Exhibit 2.8: Descriptions of the TIMSS 2015 International Benchmarks of Science Achievement

625 Advanced International Benchmark

Students communicate understanding of complex concepts related to biology, chemistry, physics and Earth science in practical, abstract, and experimental contexts. Students apply knowledge of cells and their functions as well as characteristics and life processes of organisms. They demonstrate understanding of diversity, adaptation, and natural selection among organisms, and of ecosystems and the interaction of organisms with their environment. Students apply knowledge of life cycles, and heredity in plants and animals. Students demonstrate knowledge of the composition and physical properties of matter and apply knowledge of chemical and physical change in practical and experimental contexts. Students communicate understanding of physical states and changes in matter in practical and experimental contexts, apply knowledge of energy transfer, and demonstrate knowledge of electricity and magnetism. Students communicate understanding of forces and pressure and demonstrate knowledge of light and sound in practical and abstract situations. Students communicate understanding of Earth's structure, physical features, and resources as well as of Earth in the solar system. Students show understanding of basic aspects of scientific investigation. They identify which variables to control in an experimental situation, compare information from several sources, combine information to predict and draw conclusions, and interpret information in diagrams, maps, graphs, and tables to solve problems. They provide written explanations to communicate scientific knowledge.

550 High International Benchmark

Students apply and communicate understanding of concepts from biology, chemistry, physics, and Earth science in everyday and abstract situations. Students apply knowledge of cells and their functions and of the characteristics and life processes of organisms. They communicate understanding of ecosystems and the interaction of organisms with their environment and apply some knowledge of human health related to nutrition and infectious disease. Students show some knowledge and understanding of the composition and properties of matter and chemical change. They apply basic knowledge of energy transformation and transfer and of light and sound in practical situations, and demonstrate understanding of simple electrical circuits and properties of magnets. Students apply their knowledge of forces and motion to everyday and abstract situations. They apply knowledge of Earth's physical features, processes, cycles, and history, and show some understanding of Earth's resources, their use, and conservation as well as some knowledge of the interaction between the Earth and the Moon. Students demonstrate some scientific inquiry skills, including selecting and justifying an appropriate experimental method. They combine and interpret information from various types of diagrams, graphs, and tables; select relevant information to analyze and draw conclusions; and provide short explanations conveying scientific knowledge.

475 Intermediate International Benchmark

Students demonstrate and apply their knowledge of biology, chemistry, physics, and Earth science in various contexts. Students demonstrate some knowledge of characteristics and life processes of animals and human health. They apply knowledge of ecosystems, the interaction of living things, and the adaptation of animals to their environments. Students apply some knowledge of the properties of matter. They also show knowledge of some aspects of force, motion, and energy. Students apply knowledge of Earth's processes, resources, and physical features. They interpret information from tables, graphs, and pictorial diagrams to draw conclusions, apply knowledge to practical situations, and communicate their understanding through brief descriptive responses.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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Exhibit 2.8: Descriptions of the TIMSS 2015 International Benchmarks of Science Achievement (Continued)

400 Low International Benchmark

Students show some basic knowledge of biology, chemistry, physics, and Earth science. Students apply basic knowledge of ecosystems and adaptation of animals to their environment, show knowledge of basic facts related to thermal and electrical conductivity and electromagnetism, and show knowledge of some basic Earth science facts. Students interpret simple pictorial diagrams and apply basic knowledge to practical situations.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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