.

The four topics are presented not only as **commonly encountered situations in adult life in general**, but as **the types of mathematics needed in the emerging new areas of the economy such as high-tech manufacturing** etc.

PISA 2022 Mathematics Framework

PISA 2022: Key Innovations

- **increase the resolution of the PISA assessments at the lower end of the student performance distribution** by drawing from the PISA for Development framework when developing the assessment
- **capture a wider range of social and economic contexts**
- provide all participating countries with greater detail on the performance characteristics of their students

PISA 2022: Key Innovations

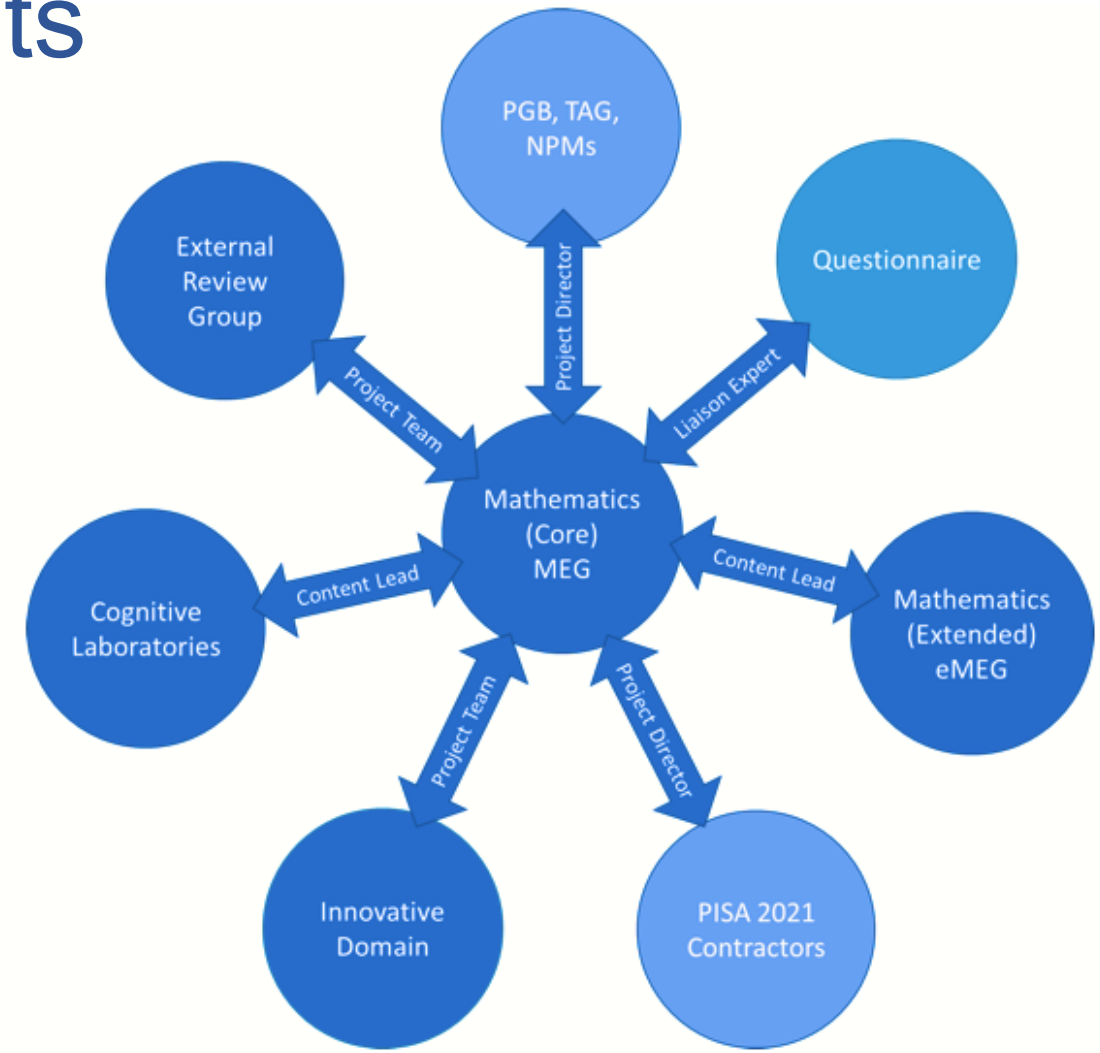
- **computer-based assessment of mathematics (CBAM) will be the primary mode of delivery** for assessing mathematical literacy
- reflects the change in delivery mode introduced in 2015, including a discussion of the **considerations that should inform the development of the CBAM items**
- CBAM also includes **adaptive assessment**

PISA 2022: Key Innovations

- recognizes that **students should possess and be able to demonstrate computational thinking skills as part of their mathematical problem-solving practice**
- computational thinking skills include pattern recognition, decomposition, determining which (if any) computing tools could be employed in analysing or solving a problem, and defining algorithms as part of a detailed solution
- foregrounds the importance of computational thinking, **encouraging participating countries to reflect on the role of computational thinking in mathematics curricula and pedagogy**

PISA 2022: The PISA process includes a wide range of inputs

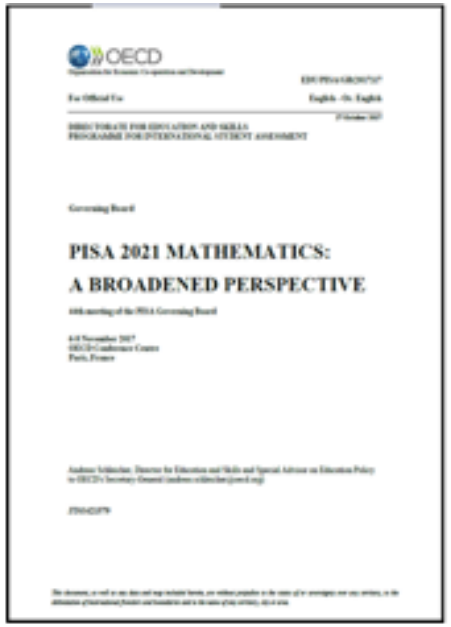
Input



PISA 2022: Mathematics Expert Group

PISA 2022 Mathematics Framework

PISA Governing Board


OECD

PISA 2021 MATHEMATICS:
A BROADENED PERSPECTIVE

Comments on the *Broadened Perspective* document by the PGB

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Thank you!

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