Exhibit 13.6: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

About the Scale

Exhibit 13.7 reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Choose the response that best describes when students in this class have been taught each topic.

	Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
A. Biology			
1) Differences among major taxonomic groups of organisms (plants, animals, fungi, mammals, birds, reptiles, fish, amphibians, insects)	○	○	○
2) Major organs and organ systems in humans and other organisms (structure/function, life processes)	○	○	○
3) Cells, their structure and functions, including respiration and photosynthesis as cellular processes	○	○	○
4) Life cycles, sexual reproduction, and heredity (inherited versus acquired/learned characteristics)	○	○	○
5) Role of variation and adaptation in survival/extinction of species (including fossil evidence)	○	○	○
6) Interdependence of populations of organisms in an ecosystem (e.g., carbon and water cycles, energy flow, food webs, competition, predation, human impacts on ecosystems)	○	○	○
7) Human health (e.g., causes, transmission, and prevention of common infectious diseases, immunity) and the importance of diet, exercise, and other lifestyle choices in maintaining health	○	○	○
B. Chemistry			
1) Particulate structure, classification, and composition of matter (protons, neutrons, electrons, atoms, molecules, elements, compounds, mixtures)	○	○	○
2) The periodic table as an organizing principle for the known elements	○	○	○
3) Physical and chemical properties of matter	○	○	○
4) Mixtures and solutions (e.g., solvent, solute, concentration/dilution)	○	○	○
5) Properties of common acids and bases (e.g., acids have pH less than 7, reactions with indicators produce color changes, acids and bases neutralize each other)	○	○	○
6) Characteristics of chemical reactions (e.g., transformation of reactants, evidence of chemical change)	○	○	○
7) Matter and energy in chemical reactions (conservation of matter, familiar exothermic and endothermic reactions, factors affecting reaction rates)	○	○	○
8) The role of electrons in chemical bonds	○	○	○
C. Physics			
1) Physical states and changes in matter (explanations of properties in terms of movement and distance between particles; phase change, changes in volume and/or pressure, physical changes)	○	○	○
2) Energy transformation and transfer (e.g., forms of energy, energy conservation, heat, temperature, equilibrium)	○	○	○
3) Basic properties/behaviors of light (reflection, refraction, color, shadows, simple ray diagrams)	○	○	○
4) Basic properties/behaviors of sound (vibrations that produce sound, transmission through media, loudness, pitch)	○	○	○
5) Electric circuits (e.g., electrical conductors/insulators and the flow of electricity in series/parallel circuits)	○	○	○
6) Properties and uses of permanent magnets and electromagnets	○	○	○
7) Motion and forces (e.g., basic description of motion, common mechanical forces, properties of forces, effects of forces, simple machines, buoyancy, effects of density and pressure)	○	○	○
D. Earth Science			
1) Earth's structure and physical features (e.g., Earth's crust, mantle, and core; composition and relative distribution of water; composition of Earth's atmosphere)	○	○	○
2) Earth's processes, cycles, and history (e.g., rock cycle, major geological events, formation of fossils and fossil fuels, water cycle, weather versus climate)	○	○	○
3) Earth's resources, their use, and conservation (e.g., renewable/nonrenewable resources, human use of land and water resources)	○	○	○
4) Earth in the Solar System and the universe (phenomena on Earth: seasons, eclipses, tides, phases of moon; members of the Solar System; physical features of Earth)	○	○	○

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Exhibit 13.7: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

The exhibit reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Country	All Science (26 Topics)	Biology (7 Topics)	Chemistry (8 Topics)	Physics (7 Topics)	Earth Science (4 Topics)
Australia	r 63 (1.2)	r 61 (1.7)	r 64 (1.5)	r 56 (1.4)	r 79 (1.9)
Bahrain	81 (1.1)	92 (0.7)	74 (1.7)	72 (2.0)	93 (1.0)
Chile	71 (1.4)	77 (1.8)	60 (2.1)	69 (2.0)	85 (2.4)
Chinese Taipei	70 (0.6)	92 (2.2)	92 (0.5)	61 (1.0)	7 (1.5)
Cyprus	r 49 (0.7)	s 63 (1.1)	s 47 (1.2)	r 34 (1.5)	r 54 (1.1)
Egypt	82 (1.1)	78 (1.5)	78 (1.3)	84 (1.4)	91 (1.5)
England	s 71 (2.3)	s 71 (3.0)	s 79 (2.2)	s 72 (3.4)	x 54 (5.3)
Finland	72 (0.6)	51 (1.0)	91 (1.0)	63 (1.0)	87 (1.3)
France	r 59 (0.9)	r 70 (1.6)	r 54 (1.5)	r 46 (1.7)	r 69 (2.5)
Georgia	67 (0.8)	55 (1.4)	66 (1.6)	61 (1.3)	99 (0.5)
Hong Kong SAR	53 (1.8)	64 (2.3)	43 (2.2)	64 (2.0)	33 (3.0)
Hungary	91 (0.6)	85 (0.9)	97 (0.6)	88 (1.1)	91 (1.8)
Iran, Islamic Rep. of	70 (0.9)	61 (1.3)	78 (1.1)	70 (1.4)	71 (1.5)
Ireland	63 (0.8)	66 (1.2)	77 (1.1)	48 (1.4)	54 (2.5)
Israel	65 (1.2)	64 (1.6)	82 (1.1)	62 (1.6)	39 (3.1)
Italy	69 (1.2)	81 (1.2)	81 (2.0)	48 (2.1)	60 (2.5)
Japan	65 (0.6)	56 (1.0)	73 (0.9)	77 (1.1)	41 (1.7)
Jordan	80 (1.3)	87 (1.3)	76 (1.4)	80 (1.9)	78 (2.2)
Kazakhstan	87 (0.5)	83 (1.3)	94 (0.8)	80 (1.1)	97 (0.7)
Korea, Rep. of	57 (1.0)	50 (1.5)	49 (1.4)	68 (0.9)	67 (1.4)
Kuwait	87 (0.9)	91 (0.9)	94 (1.1)	83 (1.2)	75 (2.2)
Lebanon	76 (0.8)	76 (1.9)	80 (1.3)	71 (1.5)	- -
Lithuania	73 (1.0)	78 (1.7)	62 (2.3)	69 (1.7)	93 (1.2)
Malaysia	88 (0.8)	93 (0.9)	82 (1.3)	93 (1.2)	82 (1.9)
Morocco	57 (0.6)	69 (1.1)	45 (1.0)	48 (0.8)	74 (1.7)
New Zealand	48 (1.2)	48 (1.7)	55 (1.8)	48 (1.7)	37 (2.7)
Norway (9)	s 55 (1.2)	s 51 (2.2)	s 71 (1.5)	s 35 (2.1)	s 68 (2.9)
Oman	73 (0.9)	82 (0.8)	54 (1.5)	79 (1.4)	89 (1.5)
Portugal	63 (0.7)	63 (1.4)	73 (1.0)	40 (1.2)	80 (1.5)
Qatar	77 (1.0)	80 (1.5)	76 (1.3)	75 (1.4)	76 (1.9)
Romania	95 (0.5)	93 (1.0)	95 (0.8)	98 (0.5)	- -
Russian Federation	79 (0.6)	68 (1.6)	82 (1.4)	75 (1.0)	97 (0.8)
Saudi Arabia	84 (1.0)	89 (1.0)	82 (1.6)	77 (1.6)	95 (0.8)
Singapore	65 (0.8)	71 (1.2)	73 (1.2)	75 (1.2)	20 (1.5)
South Africa (9)	76 (1.2)	83 (1.3)	84 (1.2)	72 (1.5)	55 (3.0)
Sweden	71 (0.8)	72 (1.4)	68 (1.3)	74 (1.7)	- -
Turkey	93 (0.5)	94 (0.7)	95 (0.6)	88 (1.1)	92 (1.5)
United Arab Emirates	r 86 (0.5)	r 85 (0.6)	r 85 (0.6)	r 86 (0.8)	r 86 (0.9)
United States	r 84 (1.1)	r 89 (1.2)	r 82 (1.8)	r 76 (1.7)	r 91 (1.5)
International Average	**72 (0.2)**	**74 (0.2)**	**74 (0.2)**	**68 (0.2)**	**71 (0.3)**
Benchmarking Participants					
Ontario, Canada	s 65 (1.7)	s 81 (1.9)	s 41 (2.5)	s 69 (2.7)	s 79 (3.0)
Moscow City, Russian Fed.	74 (0.7)	62 (1.6)	76 (1.3)	70 (0.9)	98 (0.5)
Gauteng, RSA (9)	76 (1.6)	85 (1.8)	82 (1.7)	70 (2.3)	57 (3.4)
Western Cape, RSA (9)	75 (1.3)	80 (1.7)	83 (1.3)	72 (2.1)	56 (3.4)
Abu Dhabi, UAE	r 86 (0.8)	r 85 (1.0)	r 86 (1.0)	r 88 (1.2)	r 83 (1.4)
Dubai, UAE	r 85 (0.9)	r 84 (0.9)	r 84 (0.8)	r 84 (1.5)	r 89 (1.5)
Quebec, Canada	y - -	y - -	y - -	y - -	y - -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2019

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