

# Appendix E



*Summary Statistics and Standard Errors  
for Proficiency in Mathematics and Science  
Content Domains and Cognitive Domains  
in the Fourth and Eighth Grades*

**Exhibit E.1 Summary Statistics and Standard Errors for Proficiency in Number in the Fourth Grade**

Country	Sample Size	Number			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	390.710	91.852	4.986	5.025
Armenia	4,079	521.780	87.024	3.898	4.005
Australia	4,108	496.443	95.241	3.474	3.669
Austria	4,859	502.395	68.213	1.900	2.188
Chinese Taipei	4,131	581.167	74.717	1.752	1.897
Colombia	4,801	359.708	88.768	4.334	4.339
Czech Republic	4,235	481.901	69.955	2.676	2.830
Denmark	3,519	508.740	74.195	2.657	2.910
El Salvador	4,166	317.087	100.003	3.680	3.928
England	4,316	530.860	96.382	3.163	3.228
Georgia	4,108	464.430	82.897	3.660	3.753
Germany	5,200	521.146	68.537	2.131	2.215
Hong Kong SAR	3,791	606.196	75.313	3.678	3.815
Hungary	4,048	509.829	94.144	3.618	3.653
Iran, Islamic Rep. of	3,833	398.383	84.475	3.532	3.552
Italy	4,470	505.231	78.532	3.098	3.154
Japan	4,487	560.979	84.174	2.144	2.166
Kazakhstan	3,990	555.743	81.597	6.378	6.594
Kuwait	3,803	320.618	96.746	3.224	3.497
Latvia	3,908	535.657	74.911	2.014	2.061
Lithuania	3,980	533.016	75.455	2.232	2.255
Morocco	3,894	353.393	96.588	4.536	4.726
Netherlands	3,349	534.734	63.514	1.934	2.221
New Zealand	4,940	477.823	101.486	2.573	2.654
Norway	4,108	460.983	83.254	2.530	2.832
Qatar	7,019	291.850	97.307	1.012	1.176
Russian Federation	4,464	546.403	76.920	4.311	4.395
Scotland	3,929	480.932	88.783	2.455	2.622
Singapore	5,041	610.549	92.680	4.081	4.252
Slovak Republic	4,963	495.171	83.286	3.860	3.927
Slovenia	4,351	484.568	79.168	1.777	1.858
Sweden	4,676	489.971	72.729	2.523	2.549
Tunisia	4,134	352.482	104.420	3.971	4.467
Ukraine	4,292	479.915	81.032	2.625	2.900
United States	7,896	524.176	85.120	2.706	2.744
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	489.445	77.420	3.106	3.275
British Columbia, Canada	4,153	492.799	80.609	2.659	2.784
Dubai, UAE	3,064	444.234	93.006	1.877	1.998
Massachusetts, US	1,747	571.317	75.766	3.707	3.972
Minnesota, US	1,846	545.599	89.029	6.135	6.164
Ontario, Canada	3,496	489.115	81.921	3.274	3.600
Quebec, Canada	3,885	510.571	73.222	2.883	2.998

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.2 Summary Statistics and Standard Errors for Proficiency in Geometric Shapes and Measures in the Fourth Grade**

Country	Sample Size	Geometric Shapes and Measures			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	382.820	86.105	4.224	4.497
Armenia	4,079	483.326	101.062	4.386	4.715
Australia	4,108	535.784	77.443	2.928	3.056
Austria	4,859	509.013	67.306	1.997	2.432
Chinese Taipei	4,131	555.737	74.380	1.764	2.182
Colombia	4,801	361.299	92.218	4.372	4.831
Czech Republic	4,235	494.165	71.299	2.667	2.778
Denmark	3,519	543.509	69.047	2.276	2.627
El Salvador	4,166	333.015	95.837	3.921	4.257
England	4,316	547.933	78.425	2.682	2.734
Georgia	4,108	415.187	95.200	4.646	4.840
Germany	5,200	528.447	64.609	1.995	2.031
Hong Kong SAR	3,791	598.855	62.912	2.987	3.076
Hungary	4,048	509.736	84.784	3.224	3.284
Iran, Islamic Rep. of	3,833	428.549	79.180	3.111	3.288
Italy	4,470	509.252	77.373	2.981	2.999
Japan	4,487	565.781	74.586	1.819	2.227
Kazakhstan	3,990	542.194	95.291	7.297	7.379
Kuwait	3,803	316.495	100.567	3.186	3.632
Latvia	3,908	532.106	66.083	1.887	2.621
Lithuania	3,980	517.941	71.088	2.107	2.360
Morocco	3,894	364.809	90.152	3.939	4.328
Netherlands	3,349	522.475	58.439	2.028	2.294
New Zealand	4,940	502.115	73.425	2.056	2.269
Norway	4,108	489.711	69.428	2.485	2.998
Qatar	7,019	296.299	97.234	0.982	1.430
Russian Federation	4,464	538.337	86.560	4.858	5.088
Scotland	3,929	503.380	72.160	1.998	2.575
Singapore	5,041	570.192	79.775	3.529	3.650
Slovak Republic	4,963	499.479	81.899	3.995	4.259
Slovenia	4,351	522.223	61.401	1.543	1.756
Sweden	4,676	508.331	62.197	2.253	2.303
Tunisia	4,134	334.383	107.635	4.044	4.464
Ukraine	4,292	457.210	86.113	2.685	2.824
United States	7,896	522.443	72.769	2.356	2.498
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	512.261	61.869	2.590	2.899
British Columbia, Canada	4,153	509.942	68.954	2.659	2.941
Dubai, UAE	3,064	440.213	90.378	2.025	2.814
Massachusetts, US	1,747	564.368	71.818	3.782	4.078
Minnesota, US	1,846	556.240	76.126	4.944	5.258
Ontario, Canada	3,496	530.411	67.449	2.861	3.047
Quebec, Canada	3,885	525.078	68.312	3.156	3.245

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.3 Summary Statistics and Standard Errors for Proficiency in Data Display in the Fourth Grade**

Country	Sample Size	Data Display			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	361.401	93.498	4.998	5.157
Armenia	4,079	457.833	95.256	4.162	4.270
Australia	4,108	533.623	72.290	2.735	3.120
Austria	4,859	508.047	69.124	1.904	2.625
Chinese Taipei	4,131	566.549	56.620	1.145	1.956
Colombia	4,801	363.156	106.033	5.208	5.895
Czech Republic	4,235	493.047	83.361	2.902	3.328
Denmark	3,519	528.758	73.073	2.913	3.384
El Salvador	4,166	367.255	87.502	3.235	3.481
England	4,316	546.677	68.286	2.069	2.473
Georgia	4,108	414.263	88.411	4.289	4.582
Germany	5,200	533.510	77.809	2.162	3.077
Hong Kong SAR	3,791	585.210	53.397	2.507	2.651
Hungary	4,048	504.083	90.908	3.354	3.518
Iran, Islamic Rep. of	3,833	399.807	88.222	3.531	4.044
Italy	4,470	506.384	74.663	2.870	3.407
Japan	4,487	578.285	62.783	1.758	2.840
Kazakhstan	3,990	521.620	68.564	5.628	5.775
Kuwait	3,803	317.517	110.496	3.689	4.661
Latvia	3,908	535.591	71.313	1.897	3.019
Lithuania	3,980	530.352	74.260	2.089	2.873
Morocco	3,894	315.555	107.776	4.958	6.068
Netherlands	3,349	542.810	60.553	1.919	2.316
New Zealand	4,940	512.823	72.667	2.034	2.623
Norway	4,108	486.719	75.823	2.358	2.611
Qatar	7,019	326.030	81.249	0.826	1.559
Russian Federation	4,464	530.068	85.168	4.778	4.930
Scotland	3,929	515.785	69.519	2.025	2.186
Singapore	5,041	583.245	70.772	3.021	3.187
Slovak Republic	4,963	492.059	83.359	4.035	4.224
Slovenia	4,351	517.565	72.306	1.894	2.494
Sweden	4,676	529.264	75.256	2.419	2.667
Tunisia	4,134	307.304	113.710	4.707	4.833
Ukraine	4,292	462.083	84.490	2.811	3.248
United States	7,896	543.264	61.271	1.971	2.442
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	537.239	66.787	2.844	3.675
British Columbia, Canada	4,153	531.238	65.087	2.329	2.783
Dubai, UAE	3,064	461.020	87.313	2.093	2.669
Massachusetts, US	1,747	571.013	72.148	3.242	4.025
Minnesota, US	1,846	557.245	71.466	4.340	4.753
Ontario, Canada	3,496	543.821	62.522	2.562	3.425
Quebec, Canada	3,885	527.072	66.798	2.563	3.621

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.4 Summary Statistics and Standard Errors for Proficiency in Mathematics Knowing in the Fourth Grade**

Country	Sample Size	Mathematics Knowing			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	383.954	97.298	5.071	5.412
Armenia	4,079	517.582	93.651	4.652	4.805
Australia	4,108	509.048	90.528	4.014	4.213
Austria	4,859	504.774	61.294	1.688	1.958
Chinese Taipei	4,131	583.997	65.080	1.572	1.732
Colombia	4,801	359.523	85.599	4.680	5.152
Czech Republic	4,235	472.999	57.774	2.277	2.410
Denmark	3,519	512.785	67.318	2.539	2.731
El Salvador	4,166	312.465	95.251	3.590	4.055
England	4,316	544.165	91.465	3.187	3.558
Georgia	4,108	450.243	84.188	3.983	4.027
Germany	5,200	514.427	62.999	1.964	2.021
Hong Kong SAR	3,791	616.614	67.527	3.265	3.509
Hungary	4,048	510.725	85.763	3.237	3.424
Iran, Islamic Rep. of	3,833	409.878	83.634	3.464	3.556
Italy	4,470	514.285	75.088	2.972	3.206
Japan	4,487	564.626	70.549	1.997	2.139
Kazakhstan	3,990	558.627	87.289	7.115	7.251
Kuwait	3,803	326.117	103.480	3.673	4.576
Latvia	3,908	529.768	64.743	2.119	2.223
Lithuania	3,980	520.059	72.534	2.279	2.776
Morocco	3,894	353.727	97.815	4.531	4.825
Netherlands	3,349	525.442	56.532	2.007	2.190
New Zealand	4,940	481.568	92.462	2.479	2.544
Norway	4,108	460.501	74.656	2.507	2.901
Qatar	7,019	292.677	101.483	1.013	1.262
Russian Federation	4,464	538.031	71.323	4.327	4.456
Scotland	3,929	488.930	77.790	2.518	2.617
Singapore	5,041	620.492	85.177	3.840	3.969
Slovak Republic	4,963	492.270	74.647	3.864	3.921
Slovenia	4,351	497.220	60.760	1.393	1.792
Sweden	4,676	482.016	65.016	2.376	2.519
Tunisia	4,134	343.236	104.713	4.587	4.885
Ukraine	4,292	471.933	77.729	2.813	3.019
United States	7,896	541.183	76.644	2.495	2.563
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	494.241	64.418	3.063	3.101
British Columbia, Canada	4,153	497.723	69.406	2.432	2.485
Dubai, UAE	3,064	456.974	88.156	1.948	2.114
Massachusetts, US	1,747	580.920	70.258	3.900	4.115
Minnesota, US	1,846	565.311	80.275	5.809	6.209
Ontario, Canada	3,496	497.835	70.653	2.937	3.189
Quebec, Canada	3,885	517.442	65.525	2.927	3.189

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.5 Summary Statistics and Standard Errors for Proficiency in Mathematics Applying in the Fourth Grade**

Country	Sample Size	Mathematics Applying			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	375.570	88.789	4.855	5.167
Armenia	4,079	492.816	87.513	4.055	4.070
Australia	4,108	522.855	79.031	3.435	3.525
Austria	4,859	507.039	66.527	1.752	1.833
Chinese Taipei	4,131	569.405	64.839	1.590	1.728
Colombia	4,801	357.434	90.074	4.858	5.116
Czech Republic	4,235	496.138	72.967	2.632	2.683
Denmark	3,519	527.709	68.163	2.435	2.502
El Salvador	4,166	338.630	88.134	3.477	3.683
England	4,316	540.486	78.698	2.769	3.050
Georgia	4,108	433.190	96.246	4.486	4.502
Germany	5,200	530.861	64.415	2.061	2.204
Hong Kong SAR	3,791	599.495	61.237	3.158	3.420
Hungary	4,048	507.369	84.116	3.204	3.485
Iran, Islamic Rep. of	3,833	404.619	82.521	3.464	3.696
Italy	4,470	500.987	71.789	2.865	2.922
Japan	4,487	565.605	73.033	1.893	1.975
Kazakhstan	3,990	547.383	88.363	7.092	7.151
Kuwait	3,803	304.992	103.463	3.619	4.142
Latvia	3,908	540.093	68.358	2.178	2.543
Lithuania	3,980	539.176	73.854	2.207	2.446
Morocco	3,894	345.679	95.791	4.699	4.724
Netherlands	3,349	539.908	57.984	1.899	1.995
New Zealand	4,940	495.241	78.599	2.153	2.335
Norway	4,108	479.069	70.045	2.432	2.826
Qatar	7,019	296.431	90.045	0.907	1.159
Russian Federation	4,464	546.737	86.500	4.762	4.802
Scotland	3,929	499.679	74.092	2.103	2.350
Singapore	5,041	589.533	77.304	3.435	3.676
Slovak Republic	4,963	497.976	82.411	3.999	4.035
Slovenia	4,351	503.754	68.019	1.564	1.906
Sweden	4,676	508.404	60.104	2.086	2.168
Tunisia	4,134	329.002	111.229	4.776	4.843
Ukraine	4,292	466.441	86.659	2.927	3.146
United States	7,896	523.904	73.506	2.385	2.610
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	505.432	64.432	2.818	2.867
British Columbia, Canada	4,153	505.221	67.309	2.562	2.566
Dubai, UAE	3,064	440.841	85.015	1.550	1.705
Massachusetts, US	1,747	565.787	68.838	3.242	3.476
Minnesota, US	1,846	547.871	79.260	5.359	5.458
Ontario, Canada	3,496	514.840	64.560	2.746	3.076
Quebec, Canada	3,885	517.289	63.871	2.592	2.753

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.6 Summary Statistics and Standard Errors for Proficiency in Mathematics Reasoning in the Fourth Grade**

Country	Sample Size	Mathematics Reasoning			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	386.715	93.274	4.713	4.750
Armenia	4,079	489.302	95.625	4.535	4.693
Australia	4,108	516.265	73.607	3.085	3.391
Austria	4,859	506.257	70.190	1.730	2.113
Chinese Taipei	4,131	565.766	71.783	1.662	1.862
Colombia	4,801	372.023	97.979	4.514	4.877
Czech Republic	4,235	492.634	79.388	3.105	3.408
Denmark	3,519	524.397	71.383	1.946	2.088
El Salvador	4,166	355.889	93.231	3.388	4.003
England	4,316	537.381	76.988	2.629	3.096
Georgia	4,108	437.371	85.694	3.784	4.181
Germany	5,200	528.289	68.439	2.001	2.546
Hong Kong SAR	3,791	588.933	70.283	3.160	3.493
Hungary	4,048	509.030	95.572	3.667	3.821
Iran, Islamic Rep. of	3,833	410.055	83.351	3.312	3.776
Italy	4,470	509.412	78.255	2.782	3.078
Japan	4,487	563.031	78.224	2.017	2.092
Kazakhstan	3,990	538.775	74.152	6.025	6.091
Kuwait	+	+	+	+	+
Latvia	3,908	537.314	73.699	2.298	2.458
Lithuania	3,980	526.013	75.850	2.237	2.549
Morocco	+	+	+	+	+
Netherlands	3,349	534.152	67.055	2.197	2.356
New Zealand	4,940	503.208	81.234	2.317	2.808
Norway	4,108	488.764	76.252	2.444	2.687
Qatar	+	+	+	+	+
Russian Federation	4,464	540.366	81.098	4.745	4.827
Scotland	3,929	497.093	78.729	2.149	2.207
Singapore	5,041	577.657	83.469	3.745	3.778
Slovak Republic	4,963	499.403	87.103	3.908	3.982
Slovenia	4,351	504.970	77.080	1.529	2.054
Sweden	4,676	519.077	67.844	2.307	2.503
Tunisia	+	+	+	+	+
Ukraine	4,292	474.257	81.309	2.796	3.198
United States	7,896	523.211	67.120	2.134	2.194
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	519.312	65.103	2.645	3.056
British Columbia, Canada	4,153	516.418	68.246	2.148	2.341
Dubai, UAE	3,064	445.695	92.340	1.981	2.876
Massachusetts, US	1,747	564.656	66.253	3.025	3.237
Minnesota, US	1,846	542.604	66.303	4.839	5.051
Ontario, Canada	3,496	525.702	65.325	2.470	2.641
Quebec, Canada	3,885	522.984	68.436	2.609	2.969

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.7 Summary Statistics and Standard Errors for Proficiency in Life Science in the Fourth Grade**

Country	Sample Size	Life Science			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	351.168	105.043	6.019	6.207
Armenia	4,079	489.098	117.828	5.486	5.861
Australia	4,108	528.201	71.898	2.978	3.384
Austria	4,859	525.823	66.658	1.828	2.027
Chinese Taipei	4,131	540.879	67.619	1.930	2.149
Colombia	4,801	408.445	91.678	4.992	5.207
Czech Republic	4,235	519.564	68.287	2.564	2.898
Denmark	3,519	526.957	70.161	2.162	2.445
El Salvador	4,166	409.749	89.399	3.025	3.555
England	4,316	532.264	77.132	2.592	2.692
Georgia	4,108	426.944	75.857	3.444	3.496
Germany	5,200	528.906	66.312	1.909	2.009
Hong Kong SAR	3,791	532.105	60.694	3.134	3.491
Hungary	4,048	547.744	75.764	2.780	2.850
Iran, Islamic Rep. of	3,833	442.484	90.677	4.041	4.378
Italy	4,470	548.981	74.988	2.835	2.962
Japan	4,487	530.357	67.275	1.649	1.991
Kazakhstan	3,990	527.568	62.753	4.725	5.026
Kuwait	3,803	352.820	138.928	4.381	4.929
Latvia	3,908	535.055	58.841	1.703	2.118
Lithuania	3,980	516.282	59.387	1.588	1.801
Morocco	3,894	291.706	127.103	5.861	6.766
Netherlands	3,349	535.822	54.755	2.090	2.222
New Zealand	4,940	506.500	86.256	2.422	2.505
Norway	4,108	486.638	66.617	2.391	2.536
Qatar	7,019	291.105	130.979	1.313	1.433
Russian Federation	4,464	538.699	67.811	4.098	4.108
Scotland	3,929	503.754	74.422	2.035	2.172
Singapore	5,041	582.189	95.356	3.829	4.083
Slovak Republic	4,963	531.768	78.620	4.022	4.041
Slovenia	4,351	510.508	65.511	1.585	2.175
Sweden	4,676	530.822	63.010	2.343	2.529
Tunisia	4,134	323.427	136.110	5.344	5.565
Ukraine	4,292	481.915	72.161	2.260	2.478
United States	7,896	539.622	81.025	2.444	2.533
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	541.112	70.962	3.418	3.693
British Columbia, Canada	4,153	538.147	67.623	2.348	2.766
Dubai, UAE	3,064	457.495	103.945	2.496	2.842
Massachusetts, US	1,747	568.138	70.411	3.306	3.491
Minnesota, US	1,846	544.836	75.295	5.787	6.102
Ontario, Canada	3,496	535.132	76.964	3.464	3.709
Quebec, Canada	3,885	522.286	63.146	2.523	2.659

Note: A plus sign (+) indicates average achievement could not be accurately estimated.



**Exhibit E.8 Summary Statistics and Standard Errors for Proficiency in Physical Science in the Fourth Grade**

Country	Sample Size	Physical Science			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	377.110	107.678	5.223	5.313
Armenia	4,079	492.365	107.232	4.933	5.081
Australia	4,108	522.334	75.069	3.004	3.081
Austria	4,859	513.647	78.231	2.164	2.404
Chinese Taipei	4,131	559.332	85.425	2.192	2.549
Colombia	4,801	411.234	100.703	4.832	4.880
Czech Republic	4,235	510.822	68.129	2.447	2.794
Denmark	3,519	502.328	80.656	2.373	2.484
El Salvador	4,166	391.749	98.094	3.023	3.780
England	4,316	542.745	72.053	2.535	2.657
Georgia	4,108	413.514	88.050	3.693	4.019
Germany	5,200	523.734	78.175	2.259	2.544
Hong Kong SAR	3,791	558.063	66.349	3.225	3.484
Hungary	4,048	529.224	78.967	2.996	3.262
Iran, Islamic Rep. of	3,833	453.703	101.188	4.144	4.186
Italy	4,470	520.880	77.479	2.926	3.056
Japan	4,487	564.382	65.851	1.706	2.340
Kazakhstan	3,990	527.612	76.391	5.709	5.802
Kuwait	3,803	345.348	127.324	3.982	5.152
Latvia	3,908	543.956	64.517	2.187	2.407
Lithuania	3,980	514.069	61.281	1.393	1.447
Morocco	3,894	323.801	136.165	5.151	5.510
Netherlands	3,349	502.685	58.112	1.804	2.309
New Zealand	4,940	498.330	85.728	2.262	2.495
Norway	4,108	468.714	69.474	2.105	2.661
Qatar	7,019	303.044	152.671	1.577	2.055
Russian Federation	4,464	547.384	80.496	4.426	4.551
Scotland	3,929	499.399	68.495	1.833	1.897
Singapore	5,041	585.055	92.126	3.505	3.895
Slovak Republic	4,963	512.651	84.012	4.375	4.571
Slovenia	4,351	529.645	69.225	1.484	1.644
Sweden	4,676	508.103	75.978	2.633	2.656
Tunisia	4,134	339.809	152.881	6.076	6.419
Ukraine	4,292	474.817	83.439	2.479	2.723
United States	7,896	534.158	77.372	2.221	2.350
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	534.519	68.421	2.938	3.125
British Columbia, Canada	4,153	530.812	68.136	2.438	2.618
Dubai, UAE	3,064	466.808	105.525	2.222	2.820
Massachusetts, US	1,747	560.149	62.025	3.615	4.391
Minnesota, US	1,846	544.543	75.348	5.328	5.351
Ontario, Canada	3,496	534.935	71.870	2.725	2.942
Quebec, Canada	3,885	513.218	64.679	2.308	2.577

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.9 Summary Statistics and Standard Errors for Proficiency in Earth Science in the Fourth Grade**

Country	Sample Size	Earth Science			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	365.160	109.492	5.574	5.748
Armenia	4,079	478.865	115.865	5.272	5.536
Australia	4,108	534.144	72.157	3.006	3.194
Austria	4,859	532.239	82.279	1.922	1.939
Chinese Taipei	4,131	553.276	74.995	1.699	1.947
Colombia	4,801	401.055	106.686	5.079	5.578
Czech Republic	4,235	517.598	72.376	2.356	2.607
Denmark	3,519	521.832	71.991	2.627	2.716
El Salvador	4,166	393.319	102.009	3.017	3.335
England	4,316	538.446	73.486	2.449	2.949
Georgia	4,108	431.778	104.063	4.719	4.977
Germany	5,200	523.912	78.809	2.255	2.370
Hong Kong SAR	3,791	559.544	65.760	2.912	3.150
Hungary	4,048	516.726	87.028	3.025	3.466
Iran, Islamic Rep. of	3,833	433.364	98.274	3.825	4.106
Italy	4,470	526.031	80.692	2.870	3.043
Japan	4,487	528.608	71.574	1.859	2.713
Kazakhstan	3,990	534.056	71.102	4.947	5.160
Kuwait	3,803	362.660	120.570	3.660	3.835
Latvia	3,908	535.805	68.202	2.100	2.201
Lithuania	3,980	510.584	68.521	2.024	2.455
Morocco	3,894	292.501	140.623	6.019	6.213
Netherlands	3,349	523.548	72.288	2.235	2.537
New Zealand	4,940	514.787	78.006	2.019	2.647
Norway	4,108	496.638	80.938	2.614	2.932
Qatar	7,019	304.917	127.406	1.287	2.218
Russian Federation	4,464	536.337	76.222	4.242	4.302
Scotland	3,929	507.849	69.763	1.802	2.519
Singapore	5,041	553.520	81.208	3.230	3.317
Slovak Republic	4,963	530.287	79.911	4.171	4.781
Slovenia	4,351	517.011	79.206	2.040	2.502
Sweden	4,676	534.880	75.213	2.455	2.710
Tunisia	4,134	325.029	142.181	5.208	5.789
Ukraine	4,292	473.776	84.301	2.777	3.087
United States	7,896	533.463	76.848	2.362	2.586
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	544.019	67.736	3.065	3.343
British Columbia, Canada	4,153	536.806	64.506	2.280	2.659
Dubai, UAE	3,064	470.760	95.846	2.182	2.569
Massachusetts, US	1,747	557.924	72.579	4.139	4.434
Minnesota, US	1,846	547.013	76.697	5.305	5.784
Ontario, Canada	3,496	529.540	67.655	2.885	3.175
Quebec, Canada	3,885	523.219	61.114	2.349	2.589

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.10 Summary Statistics and Standard Errors for Proficiency in Science Knowing in the Fourth Grade**

Country	Sample Size	Science Knowing			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	350.300	102.061	5.574	5.771
Armenia	4,079	486.136	110.880	5.225	5.232
Australia	4,108	529.092	74.426	3.090	3.119
Austria	4,859	529.244	72.189	1.992	2.013
Chinese Taipei	4,131	536.348	75.403	1.894	2.483
Colombia	4,801	409.078	99.597	5.250	5.453
Czech Republic	4,235	519.559	68.346	2.381	2.664
Denmark	3,519	515.932	75.522	2.725	2.929
El Salvador	4,166	410.218	95.333	3.294	3.910
England	4,316	542.960	80.349	2.690	2.912
Georgia	4,108	434.337	81.268	3.769	3.839
Germany	5,200	527.486	71.734	2.016	2.151
Hong Kong SAR	3,791	545.536	64.624	2.957	3.249
Hungary	4,048	539.670	77.225	2.884	2.978
Iran, Islamic Rep. of	3,833	437.377	96.592	4.032	4.330
Italy	4,470	529.934	82.853	3.374	3.892
Japan	4,487	528.293	66.863	1.909	2.201
Kazakhstan	3,990	533.687	78.255	5.770	5.836
Kuwait	3,803	360.002	120.660	3.620	3.879
Latvia	3,908	539.561	61.317	1.962	2.165
Lithuania	3,980	510.729	57.054	1.485	1.708
Morocco	3,894	290.725	130.830	5.626	5.836
Netherlands	3,349	517.683	57.943	1.815	2.479
New Zealand	4,940	510.533	82.562	2.157	2.530
Norway	4,108	484.920	68.773	2.331	2.423
Qatar	7,019	303.548	140.056	1.473	2.260
Russian Federation	4,464	541.670	73.846	4.643	4.838
Scotland	3,929	510.710	69.556	1.865	2.045
Singapore	5,041	587.014	101.504	3.925	4.079
Slovak Republic	4,963	527.369	81.409	4.224	4.393
Slovenia	4,351	511.313	68.595	1.593	1.648
Sweden	4,676	525.595	68.973	2.459	2.499
Tunisia	4,134	315.512	144.012	5.553	5.861
Ukraine	4,292	476.024	74.547	2.305	2.439
United States	7,896	541.317	78.928	2.198	2.274
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	548.730	71.785	3.232	3.486
British Columbia, Canada	4,153	539.490	69.737	2.342	2.536
Dubai, UAE	3,064	462.769	107.432	2.087	2.557
Massachusetts, US	1,747	566.167	69.880	3.862	4.427
Minnesota, US	1,846	549.634	78.041	5.646	5.853
Ontario, Canada	3,496	538.367	75.323	3.221	3.397
Quebec, Canada	3,885	516.166	64.219	2.417	2.756

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.11 Summary Statistics and Standard Errors for Proficiency in Science Applying in the Fourth Grade**

Country	Sample Size	Science Applying			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	379.021	99.361	5.280	5.684
Armenia	4,079	486.720	121.406	5.580	5.604
Australia	4,108	523.066	77.132	3.020	3.312
Austria	4,859	526.030	76.186	2.018	2.156
Chinese Taipei	4,131	556.064	71.070	1.803	2.098
Colombia	4,801	403.567	97.254	5.155	5.400
Czech Republic	4,235	515.871	72.146	2.746	3.114
Denmark	3,519	515.208	72.422	2.263	2.556
El Salvador	4,166	393.469	92.780	3.322	3.569
England	4,316	536.118	76.289	2.443	2.653
Georgia	4,108	423.639	89.445	4.057	4.105
Germany	5,200	526.309	74.281	2.159	2.177
Hong Kong SAR	3,791	549.416	56.871	2.751	2.950
Hungary	4,048	530.669	80.881	3.126	3.198
Iran, Islamic Rep. of	3,833	450.520	89.407	3.927	4.256
Italy	4,470	539.142	74.620	2.981	3.073
Japan	4,487	542.351	64.050	1.775	2.745
Kazakhstan	3,990	535.537	66.630	4.786	4.937
Kuwait	3,803	337.972	140.437	4.100	4.268
Latvia	3,908	534.649	64.100	2.149	2.425
Lithuania	3,980	515.060	65.114	1.812	2.755
Morocco	3,894	311.121	130.922	5.938	6.280
Netherlands	3,349	525.241	59.405	2.018	2.225
New Zealand	4,940	499.577	88.891	2.275	2.391
Norway	4,108	478.350	76.833	2.490	2.790
Qatar	7,019	283.039	140.934	1.432	2.664
Russian Federation	4,464	546.307	72.631	4.564	4.706
Scotland	3,929	493.812	76.592	2.064	2.425
Singapore	5,041	578.640	81.501	3.377	3.699
Slovak Republic	4,963	526.801	82.573	4.303	4.422
Slovenia	4,351	525.100	73.863	1.887	2.130
Sweden	4,676	520.714	72.083	2.499	2.852
Tunisia	4,134	329.075	146.437	5.772	6.266
Ukraine	4,292	477.285	77.649	2.636	3.152
United States	7,896	532.990	82.756	2.565	2.786
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	534.949	71.335	3.499	3.712
British Columbia, Canada	4,153	533.176	68.513	2.263	2.385
Dubai, UAE	3,064	463.196	101.442	1.942	2.626
Massachusetts, US	1,747	563.121	68.675	4.140	4.360
Minnesota, US	1,846	544.233	81.236	5.795	5.890
Ontario, Canada	3,496	528.056	76.712	3.169	3.417
Quebec, Canada	3,885	515.121	62.083	2.501	2.650

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.12 Summary Statistics and Standard Errors for Proficiency in Science Reasoning in the Fourth Grade**

Country	Sample Size	Science Reasoning			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	4,223	357.397	107.884	4.919	5.769
Armenia	4,079	484.175	116.357	4.985	5.258
Australia	4,108	530.259	79.407	3.116	3.378
Austria	4,859	513.256	77.111	2.218	2.338
Chinese Taipei	4,131	570.802	87.174	2.063	2.383
Colombia	4,801	409.056	97.454	4.827	5.123
Czech Republic	4,235	510.027	75.305	2.812	2.901
Denmark	3,519	525.434	80.010	2.865	3.791
El Salvador	4,166	376.398	99.483	3.481	4.034
England	4,316	537.252	70.511	2.363	2.689
Georgia	4,108	388.091	98.600	4.507	4.943
Germany	5,200	525.005	82.058	2.225	2.275
Hong Kong SAR	3,791	561.105	78.734	3.632	4.363
Hungary	4,048	529.055	94.505	3.534	3.691
Iran, Islamic Rep. of	3,833	436.072	97.377	3.999	4.350
Italy	4,470	525.686	80.614	2.995	3.781
Japan	4,487	567.424	61.462	1.729	2.081
Kazakhstan	3,990	519.380	76.992	5.241	5.324
Kuwait	3,803	330.941	132.494	4.042	5.358
Latvia	3,908	550.769	71.556	2.274	2.747
Lithuania	3,980	524.135	71.919	1.987	2.373
Morocco	3,894	317.712	119.143	4.931	5.350
Netherlands	3,349	525.421	55.642	1.915	2.252
New Zealand	4,940	505.200	85.759	2.044	2.908
Norway	4,108	480.024	70.618	2.097	3.202
Qatar	7,019	292.623	119.315	1.243	2.858
Russian Federation	4,464	542.295	87.213	4.611	4.629
Scotland	3,929	500.674	76.907	1.824	2.186
Singapore	5,041	567.752	87.578	3.214	3.707
Slovak Republic	4,963	513.444	92.232	4.665	4.878
Slovenia	4,351	527.440	75.537	1.555	1.794
Sweden	4,676	527.296	70.950	2.614	3.489
Tunisia	4,134	349.024	126.868	4.869	5.344
Ukraine	4,292	478.145	88.814	2.757	2.963
United States	7,896	534.873	78.012	2.236	2.641
Yemen	+	+	+	+	+
<b>Benchmarking Participants</b>					
Alberta, Canada	4,037	536.740	74.222	3.658	4.401
British Columbia, Canada	4,153	535.881	72.688	2.390	2.708
Dubai, UAE	3,064	461.739	100.757	2.452	2.602
Massachusetts, US	1,747	568.581	68.198	4.268	6.205
Minnesota, US	1,846	548.842	77.528	5.648	6.358
Ontario, Canada	3,496	541.019	75.233	2.966	3.140
Quebec, Canada	3,885	527.518	67.942	2.616	3.255

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.13 Summary Statistics and Standard Errors for Proficiency in Number in the Eighth Grade**

Country	Sample Size	Number			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	403.213	65.685	1.460	1.712
Armenia	4,689	492.486	89.825	3.100	3.124
Australia	4,069	503.343	83.587	3.625	3.695
Bahrain	4,230	387.993	83.246	1.362	2.000
Bosnia and Herzegovina	4,220	450.777	74.211	2.519	2.975
Botswana	4,208	366.481	86.941	2.417	2.927
Bulgaria	4,019	457.930	97.873	4.453	4.665
Chinese Taipei	4,046	576.956	103.754	4.103	4.240
Colombia	4,873	369.308	97.213	3.369	3.453
Cyprus	4,399	464.280	88.895	1.470	1.649
Czech Republic	4,845	511.045	78.659	2.361	2.488
Egypt	6,582	392.659	95.445	2.969	3.138
El Salvador	4,063	354.709	81.048	2.555	2.954
England	4,025	509.720	85.300	4.782	4.977
Georgia	4,178	420.808	87.158	5.442	5.552
Ghana	5,294	309.799	96.730	3.880	3.950
Hong Kong SAR	3,470	566.891	95.544	5.604	5.638
Hungary	4,111	516.915	87.947	3.334	3.599
Indonesia	4,203	399.181	87.214	3.419	3.722
Iran, Islamic Rep. of	3,981	394.931	91.360	3.822	3.878
Israel	3,294	468.888	92.556	3.144	3.241
Italy	4,408	477.509	75.709	2.600	2.751
Japan	4,312	551.397	91.314	2.152	2.304
Jordan	5,251	416.473	100.425	3.998	4.293
Korea, Rep. of	4,240	583.341	96.344	2.346	2.365
Kuwait	4,091	346.661	87.770	2.343	3.127
Lebanon	3,786	454.436	71.255	3.305	3.351
Lithuania	3,991	506.007	80.087	2.386	2.659
Malaysia	4,466	490.504	85.116	4.951	5.135
Malta	4,670	495.912	96.272	1.008	1.319
Morocco	3,060	389.488	83.023	2.960	3.385
Norway	4,627	487.511	68.064	1.873	1.967
Oman	4,752	362.824	88.413	2.411	2.732
Palestinian Nat'l Auth.	4,378	365.552	102.227	3.187	3.241
Qatar	7,184	334.344	87.241	0.754	1.566
Romania	4,198	456.990	93.722	3.423	3.492
Russian Federation	4,472	506.639	82.304	3.423	3.776
Saudi Arabia	4,243	309.411	96.547	2.603	3.280
Scotland	4,070	488.883	81.803	3.537	3.691
Serbia	4,045	477.765	86.099	2.617	2.888
Singapore	4,599	597.225	94.007	3.482	3.519
Slovenia	4,043	502.038	76.281	1.737	2.257
Sweden	5,215	506.844	67.118	1.707	1.760
Syrian Arab Republic	4,650	393.023	84.237	3.132	3.431
Thailand	5,412	443.654	95.546	4.727	4.805
Tunisia	4,080	425.031	70.800	2.283	2.583
Turkey	4,498	429.167	101.776	3.872	4.048
Ukraine	4,424	459.864	86.046	3.281	3.659
United States	7,377	510.165	80.628	2.726	2.739
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	508.930	66.526	2.630	2.852
British Columbia, Canada	4,256	520.053	78.464	3.098	3.186
Dubai, UAE	3,195	458.321	97.499	2.463	3.164
Massachusetts, US	1,897	548.299	86.883	5.101	5.185
Minnesota, US	1,777	536.754	71.257	4.118	4.289
Ontario, Canada	3,448	524.789	77.030	3.780	3.959
Quebec, Canada	3,956	534.112	71.183	3.087	3.407

**Exhibit E.14 Summary Statistics and Standard Errors for Proficiency in Algebra in the Eighth Grade**

Country	Sample Size	Algebra			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	349.470	83.997	1.936	2.434
Armenia	4,689	531.532	82.046	2.327	2.498
Australia	4,069	470.888	80.289	3.557	3.707
Bahrain	4,230	403.175	93.720	1.622	1.828
Bosnia and Herzegovina	4,220	475.055	78.642	2.798	3.196
Botswana	4,208	393.943	70.298	1.757	2.169
Bulgaria	4,019	475.942	105.529	5.042	5.101
Chinese Taipei	4,046	617.380	128.261	5.276	5.439
Colombia	4,873	390.247	78.267	2.763	3.123
Cyprus	4,399	467.927	84.365	1.537	2.001
Czech Republic	4,845	483.684	73.813	2.266	2.352
Egypt	6,582	409.360	94.309	3.275	3.299
El Salvador	4,063	331.123	82.233	2.742	3.702
England	4,025	491.763	83.552	4.473	4.621
Georgia	4,178	421.189	107.125	6.517	6.595
Ghana	5,294	358.077	87.397	3.439	3.605
Hong Kong SAR	3,470	565.497	96.965	5.524	5.570
Hungary	4,111	503.227	84.179	3.445	3.578
Indonesia	4,203	405.263	87.852	3.219	3.469
Iran, Islamic Rep. of	3,981	408.052	84.800	3.848	3.918
Israel	3,294	469.599	96.168	3.690	3.930
Italy	4,408	460.466	79.610	3.110	3.242
Japan	4,312	559.081	92.795	2.419	2.540
Jordan	5,251	447.939	97.242	3.985	4.079
Korea, Rep. of	4,240	596.223	110.273	2.907	3.008
Kuwait	4,091	354.173	87.375	2.391	2.992
Lebanon	3,786	464.788	75.426	3.173	3.201
Lithuania	3,991	482.548	87.700	2.623	2.728
Malaysia	4,466	454.060	74.394	4.273	4.294
Malta	4,670	473.396	81.683	0.906	1.442
Morocco	3,060	362.339	103.047	3.383	3.958
Norway	4,627	425.378	70.588	2.176	2.773
Oman	4,752	391.466	102.415	3.002	3.178
Palestinian Nat'l Auth.	4,378	382.288	96.950	3.000	3.354
Qatar	7,184	312.067	96.987	0.929	1.488
Romania	4,198	478.360	105.002	4.385	4.603
Russian Federation	4,472	518.395	91.525	4.458	4.531
Saudi Arabia	4,243	343.915	79.755	1.980	2.797
Scotland	4,070	466.847	80.959	3.530	3.710
Serbia	4,045	500.177	94.192	3.073	3.247
Singapore	4,599	579.148	93.721	3.592	3.661
Slovenia	4,043	488.090	74.954	2.218	2.361
Sweden	5,215	456.398	76.887	2.235	2.431
Syrian Arab Republic	4,650	405.619	89.820	3.635	3.694
Thailand	5,412	433.389	95.006	4.998	5.040
Tunisia	4,080	423.151	64.624	2.437	2.608
Turkey	4,498	440.248	114.887	4.879	5.139
Ukraine	4,424	463.975	95.091	3.605	3.868
United States	7,377	500.601	74.262	2.517	2.727
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	484.884	71.626	2.931	3.100
British Columbia, Canada	4,256	489.306	73.565	2.910	3.074
Dubai, UAE	3,195	474.535	94.549	2.196	2.423
Massachusetts, US	1,897	537.901	79.814	4.678	4.846
Minnesota, US	1,777	515.119	69.180	4.546	4.659
Ontario, Canada	3,448	489.601	71.559	3.151	3.659
Quebec, Canada	3,956	504.690	72.950	3.101	3.301

**Exhibit E.15 Summary Statistics and Standard Errors for Proficiency in Geometry in the Eighth Grade**

Country	Sample Size	Geometry			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	432.138	63.313	1.439	2.098
Armenia	4,689	492.845	90.514	4.051	4.122
Australia	4,069	487.438	74.741	3.271	3.628
Bahrain	4,230	412.270	86.990	1.448	2.113
Bosnia and Herzegovina	4,220	450.897	79.179	2.806	3.475
Botswana	4,208	324.546	99.348	2.661	3.180
Bulgaria	4,019	468.231	98.455	4.421	5.047
Chinese Taipei	4,046	591.966	101.853	4.084	4.620
Colombia	4,873	371.346	76.549	3.214	3.299
Cyprus	4,399	457.676	96.585	1.990	2.698
Czech Republic	4,845	497.622	76.540	2.238	2.725
Egypt	6,582	406.314	100.057	3.319	3.408
El Salvador	4,063	317.663	87.204	3.212	3.680
England	4,025	510.117	77.803	4.289	4.408
Georgia	4,178	408.607	104.577	6.489	6.710
Ghana	5,294	274.516	109.317	4.472	4.859
Hong Kong SAR	3,470	569.904	85.246	5.375	5.472
Hungary	4,111	507.594	87.700	3.547	3.627
Indonesia	4,203	394.579	98.354	3.929	4.450
Iran, Islamic Rep. of	3,981	422.674	90.126	4.104	4.382
Israel	3,294	436.045	97.892	3.901	4.277
Italy	4,408	489.591	78.356	2.977	3.054
Japan	4,312	572.856	71.616	1.906	2.158
Jordan	5,251	435.601	96.429	3.746	3.852
Korea, Rep. of	4,240	586.590	83.479	2.067	2.327
Kuwait	4,091	384.645	81.606	2.659	2.841
Lebanon	3,786	462.127	75.199	3.506	3.955
Lithuania	3,991	506.922	79.745	2.235	2.647
Malaysia	4,466	476.893	88.244	5.520	5.553
Malta	4,670	495.116	87.215	0.804	1.118
Morocco	3,060	396.372	90.518	3.301	3.643
Norway	4,627	458.710	76.513	2.264	2.285
Oman	4,752	387.457	95.476	2.658	3.032
Palestinian Nat'l Auth.	4,378	388.168	99.800	3.101	3.779
Qatar	7,184	301.457	102.787	1.081	1.804
Romania	4,198	466.435	97.862	3.900	4.027
Russian Federation	4,472	509.631	76.112	3.669	4.069
Saudi Arabia	4,243	358.898	82.147	2.302	2.608
Scotland	4,070	485.452	74.903	3.271	3.854
Serbia	4,045	485.742	90.015	3.416	3.599
Singapore	4,599	578.350	85.182	3.332	3.369
Slovenia	4,043	499.461	70.114	2.140	2.402
Sweden	5,215	471.686	80.670	2.329	2.517
Syrian Arab Republic	4,650	417.187	85.441	3.160	3.437
Thailand	5,412	441.933	95.640	5.075	5.322
Tunisia	4,080	436.791	68.914	2.282	2.588
Turkey	4,498	411.109	113.026	4.807	5.091
Ukraine	4,424	467.221	82.808	3.252	3.567
United States	7,377	479.943	70.712	2.399	2.525
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	476.328	76.259	3.376	3.716
British Columbia, Canada	4,256	486.936	75.056	3.054	3.718
Dubai, UAE	3,195	450.873	88.844	2.409	3.422
Massachusetts, US	1,897	519.231	74.315	4.198	4.297
Minnesota, US	1,777	505.065	67.359	4.057	4.372
Ontario, Canada	3,448	507.977	70.981	3.923	4.215
Quebec, Canada	3,956	523.001	69.729	3.164	3.269



**Exhibit E.16 Summary Statistics and Standard Errors for Proficiency in Data and Chance in the Eighth Grade**

Country	Sample Size	Data and Chance			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	371.143	65.189	1.425	1.717
Armenia	4,689	426.761	108.793	3.863	3.925
Australia	4,069	525.295	84.705	3.084	3.209
Bahrain	4,230	418.222	70.031	1.299	2.131
Bosnia and Herzegovina	4,220	437.493	85.816	2.234	2.313
Botswana	4,208	383.835	74.550	1.548	2.605
Bulgaria	4,019	440.206	110.674	4.391	4.733
Chinese Taipei	4,046	565.603	88.894	3.367	3.646
Colombia	4,873	405.115	84.356	3.625	3.834
Cyprus	4,399	464.303	90.753	1.427	1.649
Czech Republic	4,845	511.667	81.205	2.569	2.799
Egypt	6,582	383.997	87.310	2.574	3.149
El Salvador	4,063	361.784	80.658	2.345	2.994
England	4,025	547.261	94.618	4.837	4.970
Georgia	4,178	372.737	106.358	3.807	4.256
Ghana	5,294	320.558	86.422	3.180	3.647
Hong Kong SAR	3,470	548.909	80.549	4.710	4.730
Hungary	4,111	523.621	82.712	3.143	3.254
Indonesia	4,203	402.427	89.834	3.165	3.580
Iran, Islamic Rep. of	3,981	414.506	76.862	3.241	3.466
Israel	3,294	465.406	114.125	4.203	4.382
Italy	4,408	490.601	83.617	2.944	3.128
Japan	4,312	573.325	74.262	1.646	2.192
Jordan	5,251	424.877	94.222	3.547	3.781
Korea, Rep. of	4,240	579.661	75.758	1.715	1.968
Kuwait	4,091	365.996	77.967	2.180	3.538
Lebanon	3,786	407.275	85.230	4.076	4.437
Lithuania	3,991	523.385	80.025	1.871	2.273
Malaysia	4,466	468.836	71.798	3.874	4.093
Malta	4,670	486.961	102.254	0.980	1.413
Morocco	3,060	371.141	92.504	3.294	3.382
Norway	4,627	504.982	94.770	2.391	2.481
Oman	4,752	389.389	87.227	2.468	3.015
Palestinian Nat'l Auth.	4,378	370.585	93.907	2.721	2.915
Qatar	7,184	305.240	97.657	0.875	1.649
Romania	4,198	428.768	99.453	3.591	3.688
Russian Federation	4,472	487.139	85.842	3.481	3.837
Saudi Arabia	4,243	348.391	74.424	1.749	2.161
Scotland	4,070	516.512	82.023	3.334	3.451
Serbia	4,045	458.224	93.973	2.733	3.033
Singapore	4,599	573.958	96.242	3.525	3.866
Slovenia	4,043	510.962	74.122	2.068	2.317
Sweden	5,215	525.690	96.760	2.775	3.044
Syrian Arab Republic	4,650	387.241	77.129	2.449	2.660
Thailand	5,412	452.884	79.393	3.592	4.082
Tunisia	4,080	411.176	73.373	2.171	2.327
Turkey	4,498	444.830	98.557	3.966	4.361
Ukraine	4,424	457.571	87.490	3.209	3.548
United States	7,377	530.647	86.819	2.792	2.817
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	503.734	80.762	2.859	3.661
British Columbia, Canada	4,256	529.151	81.799	3.129	3.241
Dubai, UAE	3,195	456.834	99.907	2.503	3.205
Massachusetts, US	1,897	568.805	95.351	4.770	5.170
Minnesota, US	1,777	560.223	85.620	4.894	5.357
Ontario, Canada	3,448	543.461	83.528	3.840	4.244
Quebec, Canada	3,956	533.170	73.853	2.887	2.979

**Exhibit E.17 Summary Statistics and Standard Errors for Proficiency in Mathematics Knowing in the Eighth Grade**

Country	Sample Size	Mathematics Knowing			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	370.844	66.511	1.714	1.886
Armenia	4,689	506.739	76.632	3.079	3.136
Australia	4,069	487.476	70.703	3.308	3.335
Bahrain	4,230	394.660	88.193	1.511	1.734
Bosnia and Herzegovina	4,220	477.982	75.876	2.646	2.908
Botswana	4,208	376.467	76.079	1.935	2.067
Bulgaria	4,019	476.974	98.191	4.612	4.662
Chinese Taipei	4,046	593.722	104.249	4.371	4.531
Colombia	4,873	364.183	79.311	3.304	3.442
Cyprus	4,399	468.458	77.953	1.531	1.600
Czech Republic	4,845	502.414	68.269	2.402	2.478
Egypt	6,582	392.096	100.852	3.553	3.614
El Salvador	4,063	335.589	78.854	2.801	3.141
England	4,025	503.328	70.176	3.922	4.041
Georgia	4,178	426.850	98.228	5.739	5.812
Ghana	5,294	313.231	105.121	4.539	4.600
Hong Kong SAR	3,470	573.639	87.202	5.312	5.351
Hungary	4,111	518.288	80.307	3.229	3.279
Indonesia	4,203	396.619	96.328	3.808	3.978
Iran, Islamic Rep. of	3,981	403.309	83.560	3.748	4.077
Israel	3,294	473.284	89.123	3.453	3.730
Italy	4,408	476.043	71.452	2.967	2.999
Japan	4,312	560.004	77.224	1.828	2.249
Jordan	5,251	431.751	101.723	4.158	4.224
Korea, Rep. of	4,240	596.328	90.930	2.360	2.542
Kuwait	4,091	347.026	85.732	2.612	3.060
Lebanon	3,786	464.065	74.588	3.798	3.879
Lithuania	3,991	507.604	80.388	2.410	2.483
Malaysia	4,466	476.671	75.581	4.777	4.817
Malta	4,670	490.438	86.102	0.822	1.610
Morocco	3,060	364.908	100.584	3.922	4.400
Norway	4,627	458.171	51.440	1.624	1.839
Oman	4,752	372.075	101.219	3.328	3.468
Palestinian Nat'l Auth.	4,378	365.218	107.992	3.633	3.798
Qatar	7,184	306.934	99.277	1.057	1.438
Romania	4,198	470.063	100.190	4.068	4.173
Russian Federation	4,472	521.147	82.054	3.857	3.890
Saudi Arabia	4,243	307.727	90.522	2.499	2.582
Scotland	4,070	480.900	67.774	3.242	3.256
Serbia	4,045	500.096	84.365	2.950	3.232
Singapore	4,599	581.458	81.192	3.281	3.407
Slovenia	4,043	499.738	68.504	2.014	2.197
Sweden	5,215	478.244	54.384	1.676	2.019
Syrian Arab Republic	4,650	393.144	88.910	3.559	4.172
Thailand	5,412	436.002	86.827	4.786	4.823
Tunisia	4,080	420.619	66.436	2.409	2.594
Turkey	4,498	439.242	108.735	4.512	4.842
Ukraine	4,424	471.266	89.895	3.401	3.493
United States	7,377	513.980	68.426	2.515	2.562
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	501.394	59.738	2.724	2.946
British Columbia, Canada	4,256	504.409	62.500	2.704	2.921
Dubai, UAE	3,195	469.000	90.988	2.037	2.310
Massachusetts, US	1,897	546.382	75.201	4.356	4.493
Minnesota, US	1,777	532.183	61.751	4.310	4.610
Ontario, Canada	3,448	505.146	59.571	2.937	3.219
Quebec, Canada	3,956	519.509	61.070	2.626	2.710

**Exhibit E.18 Summary Statistics and Standard Errors for Proficiency in Mathematics Applying in the Eighth Grade**

Country	Sample Size	Mathematics Applying			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	411.850	61.428	1.508	1.987
Armenia	4,689	492.722	90.860	3.752	3.831
Australia	4,069	499.940	78.553	3.355	3.442
Bahrain	4,230	402.648	78.090	1.565	1.918
Bosnia and Herzegovina	4,220	440.313	81.577	2.599	2.610
Botswana	4,208	351.095	82.065	2.184	2.632
Bulgaria	4,019	457.872	103.823	4.622	4.766
Chinese Taipei	4,046	592.168	101.796	4.061	4.177
Colombia	4,873	383.943	80.751	3.255	3.737
Cyprus	4,399	465.074	92.791	1.772	1.811
Czech Republic	4,845	504.302	75.591	2.610	2.655
Egypt	6,582	393.278	101.745	3.316	3.581
El Salvador	4,063	346.656	72.373	2.519	3.283
England	4,025	514.286	83.674	4.764	4.900
Georgia	4,178	401.063	102.317	5.317	5.516
Ghana	5,294	296.698	95.290	4.047	4.177
Hong Kong SAR	3,470	568.634	92.272	5.696	5.907
Hungary	4,111	513.358	84.032	3.080	3.113
Indonesia	4,203	398.328	88.119	3.626	3.691
Iran, Islamic Rep. of	3,981	401.572	88.816	3.945	4.167
Israel	3,294	455.903	102.738	3.948	4.051
Italy	4,408	482.989	74.280	2.768	2.852
Japan	4,312	565.043	82.926	2.103	2.224
Jordan	5,251	422.237	101.562	3.979	4.118
Korea, Rep. of	4,240	595.252	93.479	2.596	2.759
Kuwait	4,091	361.052	80.175	2.350	2.650
Lebanon	3,786	448.024	74.532	3.930	4.557
Lithuania	3,991	511.386	77.605	2.302	2.397
Malaysia	4,466	478.063	79.645	4.917	4.949
Malta	4,670	492.207	92.596	0.870	1.032
Morocco	3,060	389.406	79.269	3.201	3.262
Norway	4,627	477.205	68.119	1.914	2.182
Oman	4,752	367.525	96.152	2.921	3.045
Palestinian Nat'l Auth.	4,378	370.805	97.757	3.243	3.445
Qatar	7,184	304.612	96.383	1.084	1.448
Romania	4,198	462.047	96.758	3.911	3.961
Russian Federation	4,472	509.614	81.491	3.705	3.746
Saudi Arabia	4,243	335.245	81.751	2.167	2.303
Scotland	4,070	488.989	79.925	3.658	3.710
Serbia	4,045	478.465	93.081	3.292	3.347
Singapore	4,599	593.030	90.292	3.629	3.642
Slovenia	4,043	502.984	70.096	1.884	1.992
Sweden	5,215	497.100	71.588	1.962	2.015
Syrian Arab Republic	4,650	400.914	82.532	3.175	3.396
Thailand	5,412	446.403	88.081	4.626	4.665
Tunisia	4,080	423.358	70.815	2.410	2.430
Turkey	4,498	424.923	107.101	4.494	4.524
Ukraine	4,424	463.747	88.024	3.478	3.541
United States	7,377	502.647	79.417	2.796	2.864
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	494.655	70.643	2.889	3.016
British Columbia, Canada	4,256	509.211	72.667	2.996	3.054
Dubai, UAE	3,195	455.519	94.610	2.477	2.946
Massachusetts, US	1,897	542.410	81.408	4.294	4.350
Minnesota, US	1,777	529.510	72.998	4.615	4.782
Ontario, Canada	3,448	518.254	71.353	3.467	3.662
Quebec, Canada	3,956	529.014	67.904	3.065	3.132

**Exhibit E.19 Summary Statistics and Standard Errors for Proficiency in Mathematics Reasoning in the Eighth Grade**

Country	Sample Size	Mathematics Reasoning			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	+	+	+	+	+
Armenia	4,689	489.443	101.065	3.420	3.846
Australia	4,069	501.731	79.206	3.222	3.339
Bahrain	4,230	413.316	87.897	1.731	2.054
Bosnia and Herzegovina	4,220	452.214	85.979	2.714	2.907
Botswana	+	+	+	+	+
Bulgaria	4,019	455.005	108.868	4.395	4.662
Chinese Taipei	4,046	591.419	108.883	4.030	4.103
Colombia	4,873	415.715	81.491	3.021	3.296
Cyprus	4,399	460.853	97.840	1.882	2.064
Czech Republic	4,845	499.812	77.289	2.479	2.557
Egypt	6,582	396.500	93.357	3.025	3.379
El Salvador	+	+	+	+	+
England	4,025	517.611	83.229	4.078	4.282
Georgia	4,178	389.302	109.117	5.466	5.770
Ghana	+	+	+	+	+
Hong Kong SAR	3,470	556.982	99.812	5.523	5.565
Hungary	4,111	512.643	88.453	3.222	3.246
Indonesia	4,203	405.061	89.524	3.285	3.332
Iran, Islamic Rep. of	3,981	426.610	82.926	3.449	3.524
Israel	3,294	462.453	99.520	3.717	4.135
Italy	4,408	483.461	80.110	2.730	2.797
Japan	4,312	567.803	92.726	2.357	2.422
Jordan	5,251	440.361	98.357	3.366	3.569
Korea, Rep. of	4,240	579.023	92.697	2.246	2.279
Kuwait	+	+	+	+	+
Lebanon	3,786	429.411	91.268	3.839	3.998
Lithuania	3,991	485.758	84.651	2.297	2.517
Malaysia	4,466	467.818	70.375	3.738	3.762
Malta	4,670	474.746	88.159	0.903	1.300
Morocco	3,060	383.314	90.609	3.327	3.536
Norway	4,627	475.382	74.860	2.094	2.251
Oman	4,752	397.110	94.743	3.095	3.331
Palestinian Nat'l Auth.	4,378	381.309	101.337	3.156	3.502
Qatar	+	+	+	+	+
Romania	4,198	448.586	114.037	4.423	4.551
Russian Federation	4,472	496.771	91.278	3.621	3.646
Saudi Arabia	+	+	+	+	+
Scotland	4,070	495.310	81.146	3.299	3.329
Serbia	4,045	473.780	94.677	3.275	3.290
Singapore	4,599	578.684	102.821	3.949	4.110
Slovenia	4,043	495.811	79.172	2.361	2.526
Sweden	5,215	490.118	84.140	2.327	2.553
Syrian Arab Republic	4,650	395.736	91.083	3.002	3.366
Thailand	5,412	456.242	87.175	4.243	4.359
Tunisia	4,080	425.476	66.299	1.813	2.315
Turkey	4,498	440.722	107.095	4.046	4.202
Ukraine	4,424	444.739	96.352	3.374	3.751
United States	7,377	504.727	72.137	2.305	2.376
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	496.030	79.086	2.834	3.523
British Columbia, Canada	4,256	510.224	73.148	2.842	3.254
Dubai, UAE	3,195	464.645	98.991	2.508	2.768
Massachusetts, US	1,897	543.099	76.272	3.992	4.076
Minnesota, US	1,777	523.210	65.210	3.851	4.190
Ontario, Canada	3,448	521.371	68.086	3.005	3.182
Quebec, Canada	3,956	523.897	72.623	2.905	2.955

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

**Exhibit E.20 Summary Statistics and Standard Errors for Proficiency in Biology in the Eighth Grade**

Country	Sample Size	Biology			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	411.430	72.948	1.567	1.862
Armenia	4,689	490.431	100.798	5.784	5.861
Australia	4,069	518.317	82.614	3.321	3.445
Bahrain	4,230	473.409	87.819	1.428	1.959
Bosnia and Herzegovina	4,220	464.044	80.476	2.821	3.036
Botswana	4,208	358.618	104.987	2.657	2.916
Bulgaria	3,079	466.611	106.516	5.863	6.039
Chinese Taipei	4,046	548.647	85.270	3.187	3.360
Colombia	4,873	433.958	79.182	3.581	3.679
Cyprus	4,399	446.668	85.590	1.623	1.919
Czech Republic	4,845	530.870	71.570	1.776	2.144
Egypt	6,582	406.477	96.651	3.248	3.409
El Salvador	4,063	398.456	71.553	2.621	2.985
England	4,025	540.886	81.899	4.118	4.366
Georgia	4,178	422.847	85.200	3.587	3.901
Ghana	5,294	303.775	113.587	4.832	4.950
Hong Kong SAR	3,470	527.126	75.317	4.464	4.586
Hungary	4,111	533.751	73.743	2.588	2.679
Indonesia	4,203	428.014	80.487	2.983	3.065
Iran, Islamic Rep. of	3,981	448.702	80.731	3.422	3.613
Israel	3,294	472.183	101.219	4.093	4.180
Italy	4,408	502.223	78.248	2.747	2.989
Japan	4,312	552.537	72.191	1.487	1.856
Jordan	5,251	478.266	90.727	3.659	3.798
Korea, Rep. of	4,240	547.726	68.962	1.653	1.900
Kuwait	4,091	419.483	87.726	2.360	2.556
Lebanon	3,786	405.258	102.444	5.912	6.159
Lithuania	3,991	526.537	81.353	2.280	2.336
Malaysia	4,466	469.150	86.476	5.726	5.772
Malta	4,670	452.838	115.155	1.137	1.654
Morocco	3,060	394.732	87.445	3.060	3.478
Norway	4,627	486.819	73.027	2.089	2.304
Oman	4,752	413.596	100.727	2.881	3.092
Palestinian Nat'l Auth.	4,378	401.647	110.088	3.560	4.064
Qatar	7,184	318.023	128.337	1.177	1.679
Romania	4,198	459.087	88.963	2.976	3.213
Russian Federation	4,472	524.926	75.652	3.421	3.627
Saudi Arabia	4,243	407.371	84.417	1.990	2.360
Scotland	4,070	495.077	80.248	3.111	3.183
Serbia	4,045	473.684	84.149	3.059	3.187
Singapore	4,599	563.815	98.546	4.043	4.166
Slovenia	4,043	529.764	73.156	1.983	2.322
Sweden	5,215	514.736	77.031	2.260	2.444
Syrian Arab Republic	4,650	459.486	79.105	2.535	2.699
Thailand	5,412	478.423	85.576	4.301	4.481
Tunisia	4,080	451.728	65.236	2.083	2.205
Turkey	4,498	461.963	87.950	3.319	3.429
Ukraine	4,424	476.718	83.970	3.179	3.444
United States	7,377	529.868	81.680	2.678	2.819
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	497.946	69.446	2.605	2.885
British Columbia, Canada	4,256	534.656	74.834	2.962	3.225
Dubai, UAE	3,195	484.856	95.941	3.138	3.381
Massachusetts, US	1,897	562.593	80.184	3.751	4.295
Minnesota, US	1,777	554.671	78.064	4.705	5.191
Ontario, Canada	3,448	537.318	72.060	3.547	3.780
Quebec, Canada	3,956	512.685	68.427	2.555	2.934

**Exhibit E.21 Summary Statistics and Standard Errors for Proficiency in Chemistry in the Eighth Grade**

Country	Sample Size	Chemistry			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	414.109	74.088	1.433	1.743
Armenia	4,689	478.354	116.937	6.071	6.317
Australia	4,069	504.714	75.396	3.404	3.558
Bahrain	4,230	468.175	86.380	1.384	2.364
Bosnia and Herzegovina	4,220	467.819	83.049	2.762	2.884
Botswana	4,208	370.987	92.341	2.050	2.434
Bulgaria	3,079	472.343	111.215	5.982	6.080
Chinese Taipei	4,046	573.171	103.757	4.191	4.212
Colombia	4,873	419.856	72.871	2.777	3.099
Cyprus	4,399	452.227	93.468	1.884	2.487
Czech Republic	4,845	535.355	73.565	1.831	2.738
Egypt	6,582	413.440	106.480	3.633	3.993
El Salvador	4,063	377.048	78.582	2.780	3.193
England	4,025	533.938	79.375	3.870	3.953
Georgia	4,178	417.718	100.547	4.239	4.563
Ghana	5,294	342.001	109.599	4.714	4.869
Hong Kong SAR	3,470	517.423	76.092	4.419	4.559
Hungary	4,111	536.414	82.423	3.259	3.481
Indonesia	4,203	420.762	74.336	3.049	3.434
Iran, Islamic Rep. of	3,981	462.683	81.535	3.415	3.487
Israel	3,294	467.486	101.090	4.053	4.589
Italy	4,408	480.747	76.367	2.631	2.860
Japan	4,312	551.399	69.341	1.723	1.901
Jordan	5,251	490.813	97.699	3.976	4.109
Korea, Rep. of	4,240	535.794	74.303	1.820	2.418
Kuwait	4,091	417.713	99.056	2.818	3.832
Lebanon	3,786	446.595	103.279	5.201	5.496
Lithuania	3,991	506.767	80.249	2.121	2.255
Malaysia	4,466	478.982	81.571	4.905	5.017
Malta	4,670	460.864	120.742	1.248	2.071
Morocco	3,060	415.509	88.269	2.547	2.953
Norway	4,627	482.767	64.208	1.818	2.203
Oman	4,752	416.252	102.440	3.075	3.648
Palestinian Nat'l Auth.	4,378	413.447	111.994	3.640	4.189
Qatar	7,184	322.241	130.065	1.216	1.755
Romania	4,198	463.286	93.158	3.225	4.031
Russian Federation	4,472	534.625	84.102	3.545	3.725
Saudi Arabia	4,243	390.013	83.524	2.238	2.486
Scotland	4,070	496.917	73.582	2.975	3.201
Serbia	4,045	466.928	88.046	2.832	3.689
Singapore	4,599	560.309	101.580	3.989	4.092
Slovenia	4,043	539.191	76.370	2.158	2.461
Sweden	5,215	499.101	79.179	2.280	2.414
Syrian Arab Republic	4,650	449.754	76.518	2.689	2.914
Thailand	5,412	461.885	78.893	3.936	4.057
Tunisia	4,080	458.467	58.563	1.962	2.451
Turkey	4,498	434.869	107.005	4.375	5.182
Ukraine	4,424	490.053	87.050	3.260	3.327
United States	7,377	510.377	76.256	2.583	2.678
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	472.465	81.704	3.070	3.451
British Columbia, Canada	4,256	504.771	70.445	2.632	2.704
Dubai, UAE	3,195	493.025	93.213	2.980	3.521
Massachusetts, US	1,897	540.384	85.388	4.278	4.576
Minnesota, US	1,777	518.823	71.032	4.451	4.906
Ontario, Canada	3,448	504.585	66.301	2.880	3.433
Quebec, Canada	3,956	496.649	74.481	2.920	3.129

**Exhibit E.22 Summary Statistics and Standard Errors for Proficiency in Physics in the Eighth Grade**

Country	Sample Size	Physics			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	396.862	73.498	1.488	2.230
Armenia	4,689	502.885	95.673	5.507	5.646
Australia	4,069	507.678	77.241	3.481	4.161
Bahrain	4,230	465.722	77.714	1.267	1.501
Bosnia and Herzegovina	4,220	463.175	80.931	2.850	3.084
Botswana	4,208	350.664	106.845	2.609	3.175
Bulgaria	3,079	465.966	104.758	5.455	5.570
Chinese Taipei	4,046	554.298	86.404	3.554	3.715
Colombia	4,873	407.098	80.119	3.392	3.515
Cyprus	4,399	457.610	87.081	1.700	2.776
Czech Republic	4,845	536.993	72.164	2.024	2.102
Egypt	6,582	413.456	92.283	3.165	3.344
El Salvador	4,063	380.492	78.774	2.531	3.506
England	4,025	544.929	77.188	3.945	4.020
Georgia	4,178	415.747	97.494	5.414	5.769
Ghana	5,294	276.337	128.229	5.299	5.784
Hong Kong SAR	3,470	528.069	85.741	4.803	4.837
Hungary	4,111	540.895	81.198	2.757	3.244
Indonesia	4,203	431.945	79.078	2.744	3.110
Iran, Islamic Rep. of	3,981	470.424	78.103	3.271	3.626
Israel	3,294	471.573	91.306	4.272	4.591
Italy	4,408	489.273	71.622	2.656	3.104
Japan	4,312	558.393	80.956	1.843	1.949
Jordan	5,251	478.720	94.368	3.961	4.167
Korea, Rep. of	4,240	571.294	81.906	2.111	2.396
Kuwait	4,091	437.951	82.738	2.186	2.781
Lebanon	3,786	430.556	87.732	4.718	5.066
Lithuania	3,991	505.432	77.407	2.349	2.928
Malaysia	4,466	483.533	84.956	5.556	5.750
Malta	4,670	469.770	95.868	1.010	1.721
Morocco	3,060	404.737	91.998	2.779	3.065
Norway	4,627	475.433	75.369	2.167	3.036
Oman	4,752	443.145	90.056	2.525	2.876
Palestinian Nat'l Auth.	4,378	413.955	108.922	3.575	3.680
Qatar	7,184	346.654	119.773	1.142	2.121
Romania	4,198	458.146	90.599	3.399	3.420
Russian Federation	4,472	519.164	82.714	3.820	4.037
Saudi Arabia	4,243	408.168	75.743	2.086	2.338
Scotland	4,070	493.710	76.894	3.077	3.658
Serbia	4,045	467.411	82.308	2.761	2.958
Singapore	4,599	575.449	95.548	3.830	3.873
Slovenia	4,043	524.498	68.753	1.857	2.049
Sweden	5,215	506.429	78.249	2.390	2.709
Syrian Arab Republic	4,650	446.777	77.995	2.674	2.728
Thailand	5,412	457.650	81.668	4.177	4.205
Tunisia	4,080	431.845	67.053	2.177	2.452
Turkey	4,498	445.421	96.560	3.570	4.255
Ukraine	4,424	492.437	85.387	3.086	3.853
United States	7,377	502.535	78.145	2.667	2.715
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	493.473	75.724	2.805	3.398
British Columbia, Canada	4,256	516.525	66.363	2.470	2.838
Dubai, UAE	3,195	489.464	86.993	2.682	3.377
Massachusetts, US	1,897	534.908	82.874	3.994	4.993
Minnesota, US	1,777	514.166	78.197	4.573	4.775
Ontario, Canada	3,448	520.368	71.353	3.611	4.141
Quebec, Canada	3,956	491.809	73.613	3.235	3.378



**Exhibit E.23 Summary Statistics and Standard Errors for Proficiency in Earth Science in the Eighth Grade**

Country	Sample Size	Earth Science			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	412.796	68.924	1.366	1.613
Armenia	4,689	474.650	107.329	5.598	5.793
Australia	4,069	519.312	81.101	3.454	3.788
Bahrain	4,230	464.857	89.542	1.520	2.391
Bosnia and Herzegovina	4,220	468.871	89.283	2.711	3.391
Botswana	4,208	360.519	113.144	2.817	4.002
Bulgaria	3,079	479.591	99.011	5.157	5.506
Chinese Taipei	4,046	545.213	75.453	2.675	2.887
Colombia	4,873	406.843	85.572	3.727	3.896
Cyprus	4,399	457.279	89.772	1.735	2.339
Czech Republic	4,845	533.953	71.631	1.886	1.954
Egypt	6,582	426.151	91.260	3.085	3.777
El Salvador	4,063	400.126	75.963	2.686	2.878
England	4,025	529.172	88.953	4.115	4.317
Georgia	4,178	424.998	89.518	4.018	4.085
Ghana	5,294	294.128	118.803	4.856	5.803
Hong Kong SAR	3,470	532.207	76.924	4.291	4.470
Hungary	4,111	531.353	79.850	2.827	2.858
Indonesia	4,203	441.672	82.663	2.780	3.257
Iran, Islamic Rep. of	3,981	475.855	80.522	3.327	3.700
Israel	3,294	462.441	94.488	3.743	4.131
Italy	4,408	502.708	84.245	2.932	3.102
Japan	4,312	532.502	71.331	1.827	2.533
Jordan	5,251	483.612	92.164	3.407	3.648
Korea, Rep. of	4,240	538.328	66.992	1.777	2.242
Kuwait	4,091	410.236	90.804	2.466	3.022
Lebanon	3,786	388.837	109.626	6.018	6.417
Lithuania	3,991	514.958	82.715	2.315	2.488
Malaysia	4,466	462.588	86.571	5.221	5.383
Malta	4,670	455.837	116.148	1.275	1.511
Morocco	3,060	397.438	95.754	3.192	3.785
Norway	4,627	502.211	77.527	2.104	2.508
Oman	4,752	438.881	82.056	2.462	2.526
Palestinian Nat'l Auth.	4,378	408.464	107.161	3.335	3.662
Qatar	7,184	312.066	129.557	1.111	1.910
Romania	4,198	470.621	90.471	3.166	3.303
Russian Federation	4,472	524.673	74.842	3.246	3.442
Saudi Arabia	4,243	423.283	77.436	2.017	2.336
Scotland	4,070	497.670	79.373	3.106	3.218
Serbia	4,045	466.122	96.218	3.051	3.806
Singapore	4,599	540.873	99.802	3.969	4.081
Slovenia	4,043	541.958	73.026	2.037	2.194
Sweden	5,215	510.048	78.251	2.247	3.037
Syrian Arab Republic	4,650	448.438	80.802	2.635	3.153
Thailand	5,412	488.455	72.414	3.615	3.814
Tunisia	4,080	447.474	59.713	1.635	1.757
Turkey	4,498	466.463	79.124	2.816	3.299
Ukraine	4,424	482.202	87.414	3.300	3.980
United States	7,377	524.590	86.044	2.865	3.144
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	513.950	77.870	2.684	2.846
British Columbia, Canada	4,256	530.098	71.038	2.451	2.716
Dubai, UAE	3,195	490.057	97.635	3.022	3.238
Massachusetts, US	1,897	559.889	79.092	3.834	4.008
Minnesota, US	1,777	544.823	80.421	4.950	5.493
Ontario, Canada	3,448	529.797	75.905	3.846	4.254
Quebec, Canada	3,956	513.010	69.203	2.685	3.520



**Exhibit E.24 Summary Statistics and Standard Errors for Proficiency in Science Knowing in the Eighth Grade**

Country	Sample Size	Science Knowing			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	409.186	65.742	1.702	1.870
Armenia	4,689	493.085	107.973	6.344	6.368
Australia	4,069	500.713	78.735	3.059	3.141
Bahrain	4,230	468.628	87.495	1.673	2.125
Bosnia and Herzegovina	4,220	486.390	84.046	3.336	3.730
Botswana	4,208	360.946	105.022	2.535	2.919
Bulgaria	3,079	489.363	101.573	5.502	5.791
Chinese Taipei	4,046	565.153	82.307	3.268	3.476
Colombia	4,873	418.171	84.158	3.561	4.032
Cyprus	4,399	438.318	91.179	1.847	2.646
Czech Republic	4,845	532.635	67.775	1.826	2.145
Egypt	6,582	434.028	109.141	3.572	3.850
El Salvador	4,063	394.203	75.679	2.762	3.215
England	4,025	530.489	90.229	4.846	4.865
Georgia	4,178	440.029	94.796	4.866	5.063
Ghana	5,294	316.284	128.276	5.553	5.667
Hong Kong SAR	3,470	532.049	73.653	4.330	4.458
Hungary	4,111	524.221	78.650	2.795	3.013
Indonesia	4,203	425.760	80.244	3.367	3.644
Iran, Islamic Rep. of	3,981	468.327	83.879	3.421	3.866
Israel	3,294	456.255	98.014	4.409	4.952
Italy	4,408	494.016	84.589	3.113	3.325
Japan	4,312	534.228	69.843	1.760	2.187
Jordan	5,251	490.870	102.758	4.447	4.495
Korea, Rep. of	4,240	543.011	70.167	1.769	2.000
Kuwait	4,091	429.852	83.911	2.191	2.463
Lebanon	3,786	402.934	103.952	5.843	5.897
Lithuania	3,991	513.080	74.437	2.271	2.372
Malaysia	4,466	458.040	93.350	6.280	6.465
Malta	4,670	436.427	122.080	1.107	1.458
Morocco	3,060	395.606	91.346	2.894	3.087
Norway	4,627	485.588	69.188	1.816	1.998
Oman	4,752	427.930	95.531	3.188	3.451
Palestinian Nat'l Auth.	4,378	406.797	108.824	3.437	3.514
Qatar	7,184	325.087	137.764	1.129	1.685
Romania	4,198	450.799	94.568	3.748	4.175
Russian Federation	4,472	534.451	81.793	4.228	4.278
Saudi Arabia	4,243	417.283	73.282	1.883	2.080
Scotland	4,070	480.256	84.088	3.382	3.892
Serbia	4,045	484.833	85.338	2.775	2.791
Singapore	4,599	553.763	102.084	4.357	4.481
Slovenia	4,043	532.999	70.456	1.982	2.020
Sweden	5,215	504.812	74.021	2.246	2.311
Syrian Arab Republic	4,650	474.413	76.487	2.661	2.900
Thailand	5,412	472.633	82.115	4.324	4.389
Tunisia	4,080	440.594	59.411	1.833	1.977
Turkey	4,498	461.816	89.808	3.535	3.598
Ukraine	4,424	476.931	90.556	3.532	3.786
United States	7,377	512.086	81.806	2.681	2.935
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	490.312	71.772	2.541	2.993
British Columbia, Canada	4,256	515.644	67.225	2.537	2.881
Dubai, UAE	3,195	494.502	93.191	2.601	3.292
Massachusetts, US	1,897	544.684	86.127	4.049	4.223
Minnesota, US	1,777	526.369	78.492	4.388	4.753
Ontario, Canada	3,448	509.976	66.808	3.161	3.288
Quebec, Canada	3,956	495.377	67.413	2.661	2.860

**Exhibit E.25 Summary Statistics and Standard Errors for Proficiency in Science Applying in the Eighth Grade**

Country	Sample Size	Science Applying			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	410.244	66.093	1.459	2.351
Armenia	4,689	502.170	94.350	5.297	5.391
Australia	4,069	510.155	74.564	3.054	3.235
Bahrain	4,230	467.918	85.645	1.452	2.065
Bosnia and Herzegovina	4,220	462.670	82.231	2.827	2.836
Botswana	4,208	357.728	104.364	2.692	3.179
Bulgaria	3,079	471.326	106.401	5.992	6.096
Chinese Taipei	4,046	560.383	85.883	3.212	3.366
Colombia	4,873	416.759	75.072	2.919	3.110
Cyprus	4,399	455.741	85.644	1.757	2.030
Czech Republic	4,845	539.189	71.061	1.776	1.923
Egypt	6,582	403.804	98.746	3.311	3.559
El Salvador	4,063	388.373	69.781	2.540	3.190
England	4,025	537.608	78.562	3.946	4.033
Georgia	4,178	421.593	87.586	4.375	4.493
Ghana	5,294	290.627	120.794	5.293	5.463
Hong Kong SAR	3,470	522.296	77.685	4.666	4.947
Hungary	4,111	549.037	76.925	2.818	2.999
Indonesia	4,203	424.720	74.416	2.866	3.138
Iran, Islamic Rep. of	3,981	454.306	82.885	3.620	3.804
Israel	3,294	471.616	93.752	3.795	4.154
Italy	4,408	498.472	73.543	2.698	2.940
Japan	4,312	554.963	75.182	1.789	1.991
Jordan	5,251	484.994	95.254	3.862	4.054
Korea, Rep. of	4,240	547.011	72.215	1.797	2.027
Kuwait	4,091	416.617	93.595	2.665	2.927
Lebanon	3,786	422.312	98.051	5.599	5.845
Lithuania	3,991	512.371	76.455	2.148	2.169
Malaysia	4,466	473.153	88.192	5.834	5.937
Malta	4,670	462.412	107.108	1.155	1.585
Morocco	3,060	399.627	86.350	2.629	3.261
Norway	4,627	486.105	72.455	2.173	2.281
Oman	4,752	422.694	98.620	2.858	3.222
Palestinian Nat'l Auth.	4,378	412.121	113.102	3.561	3.994
Qatar	7,184	321.629	130.663	1.132	1.460
Romania	4,198	470.162	88.553	3.355	3.453
Russian Federation	4,472	526.664	76.683	3.579	3.805
Saudi Arabia	4,243	403.439	84.964	2.207	2.684
Scotland	4,070	494.676	74.080	2.985	3.096
Serbia	4,045	469.422	86.803	3.091	3.557
Singapore	4,599	567.350	99.632	4.140	4.228
Slovenia	4,043	533.346	69.845	2.015	2.216
Sweden	5,215	508.802	77.676	2.478	2.707
Syrian Arab Republic	4,650	444.838	80.503	2.741	2.976
Thailand	5,412	472.417	79.783	3.943	4.102
Tunisia	4,080	444.816	61.411	1.831	2.321
Turkey	4,498	449.598	91.421	3.487	3.578
Ukraine	4,424	487.585	81.181	3.441	3.716
United States	7,377	515.971	76.561	2.595	2.698
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	499.431	73.679	2.716	2.853
British Columbia, Canada	4,256	521.104	67.084	2.566	2.805
Dubai, UAE	3,195	488.786	95.068	2.899	3.099
Massachusetts, US	1,897	549.933	75.770	3.781	4.038
Minnesota, US	1,777	534.183	69.870	4.595	4.758
Ontario, Canada	3,448	522.379	68.196	3.512	3.610
Quebec, Canada	3,956	500.449	67.609	2.820	3.060

**Exhibit E.26 Summary Statistics and Standard Errors for Proficiency in Science Reasoning in the Eighth Grade**

Country	Sample Size	Science Reasoning			
		Mean Proficiency	Standard Deviation	Jackknife Sampling Error	Overall Standard Error
Algeria	5,447	413.540	68.997	1.409	1.928
Armenia	4,689	459.389	112.703	6.412	6.514
Australia	4,069	530.345	79.887	3.358	3.592
Bahrain	4,230	468.610	82.629	1.320	2.025
Bosnia and Herzegovina	4,220	451.571	80.650	2.733	3.141
Botswana	4,208	362.466	96.541	2.470	2.702
Bulgaria	3,079	447.991	109.910	5.902	6.130
Chinese Taipei	4,046	541.305	88.476	3.354	3.464
Colombia	4,873	427.727	73.632	2.665	2.720
Cyprus	4,399	459.684	87.212	2.020	2.298
Czech Republic	4,845	533.983	74.488	2.122	2.252
Egypt	6,582	395.435	99.841	3.140	3.363
El Salvador	4,063	383.509	76.626	2.883	3.439
England	4,025	546.697	79.071	3.886	4.044
Georgia	4,178	394.435	94.628	4.081	4.629
Ghana	+	+	+	+	+
Hong Kong SAR	3,470	533.291	81.433	4.937	5.030
Hungary	4,111	530.089	78.112	2.811	3.020
Indonesia	4,203	438.362	81.145	3.049	3.168
Iran, Islamic Rep. of	3,981	461.781	74.920	3.356	3.781
Israel	3,294	481.011	100.133	4.058	4.199
Italy	4,408	492.898	71.356	2.425	2.559
Japan	4,312	559.853	75.781	1.693	2.007
Jordan	5,251	470.960	90.083	3.727	4.074
Korea, Rep. of	4,240	558.313	72.099	1.795	2.020
Kuwait	4,091	410.657	96.748	2.884	2.946
Lebanon	3,786	420.328	97.329	5.450	5.631
Lithuania	3,991	526.859	83.130	2.413	2.502
Malaysia	4,466	487.034	73.308	4.707	4.907
Malta	4,670	473.415	105.021	1.150	1.387
Morocco	3,060	412.750	86.006	2.171	3.008
Norway	4,627	491.329	72.443	2.089	2.789
Oman	4,752	427.730	89.050	2.577	3.502
Palestinian Nat'l Auth.	4,378	395.555	108.150	3.373	3.772
Qatar	+	+	+	+	+
Romania	4,198	459.503	86.852	3.453	3.500
Russian Federation	4,472	520.344	73.089	3.489	3.661
Saudi Arabia	4,243	395.392	83.935	2.101	2.485
Scotland	4,070	510.920	78.275	3.403	3.573
Serbia	4,045	454.779	93.555	3.328	3.546
Singapore	4,599	564.035	92.978	3.890	4.073
Slovenia	4,043	537.703	74.532	2.062	2.197
Sweden	5,215	516.909	75.519	2.275	2.593
Syrian Arab Republic	4,650	439.948	74.266	2.414	2.674
Thailand	5,412	473.006	78.704	3.768	3.963
Tunisia	4,080	458.137	65.298	2.121	2.918
Turkey	4,498	462.431	91.416	3.212	3.387
Ukraine	4,424	487.823	83.155	3.428	3.947
United States	7,377	528.955	76.327	2.712	2.855
<b>Benchmarking Participants</b>					
Basque Country, Spain	2,296	498.520	74.384	3.140	3.331
British Columbia, Canada	4,256	534.525	73.648	2.857	2.965
Dubai, UAE	3,195	482.678	88.845	2.692	3.308
Massachusetts, US	1,897	563.638	74.608	3.503	3.959
Minnesota, US	1,777	545.250	71.875	5.058	5.321
Ontario, Canada	3,448	542.385	74.527	3.944	3.990
Quebec, Canada	3,956	523.443	66.544	2.954	3.119

Note: A plus sign (+) indicates average achievement could not be accurately estimated.

