

APPENDIX



	Hungary	Naperville Sch. Dist. #203, IL	Michigan Invitational Group, MI	Slovenia	First in the World Consort., IL	Chinese Taipei	Slovak Republic	Academy School Dist. #20, CO	Netherlands	Japan	Belgium (Flemish)	Czech Republic	Korea, Rep. of	Project SMART Consortium, OH	Russian Federation	SW Math/Sci. Collaborative, PA	Oregon	Michigan	England	Singapore	Finland	Bulgaria	Guilford County, NC	Australia	Canada	Montgomery County, MD	T
Hungary	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Naperville Sch. Dist. #203, IL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Michigan Invitational Group, MI	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Slovenia	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
First in the World Consort., IL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chinese Taipei	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Slovak Republic	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Academy School Dist. #20, CO	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Netherlands	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Japan	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Belgium (Flemish)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Czech Republic	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Korea, Rep. of	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Project SMART Consortium, OH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Russian Federation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SW Math/Sci. Collaborative, PA	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Oregon	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Michigan	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
England	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Singapore	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Finland	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Bulgaria	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Guilford County, NC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Australia	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Canada	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Montgomery County, MD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

Participant	Connecticut Hong Kong, SAR Illinois	New Zealand United States Texas Italy	North Carolina	Delaware Science Coalition, DE Fremont/Lincoln/WestSide PS, NE Latvia (LSS) Maryland	Malaysia	Lithuania Romania Israel Thailand Moldova	Macedonia, Rep. of Rochester City Sch. Dist., NY Cyprus Iran, Islamic Rep.	Chicago Public Schools, IL Jersey City Public Schools, NJ	Miami-Dade County PS, FL	Tunisia Chile	Turkey Indonesia Philippines Morocco South Africa	Participant
Hungary Naperville Sch. Dist. #203, IL Michigan Invitational Group, MI Slovenia First in the World Consort., IL	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲
Chinese Taipei Slovak Republic Academy School Dist. #20, CO Netherlands Japan	▲▲▲▲▲	●	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲
Belgium (Flemish) Czech Republic Korea, Rep. of Project SMART Consortium, OH Russian Federation	●	●	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲	▲▲▲▲▲
SW Math/Sci. Collaborative, PA Oregon Michigan England Singapore	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Finland Bulgaria Guilford County, NC Australia Canada	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Montgomery County, MD Massachusetts Indiana Pennsylvania South Carolina	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Idaho Missouri Connecticut Hong Kong, SAR Illinois	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
New Zealand United States Texas Italy North Carolina	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Delaware Science Coalition, DE Fremont/Lincoln/WestSide PS, NE Latvia (LSS) Maryland	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Lithuania Romania Israel Thailand Moldova	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼
Macedonia, Rep. of Rochester City Sch. Dist., NY Cyprus Iran, Islamic Rep.	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼
Chicago Public Schools, IL Jersey City Public Schools, NJ	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼
Miami-Dade County PS, FL Tunisia Chile	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼
Turkey Indonesia Philippines Morocco South Africa	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼	▼▼▼▼▼

▲ Average achievement significantly higher than comparison participant

● No statistically significant difference from comparison participant

▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

F.-strucion



States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

United States	South Carolina	Russian Federation	Hong Kong, SAR	Bulgaria	Texas	North Carolina	Maryland	Latvia (LSS)	Thailand	Delaware Science Coalition, DE	New Zealand	Lithuania	Italy	Malaysia	Moldova	Rochester City Sch. Dist., NY	Romania	Chicago Public Schools, IL	Cyprus	Macedonia, Rep. of	Israel	Jersey City Public Schools, NJ	Jordan	Indonesia	Miami-Dade County PS, FL	Turkey	Tunisia	Iran, Islamic Rep.	Chile	Philippines	Morocco	South Africa	Naperville Sch. Dist. #203, IL	First in the World Consort., IL	Academy School Dist. #20, CO	Michigan Invitational Group, MI	Chinese Taipei		
▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	●	●	●	●	●	●
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	
▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		

- ▲ Average achievement significantly higher than comparison participant
- No statistically significant difference from comparison participant
- ▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.



States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

Illinois	Bulgaria	Pennsylvania	New Zealand	United States	Latvia (LSS)	Malaysia	Texas	Fremont/Lincoln/WestSide PS, NE	South Carolina	Maryland	North Carolina	Delaware Science Coalition, DE	Israel	Italy	Thailand	Romania	Macedonia, Rep. of	Cyprus	Jordan	Moldova	Chicago Public Schools, IL	Indonesia	Rochester City Sch. Dist., NY	Jersey City Public Schools, NJ	Iran, Islamic Rep.	Turkey	Miami-Dade County PS, FL	Chile	Tunisia	Philippines	Morocco	South Africa		
▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	Singapore <b>Naperville Sch. Dist. #203, IL</b> Chinese Taipei Japan Korea, Rep. of	
▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲	Hungary <b>First in the World Consort., IL</b> Netherlands <b>Michigan Invitational Group, MI</b> <b>Academy School Dist. #20, CO</b>
●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	●▲▲▲	Australia Belgium (Flemish) Russian Federation England Czech Republic
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	Slovenia <b>Michigan</b> Hong Kong, SAR Canada Finland
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	Slovak Republic <b>Project SMART Consortium, OH</b> <b>SW Math/Sci. Collaborative, PA</b> <b>Montgomery County, MD</b> <b>Oregon</b>
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	<b>Guilford County, NC</b> Lithuania <b>Massachusetts</b> <b>Indiana</b> <b>Connecticut</b>
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	<b>Idaho</b> <b>Missouri</b> <b>Illinois</b> Bulgaria <b>Pennsylvania</b>
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	New Zealand <b>United States</b> Latvia (LSS) Malaysia <b>Texas</b>
●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	<b>Fremont/Lincoln/WestSide PS, NE</b> <b>South Carolina</b> <b>Maryland</b> <b>North Carolina</b> <b>Delaware Science Coalition, DE</b>
▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	Israel Italy Thailand Romania Macedonia, Rep. of
▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	Cyprus Jordan Moldova <b>Chicago Public Schools, IL</b> Indonesia
▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	<b>Rochester City Sch. Dist., NY</b> <b>Jersey City Public Schools, NJ</b> Iran, Islamic Rep. Turkey <b>Miami-Dade County PS, FL</b>
▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	▼▼▼▼	Chile Tunisia Philippines Morocco South Africa

▲ Average achievement significantly higher than comparison participant

● No statistically significant difference from comparison participant

▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.







- ▲ Average achievement significantly higher than comparison participant
- No statistically significant difference from comparison participant
- ▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

**Instructions:** Read across the row for a participant to compare performance with the participants listed along the top of the chart. The symbols indicate whether the average achievement of the participant in the row is significantly lower than that of the comparison participant, significantly higher than that of the comparison participant, or if there is no statistically significant difference between the average achievement of the two participants.







North Carolina	Missouri	Texas	Idaho	Slovenia	Fremont/Lincoln/WestSide PS, NE	Slovak Republic	Delaware Science Coalition, DE	Latvia (LSS)	Jersey City Public Schools, NJ	Chicago Public Schools, IL	Russian Federation	Italy	Malaysia	Lithuania	Bulgaria	Rochester City Sch. Dist., NY	Israel	Moldova	Cyprus	Macedonia, Rep. of	Miami-Dade County PS, FL	Thailand	Romania	Tunisia	Iran, Islamic Rep.	Indonesia	Turkey	Chile	Jordan	Philippines	Morocco	South Africa	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼

▲ Average achievement significantly higher than comparison participant

● No statistically significant difference from comparison participant

▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

