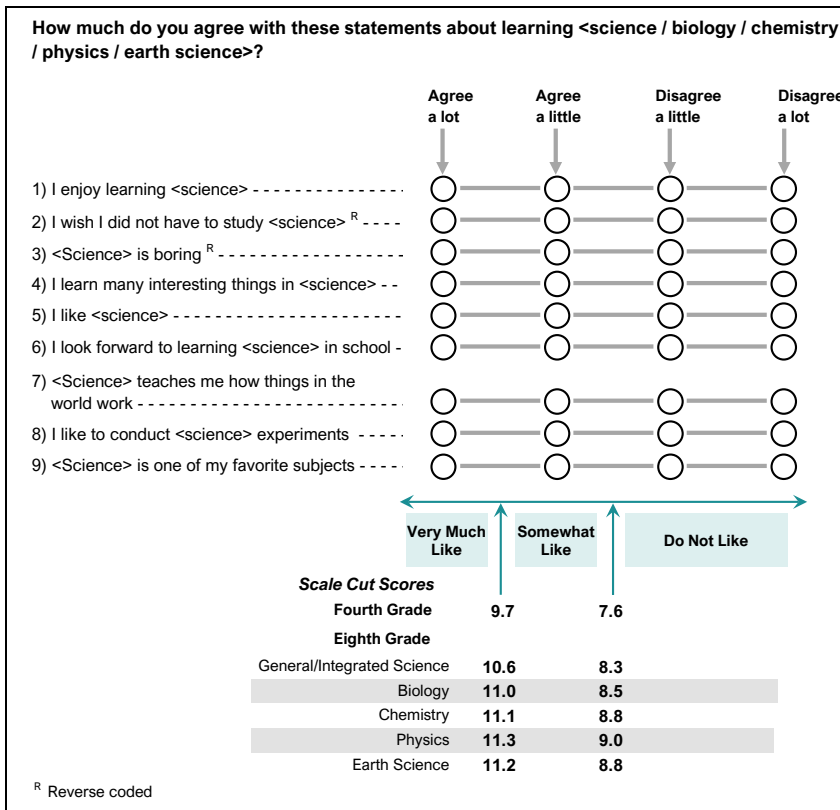


### Exhibit 11.4: Students Like Learning Science

Students' Reports

#### About the Scale

Students were scored according to their responses to nine statements on the *Students Like Learning Science* scale. Cut scores divide the scale into three categories. Students who **Very Much Like Learning Science** had a score at or above the cut score corresponding to “agreeing a lot” with five of the nine statements and “agreeing a little” with the other four, on average. Students who **Do Not Like Learning Science** had a score at or below the cut score corresponding to “disagreeing a little” with five of the nine statements and “agreeing a little” with the other four, on average. All other students **Somewhat Like Learning Science**. At the eighth grade, a comparable approach was used for biology, chemistry, physics, and Earth science in countries where these were taught as separate subjects.



SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2019  
 Downloaded from <http://timss2019.org/download>

## Exhibit 11.5: Students Like Learning Science

Students' Reports

| Country                          | Very Much Like Learning Science |                     | Somewhat Like Learning Science |                     | Do Not Like Learning Science |                     | Average Scale Score |
|----------------------------------|---------------------------------|---------------------|--------------------------------|---------------------|------------------------------|---------------------|---------------------|
|                                  | Percent of Students             | Average Achievement | Percent of Students            | Average Achievement | Percent of Students          | Average Achievement |                     |
| Albania                          | 83 (1.1)                        | 498 (3.3)           | 15 (1.0)                       | 457 (7.8)           | 1 (0.2)                      | ~ ~                 | 11.6 (0.06)         |
| Portugal                         | 74 (1.0)                        | 513 (2.6)           | 21 (0.9)                       | 480 (3.7)           | 4 (0.4)                      | 477 (6.9)           | 11.2 (0.05)         |
| Kosovo                           | 72 (1.5)                        | 429 (3.9)           | 25 (1.3)                       | 383 (5.0)           | 3 (0.4)                      | 364 (14.2)          | 10.9 (0.06)         |
| Iran, Islamic Rep. of            | 70 (1.1)                        | 459 (3.4)           | 24 (1.0)                       | 402 (6.6)           | 5 (0.5)                      | 402 (9.1)           | 11.0 (0.06)         |
| Bulgaria                         | 69 (1.6)                        | 533 (4.5)           | 25 (1.2)                       | 504 (6.8)           | 6 (0.9)                      | 486 (18.3)          | 10.8 (0.08)         |
| Morocco                          | 69 (1.3)                        | 401 (5.8)           | 26 (1.1)                       | 322 (7.6)           | 5 (0.4)                      | 294 (12.9)          | 11.0 (0.06)         |
| Turkey (5)                       | 69 (1.6)                        | 544 (3.4)           | 25 (1.2)                       | 493 (6.5)           | 6 (0.7)                      | 473 (10.0)          | 10.9 (0.07)         |
| Bahrain                          | 68 (1.2)                        | 514 (2.9)           | 24 (0.9)                       | 454 (4.9)           | 7 (0.6)                      | 445 (7.4)           | 11.0 (0.06)         |
| Oman                             | 68 (1.3)                        | 464 (4.7)           | 27 (1.2)                       | 387 (5.4)           | 5 (0.5)                      | 360 (9.2)           | 10.9 (0.07)         |
| Armenia                          | 66 (1.3)                        | 483 (3.2)           | 27 (1.2)                       | 450 (5.3)           | 8 (0.6)                      | 439 (6.7)           | 10.8 (0.07)         |
| United Arab Emirates             | 64 (0.6)                        | 500 (2.2)           | 28 (0.5)                       | 435 (2.6)           | 8 (0.3)                      | 410 (4.4)           | 10.8 (0.03)         |
| Georgia                          | 62 (1.6)                        | 459 (4.1)           | 32 (1.4)                       | 442 (6.0)           | 6 (0.6)                      | 459 (9.1)           | 10.6 (0.07)         |
| Saudi Arabia                     | 61 (1.2)                        | 438 (3.5)           | 29 (1.0)                       | 356 (5.7)           | 9 (0.6)                      | 369 (8.2)           | 10.7 (0.06)         |
| Montenegro                       | 61 (1.2)                        | 467 (2.6)           | 32 (0.9)                       | 440 (3.3)           | 7 (0.5)                      | 434 (7.8)           | 10.5 (0.05)         |
| Azerbaijan                       | 61 (1.4)                        | 448 (2.8)           | 33 (1.3)                       | 414 (4.2)           | 6 (0.5)                      | 409 (8.6)           | 10.3 (0.06)         |
| Kazakhstan                       | 59 (1.3)                        | 503 (3.8)           | 36 (1.2)                       | 484 (3.4)           | 5 (0.5)                      | 488 (7.4)           | 10.4 (0.06)         |
| North Macedonia                  | 59 (1.7)                        | 455 (4.9)           | 36 (1.7)                       | 397 (8.2)           | 6 (0.7)                      | 383 (12.5)          | 10.5 (0.07)         |
| Kuwait                           | 58 (1.4)                        | 430 (6.4)           | 33 (1.1)                       | 360 (7.7)           | 9 (0.7)                      | 333 (10.0)          | 10.5 (0.07)         |
| Malta                            | 58 (0.8)                        | 509 (1.6)           | 29 (0.6)                       | 484 (3.0)           | 13 (0.6)                     | 466 (4.0)           | 10.3 (0.04)         |
| Qatar                            | 56 (1.6)                        | 485 (3.5)           | 34 (1.3)                       | 415 (5.4)           | 10 (0.6)                     | 396 (7.4)           | 10.4 (0.07)         |
| Ireland                          | 56 (1.3)                        | 537 (3.3)           | 33 (1.0)                       | 523 (4.0)           | 12 (0.7)                     | 507 (5.2)           | 10.2 (0.06)         |
| Northern Ireland                 | 56 (1.1)                        | 530 (2.4)           | 33 (1.0)                       | 510 (3.4)           | 11 (0.7)                     | 487 (4.5)           | 10.2 (0.05)         |
| Italy                            | 55 (1.1)                        | 514 (3.5)           | 35 (0.8)                       | 509 (3.4)           | 10 (0.7)                     | 495 (4.8)           | 10.2 (0.05)         |
| Lithuania                        | 53 (1.7)                        | 541 (3.0)           | 38 (1.3)                       | 538 (3.5)           | 9 (0.8)                      | 524 (5.0)           | 9.9 (0.07)          |
| Japan                            | 52 (1.2)                        | 569 (2.1)           | 39 (1.0)                       | 554 (2.3)           | 9 (0.6)                      | 551 (4.0)           | 10.1 (0.06)         |
| United States                    | 52 (1.0)                        | 551 (2.6)           | 34 (0.8)                       | 533 (3.6)           | 14 (0.7)                     | 523 (4.8)           | 10.1 (0.05)         |
| New Zealand                      | 52 (1.1)                        | 513 (3.0)           | 34 (0.9)                       | 500 (2.8)           | 14 (0.8)                     | 479 (3.5)           | 10.0 (0.05)         |
| Chinese Taipei                   | 51 (1.5)                        | 566 (2.0)           | 37 (1.1)                       | 554 (2.6)           | 12 (0.9)                     | 537 (4.3)           | 10.1 (0.07)         |
| Australia                        | 50 (1.4)                        | 539 (3.1)           | 34 (0.9)                       | 533 (2.9)           | 16 (1.0)                     | 515 (4.6)           | 9.9 (0.07)          |
| Singapore                        | 49 (1.0)                        | 605 (3.6)           | 39 (0.7)                       | 588 (3.9)           | 12 (0.5)                     | 574 (4.7)           | 10.0 (0.04)         |
| Bosnia and Herzegovina           | 49 (1.1)                        | 467 (3.5)           | 35 (0.8)                       | 453 (3.6)           | 16 (0.8)                     | 454 (4.6)           | 9.8 (0.06)          |
| Hong Kong SAR                    | 49 (1.5)                        | 547 (3.5)           | 37 (1.2)                       | 519 (4.8)           | 15 (1.0)                     | 509 (6.7)           | 10.0 (0.08)         |
| Austria                          | 49 (1.1)                        | 533 (2.8)           | 38 (0.9)                       | 517 (3.5)           | 13 (0.7)                     | 501 (5.3)           | 9.9 (0.05)          |
| Canada                           | 49 (1.0)                        | 528 (2.2)           | 36 (0.8)                       | 524 (2.2)           | 15 (0.6)                     | 511 (2.8)           | 9.9 (0.05)          |
| Spain                            | 48 (1.4)                        | 520 (2.7)           | 40 (1.0)                       | 506 (2.5)           | 13 (0.8)                     | 503 (6.7)           | 9.8 (0.06)          |
| Germany                          | 47 (1.4)                        | 535 (2.6)           | 38 (1.0)                       | 517 (3.7)           | 15 (0.9)                     | 498 (4.4)           | 9.8 (0.07)          |
| Norway (5)                       | 47 (1.4)                        | 546 (2.6)           | 41 (1.0)                       | 540 (2.7)           | 12 (0.8)                     | 524 (5.2)           | 9.9 (0.06)          |
| England                          | 46 (1.6)                        | 542 (3.7)           | 37 (1.2)                       | 540 (3.6)           | 16 (1.1)                     | 528 (4.8)           | 9.8 (0.09)          |
| Hungary                          | 46 (1.3)                        | 538 (2.5)           | 38 (1.0)                       | 523 (3.6)           | 15 (1.0)                     | 520 (5.0)           | 9.7 (0.06)          |
| Cyprus                           | 46 (1.7)                        | 525 (3.5)           | 32 (1.1)                       | 504 (3.2)           | 22 (1.4)                     | 496 (4.4)           | 9.6 (0.10)          |
| France                           | 45 (1.2)                        | 496 (3.8)           | 38 (0.9)                       | 487 (3.4)           | 17 (1.0)                     | 467 (5.1)           | 9.7 (0.06)          |
| Russian Federation               | 44 (1.3)                        | 570 (3.8)           | 42 (0.9)                       | 565 (3.1)           | 14 (0.9)                     | 567 (4.2)           | 9.5 (0.06)          |
| Chile                            | 44 (1.1)                        | 486 (3.2)           | 44 (0.9)                       | 462 (3.2)           | 12 (0.8)                     | 450 (5.9)           | 9.7 (0.06)          |
| South Africa (5)                 | 43 (1.2)                        | 390 (5.2)           | 45 (0.9)                       | 284 (5.1)           | 11 (0.5)                     | 264 (6.3)           | 9.8 (0.05)          |
| Pakistan                         | 42 (3.2)                        | 323 (15.0)          | 49 (2.5)                       | 269 (15.2)          | 9 (1.5)                      | 258 (16.1)          | 9.8 (0.16)          |
| Netherlands                      | 41 (1.3)                        | 530 (3.1)           | 40 (0.9)                       | 516 (3.6)           | 19 (0.9)                     | 504 (4.6)           | 9.5 (0.06)          |
| Belgium (Flemish)                | 41 (1.4)                        | 507 (2.9)           | 41 (0.9)                       | 502 (2.8)           | 19 (1.0)                     | 486 (3.0)           | 9.5 (0.07)          |
| Latvia                           | 39 (1.3)                        | 546 (3.0)           | 47 (1.2)                       | 542 (2.7)           | 14 (0.8)                     | 534 (4.5)           | 9.4 (0.05)          |
| Sweden                           | 39 (1.5)                        | 538 (4.5)           | 41 (1.2)                       | 543 (3.4)           | 20 (1.3)                     | 527 (4.5)           | 9.4 (0.08)          |
| Serbia                           | 39 (1.5)                        | 522 (4.2)           | 46 (1.1)                       | 512 (4.3)           | 15 (1.1)                     | 527 (4.3)           | 9.5 (0.07)          |
| Slovak Republic                  | 38 (1.6)                        | 525 (4.1)           | 43 (0.9)                       | 522 (4.7)           | 19 (1.1)                     | 512 (5.5)           | 9.4 (0.08)          |
| Poland                           | 38 (1.3)                        | 541 (3.3)           | 44 (1.0)                       | 527 (2.8)           | 18 (0.9)                     | 528 (3.7)           | 9.3 (0.06)          |
| Korea, Rep. of                   | 37 (1.3)                        | 602 (2.7)           | 47 (0.9)                       | 581 (2.8)           | 16 (1.0)                     | 572 (3.6)           | 9.5 (0.06)          |
| Denmark                          | 35 (1.4)                        | 534 (3.1)           | 43 (1.1)                       | 521 (3.0)           | 22 (1.3)                     | 509 (3.3)           | 9.2 (0.07)          |
| Croatia                          | 34 (1.3)                        | 531 (3.2)           | 50 (1.0)                       | 521 (2.4)           | 16 (0.9)                     | 518 (4.1)           | 9.3 (0.06)          |
| Czech Republic                   | 34 (1.4)                        | 541 (4.0)           | 44 (1.0)                       | 534 (2.9)           | 22 (1.1)                     | 527 (2.9)           | 9.2 (0.07)          |
| Philippines                      | 32 (1.8)                        | 334 (7.5)           | 53 (1.4)                       | 221 (7.1)           | 15 (0.9)                     | 180 (7.3)           | 9.3 (0.07)          |
| Finland                          | 26 (1.0)                        | 554 (3.2)           | 45 (0.9)                       | 556 (3.1)           | 29 (1.1)                     | 554 (3.1)           | 8.7 (0.05)          |
| <b>International Average</b>     | <b>52 (0.2)</b>                 | <b>506 (0.5)</b>    | <b>36 (0.1)</b>                | <b>478 (0.6)</b>    | <b>12 (0.1)</b>              | <b>467 (0.9)</b>    |                     |
| <b>Benchmarking Participants</b> |                                 |                     |                                |                     |                              |                     |                     |
| Dubai, UAE                       | 72 (0.7)                        | 552 (1.6)           | 23 (0.6)                       | 525 (3.3)           | 5 (0.4)                      | 523 (6.4)           | 11.2 (0.04)         |
| Abu Dhabi, UAE                   | 52 (1.1)                        | 455 (3.5)           | 35 (0.8)                       | 386 (3.7)           | 14 (0.6)                     | 373 (5.1)           | 10.2 (0.06)         |
| Quebec, Canada                   | 48 (1.3)                        | 526 (3.1)           | 34 (1.0)                       | 523 (3.4)           | 17 (1.0)                     | 507 (3.7)           | 9.8 (0.07)          |
| Ontario, Canada                  | 46 (1.7)                        | 529 (3.9)           | 38 (1.3)                       | 527 (3.6)           | 15 (1.0)                     | 513 (4.3)           | 9.8 (0.09)          |
| Madrid, Spain                    | 43 (1.5)                        | 530 (2.7)           | 43 (1.3)                       | 519 (2.3)           | 13 (0.8)                     | 514 (4.5)           | 9.7 (0.06)          |
| Moscow City, Russian Fed.        | 40 (1.2)                        | 597 (2.8)           | 43 (1.1)                       | 594 (2.8)           | 17 (1.0)                     | 593 (3.3)           | 9.4 (0.05)          |

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

## Exhibit 11.6: Students Like Learning Science

Students' Reports

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and Earth science summarize responses for countries where students are taught science as separate subjects.

### Students Like Learning General/Integrated Science

| Country                          | Very Much Like Learning Science |                     | Somewhat Like Learning Science |                     | Do Not Like Learning Science |                     | Average Scale Score |
|----------------------------------|---------------------------------|---------------------|--------------------------------|---------------------|------------------------------|---------------------|---------------------|
|                                  | Percent of Students             | Average Achievement | Percent of Students            | Average Achievement | Percent of Students          | Average Achievement |                     |
| Jordan                           | 56 (1.6)                        | 479 (3.8)           | 36 (1.4)                       | 426 (6.1)           | 8 (0.5)                      | 424 (7.0)           | 11.1 (0.06)         |
| Egypt                            | 54 (1.6)                        | 426 (5.0)           | 38 (1.3)                       | 358 (6.5)           | 8 (0.7)                      | 345 (8.6)           | 11.0 (0.06)         |
| Turkey                           | 54 (1.4)                        | 536 (3.3)           | 37 (0.9)                       | 494 (5.0)           | 10 (0.8)                     | 481 (8.4)           | 10.8 (0.06)         |
| Iran, Islamic Rep. of            | 53 (1.3)                        | 469 (3.9)           | 37 (1.0)                       | 428 (4.4)           | 11 (0.6)                     | 429 (5.9)           | 10.8 (0.06)         |
| Kuwait                           | 46 (1.7)                        | 468 (5.5)           | 39 (1.1)                       | 435 (6.4)           | 15 (1.1)                     | 414 (7.2)           | 10.5 (0.07)         |
| Malaysia                         | 46 (1.1)                        | 484 (3.3)           | 46 (0.8)                       | 450 (3.9)           | 8 (0.7)                      | 388 (8.0)           | 10.6 (0.05)         |
| Saudi Arabia                     | 46 (1.3)                        | 454 (3.1)           | 40 (0.8)                       | 417 (3.3)           | 14 (0.9)                     | 417 (4.1)           | 10.6 (0.06)         |
| Oman                             | 46 (1.0)                        | 495 (3.0)           | 44 (0.8)                       | 438 (3.7)           | 10 (0.6)                     | 412 (7.0)           | 10.6 (0.05)         |
| United Arab Emirates             | 44 (0.6)                        | 523 (2.7)           | 41 (0.6)                       | 445 (2.6)           | 15 (0.4)                     | 412 (3.8)           | 10.5 (0.03)         |
| Bahrain                          | 44 (1.2)                        | 516 (2.4)           | 40 (0.9)                       | 474 (3.2)           | 16 (0.7)                     | 448 (4.6)           | 10.5 (0.06)         |
| South Africa (9)                 | 42 (0.9)                        | 398 (3.4)           | 45 (0.6)                       | 352 (3.3)           | 13 (0.5)                     | 353 (4.2)           | 10.4 (0.04)         |
| Qatar                            | 38 (1.4)                        | 509 (5.0)           | 45 (1.2)                       | 459 (4.8)           | 17 (0.9)                     | 441 (5.7)           | 10.2 (0.06)         |
| Singapore                        | 37 (0.9)                        | 635 (3.8)           | 49 (0.8)                       | 601 (3.8)           | 14 (0.6)                     | 558 (6.0)           | 10.2 (0.04)         |
| United States                    | 31 (0.9)                        | 550 (5.0)           | 46 (0.7)                       | 522 (4.9)           | 23 (0.7)                     | 499 (5.7)           | 9.8 (0.05)          |
| Italy                            | 29 (1.2)                        | 519 (3.4)           | 50 (1.0)                       | 499 (2.8)           | 20 (0.9)                     | 481 (3.8)           | 9.8 (0.05)          |
| Ireland                          | 27 (1.2)                        | 558 (3.5)           | 42 (1.0)                       | 532 (2.8)           | 30 (1.3)                     | 493 (4.3)           | 9.5 (0.06)          |
| Australia                        | 27 (1.1)                        | 569 (4.1)           | 45 (0.8)                       | 526 (3.5)           | 28 (1.3)                     | 499 (3.6)           | 9.6 (0.06)          |
| Israel                           | 27 (1.2)                        | 547 (4.8)           | 42 (0.8)                       | 512 (5.0)           | 31 (1.1)                     | 496 (5.2)           | 9.4 (0.06)          |
| Chile                            | 26 (1.2)                        | 482 (4.7)           | 53 (1.0)                       | 460 (3.4)           | 22 (1.2)                     | 450 (3.9)           | 9.6 (0.06)          |
| New Zealand                      | 25 (1.1)                        | 532 (4.8)           | 49 (0.9)                       | 499 (4.2)           | 25 (1.2)                     | 471 (4.6)           | 9.6 (0.06)          |
| Norway (9)                       | 25 (1.1)                        | 530 (4.5)           | 51 (1.0)                       | 495 (3.3)           | 25 (1.0)                     | 467 (4.3)           | 9.6 (0.05)          |
| England                          | 24 (1.3)                        | 556 (5.9)           | 45 (1.1)                       | 524 (5.0)           | 30 (1.3)                     | 485 (5.7)           | 9.4 (0.06)          |
| Hong Kong SAR                    | 23 (1.0)                        | 541 (6.1)           | 55 (1.1)                       | 501 (6.1)           | 22 (1.1)                     | 472 (7.5)           | 9.6 (0.05)          |
| Chinese Taipei                   | 20 (0.8)                        | 616 (3.2)           | 51 (0.9)                       | 576 (2.5)           | 30 (1.0)                     | 544 (2.6)           | 9.3 (0.04)          |
| Japan                            | 16 (0.8)                        | 605 (4.2)           | 49 (1.1)                       | 577 (2.4)           | 35 (1.4)                     | 544 (2.6)           | 9.1 (0.05)          |
| Korea, Rep. of                   | 12 (0.5)                        | 625 (4.6)           | 41 (1.0)                       | 577 (3.0)           | 47 (1.2)                     | 531 (2.4)           | 8.7 (0.04)          |
| <b>International Average</b>     | <b>35 (0.2)</b>                 | <b>524 (0.8)</b>    | <b>44 (0.2)</b>                | <b>484 (0.8)</b>    | <b>20 (0.2)</b>              | <b>460 (1.1)</b>    |                     |
| <b>Benchmarking Participants</b> |                                 |                     |                                |                     |                              |                     |                     |
| Dubai, UAE                       | 50 (1.0)                        | 574 (2.7)           | 38 (0.9)                       | 528 (3.3)           | 12 (0.6)                     | 498 (5.2)           | 10.8 (0.05)         |
| Gauteng, RSA (9)                 | 45 (1.2)                        | 438 (4.0)           | 42 (0.8)                       | 409 (4.9)           | 13 (0.8)                     | 418 (6.1)           | 10.5 (0.05)         |
| Abu Dhabi, UAE                   | 35 (1.1)                        | 498 (4.0)           | 45 (0.8)                       | 389 (4.5)           | 20 (0.9)                     | 364 (6.4)           | 10.1 (0.06)         |
| Western Cape, RSA (9)            | 35 (1.1)                        | 463 (5.8)           | 48 (0.7)                       | 426 (5.5)           | 18 (1.0)                     | 439 (6.9)           | 10.0 (0.05)         |
| Ontario, Canada                  | 33 (1.2)                        | 542 (4.1)           | 44 (1.2)                       | 518 (3.6)           | 23 (1.1)                     | 500 (4.5)           | 9.9 (0.06)          |
| Quebec, Canada                   | 27 (1.5)                        | 556 (4.3)           | 49 (1.2)                       | 539 (3.8)           | 24 (1.6)                     | 510 (5.5)           | 9.6 (0.08)          |

## Separate Science Results

### Students Like Learning Biology

| Country                          | Very Much Like Learning Biology |                     | Somewhat Like Learning Biology |                     | Do Not Like Learning Biology |                     | Average Scale Score |
|----------------------------------|---------------------------------|---------------------|--------------------------------|---------------------|------------------------------|---------------------|---------------------|
|                                  | Percent of Students             | Average Achievement | Percent of Students            | Average Achievement | Percent of Students          | Average Achievement |                     |
| Morocco                          | 46 (1.1)                        | 414 (3.4)           | 43 (0.8)                       | 382 (2.9)           | 11 (0.7)                     | 372 (4.9)           | 10.9 (0.05)         |
| Georgia                          | 43 (1.9)                        | 461 (4.3)           | 43 (1.6)                       | 442 (4.2)           | 14 (1.2)                     | 437 (7.6)           | 10.6 (0.08)         |
| Portugal                         | 38 (1.7)                        | 534 (3.2)           | 47 (1.2)                       | 515 (3.8)           | 15 (1.1)                     | 505 (4.2)           | 10.5 (0.08)         |
| Kazakhstan                       | 36 (1.3)                        | 486 (4.0)           | 56 (1.2)                       | 475 (3.5)           | 8 (0.6)                      | 471 (7.6)           | 10.5 (0.05)         |
| Lebanon                          | 36 (1.4)                        | 415 (5.6)           | 46 (1.0)                       | 361 (5.7)           | 18 (1.1)                     | 350 (7.2)           | 10.3 (0.07)         |
| Cyprus                           | 30 (1.1)                        | 511 (3.1)           | 42 (0.9)                       | 479 (2.8)           | 28 (1.1)                     | 467 (3.1)           | 9.8 (0.06)          |
| Romania                          | 29 (1.4)                        | 486 (5.0)           | 49 (1.2)                       | 464 (4.8)           | 21 (1.4)                     | 472 (6.3)           | 10.0 (0.08)         |
| Russian Federation               | 26 (1.2)                        | 550 (4.8)           | 52 (1.1)                       | 540 (4.5)           | 21 (1.1)                     | 541 (5.3)           | 9.9 (0.06)          |
| Lithuania                        | 26 (1.3)                        | 548 (3.7)           | 50 (1.1)                       | 531 (3.6)           | 24 (1.3)                     | 527 (4.7)           | 9.8 (0.06)          |
| Hungary                          | 23 (1.3)                        | 544 (4.7)           | 45 (0.9)                       | 526 (3.2)           | 32 (1.5)                     | 526 (4.0)           | 9.5 (0.08)          |
| Sweden                           | 20 (1.1)                        | 549 (5.0)           | 49 (1.2)                       | 529 (3.9)           | 30 (1.3)                     | 510 (4.2)           | 9.5 (0.05)          |
| France                           | 19 (1.0)                        | 509 (4.5)           | 53 (1.1)                       | 491 (3.0)           | 28 (1.4)                     | 472 (3.7)           | 9.5 (0.06)          |
| Finland                          | 16 (0.9)                        | 574 (4.2)           | 48 (0.9)                       | 549 (3.9)           | 36 (1.2)                     | 531 (3.5)           | 9.2 (0.05)          |
| <b>International Average</b>     | <b>30 (0.4)</b>                 | <b>506 (1.2)</b>    | <b>48 (0.3)</b>                | <b>483 (1.1)</b>    | <b>22 (0.3)</b>              | <b>476 (1.5)</b>    |                     |
| <b>Benchmarking Participants</b> |                                 |                     |                                |                     |                              |                     |                     |
| Moscow City, Russian Fed.        | 22 (1.2)                        | 571 (3.6)           | 49 (1.0)                       | 566 (3.3)           | 29 (1.4)                     | 566 (4.2)           | 9.6 (0.07)          |

This TIMSS context questionnaire scale for general/integrated science was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011 where science is taught as a single subject. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution. The separate scales for biology, chemistry, physics, and Earth science were each established in 2019 using a comparable approach.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

## Exhibit 11.6: Students Like Learning Science

Students' Reports

## Separate Science Results

(Continued)

Students Like Learning Chemistry

| Chemistry                        | Very Much Like Learning Chemistry |                     | Somewhat Like Learning Chemistry |                     | Do Not Like Learning Chemistry |                     | Average Scale Score |
|----------------------------------|-----------------------------------|---------------------|----------------------------------|---------------------|--------------------------------|---------------------|---------------------|
|                                  | Percent of Students               | Average Achievement | Percent of Students              | Average Achievement | Percent of Students            | Average Achievement |                     |
| Morocco                          | 42 (1.1)                          | 419 (3.7)           | 45 (0.8)                         | 379 (2.9)           | 13 (0.8)                       | 376 (4.0)           | 10.9 (0.06)         |
| Cyprus                           | 42 (1.1)                          | 506 (2.8)           | 40 (1.1)                         | 480 (2.5)           | 18 (0.9)                       | 460 (3.7)           | 10.7 (0.05)         |
| Lebanon                          | 37 (1.7)                          | 415 (5.2)           | 46 (1.3)                         | 357 (5.8)           | 16 (1.1)                       | 362 (8.7)           | 10.6 (0.08)         |
| Georgia                          | 35 (1.5)                          | 472 (4.8)           | 41 (1.2)                         | 441 (4.5)           | 23 (1.4)                       | 431 (5.3)           | 10.4 (0.07)         |
| Kazakhstan                       | 31 (1.3)                          | 496 (4.1)           | 53 (1.1)                         | 474 (3.5)           | 16 (1.0)                       | 461 (6.1)           | 10.4 (0.05)         |
| Portugal                         | 29 (1.4)                          | 545 (3.8)           | 45 (1.2)                         | 514 (3.4)           | 26 (1.7)                       | 500 (4.2)           | 10.1 (0.08)         |
| Russian Federation               | 27 (1.1)                          | 562 (4.8)           | 47 (1.1)                         | 541 (4.2)           | 26 (1.1)                       | 530 (5.7)           | 10.1 (0.05)         |
| Lithuania                        | 26 (1.3)                          | 559 (4.3)           | 44 (0.9)                         | 533 (3.4)           | 30 (1.6)                       | 516 (3.6)           | 9.9 (0.07)          |
| Romania                          | 24 (1.4)                          | 501 (5.7)           | 46 (1.2)                         | 465 (4.6)           | 30 (1.6)                       | 460 (5.9)           | 9.7 (0.08)          |
| Sweden                           | 18 (1.1)                          | 561 (5.1)           | 45 (1.1)                         | 525 (4.3)           | 37 (1.3)                       | 510 (3.7)           | 9.5 (0.06)          |
| Finland                          | 17 (0.9)                          | 600 (3.4)           | 42 (0.9)                         | 550 (3.6)           | 41 (1.3)                       | 521 (3.3)           | 9.4 (0.06)          |
| Hungary                          | 14 (0.9)                          | 557 (5.7)           | 38 (1.1)                         | 526 (3.8)           | 47 (1.5)                       | 525 (2.8)           | 9.1 (0.06)          |
| France                           | 14 (1.0)                          | 520 (5.5)           | 47 (1.0)                         | 493 (3.3)           | 39 (1.4)                       | 473 (3.0)           | 9.3 (0.06)          |
| <b>International Average</b>     | <b>27 (0.3)</b>                   | <b>516 (1.3)</b>    | <b>45 (0.3)</b>                  | <b>483 (1.1)</b>    | <b>28 (0.4)</b>                | <b>471 (1.4)</b>    |                     |
| <b>Benchmarking Participants</b> |                                   |                     |                                  |                     |                                |                     |                     |
| Moscow City, Russian Fed.        | 24 (1.2)                          | 586 (3.0)           | 43 (1.0)                         | 566 (3.4)           | 33 (1.5)                       | 554 (3.7)           | 9.8 (0.07)          |

Students Like Learning Physics

| Physics                          | Very Much Like Learning Physics |                     | Somewhat Like Learning Physics |                     | Do Not Like Learning Physics |                     | Average Scale Score |
|----------------------------------|---------------------------------|---------------------|--------------------------------|---------------------|------------------------------|---------------------|---------------------|
|                                  | Percent of Students             | Average Achievement | Percent of Students            | Average Achievement | Percent of Students          | Average Achievement |                     |
| Morocco                          | 43 (1.1)                        | 420 (3.5)           | 44 (0.9)                       | 380 (2.9)           | 13 (0.7)                     | 374 (3.7)           | 11.1 (0.05)         |
| Lebanon                          | 32 (1.4)                        | 413 (5.4)           | 48 (1.2)                       | 362 (5.5)           | 20 (1.0)                     | 369 (8.1)           | 10.5 (0.07)         |
| Kazakhstan                       | 30 (1.1)                        | 496 (3.9)           | 56 (1.1)                       | 475 (3.7)           | 14 (0.8)                     | 460 (5.2)           | 10.6 (0.04)         |
| Georgia                          | 30 (1.6)                        | 474 (4.8)           | 46 (1.3)                       | 439 (4.5)           | 25 (1.6)                     | 438 (5.5)           | 10.3 (0.08)         |
| Portugal                         | 29 (1.4)                        | 545 (3.8)           | 45 (1.2)                       | 514 (3.4)           | 26 (1.7)                     | 500 (4.2)           | 10.3 (0.08)         |
| Cyprus                           | 29 (1.1)                        | 518 (3.0)           | 40 (1.0)                       | 481 (2.7)           | 31 (1.2)                     | 467 (3.5)           | 10.1 (0.06)         |
| Russian Federation               | 29 (1.0)                        | 560 (4.3)           | 50 (1.0)                       | 541 (4.3)           | 22 (1.1)                     | 528 (6.0)           | 10.3 (0.05)         |
| Romania                          | 17 (1.1)                        | 509 (5.7)           | 48 (1.1)                       | 465 (4.5)           | 34 (1.4)                     | 465 (5.2)           | 9.7 (0.07)          |
| Lithuania                        | 16 (1.2)                        | 561 (5.2)           | 42 (1.2)                       | 534 (3.4)           | 42 (1.8)                     | 525 (3.8)           | 9.4 (0.08)          |
| Hungary                          | 16 (1.1)                        | 560 (5.3)           | 38 (1.0)                       | 533 (3.2)           | 46 (1.7)                     | 517 (3.1)           | 9.4 (0.07)          |
| Sweden                           | 16 (0.9)                        | 573 (5.4)           | 43 (1.0)                       | 530 (4.1)           | 42 (1.2)                     | 510 (3.9)           | 9.5 (0.05)          |
| France                           | 14 (1.0)                        | 520 (5.5)           | 47 (1.0)                       | 493 (3.3)           | 39 (1.4)                     | 473 (3.0)           | 9.5 (0.06)          |
| Finland                          | 13 (0.7)                        | 600 (4.5)           | 38 (0.9)                       | 549 (3.8)           | 49 (1.3)                     | 525 (3.6)           | 9.2 (0.05)          |
| <b>International Average</b>     | <b>24 (0.3)</b>                 | <b>519 (1.3)</b>    | <b>45 (0.3)</b>                | <b>484 (1.1)</b>    | <b>31 (0.4)</b>              | <b>473 (1.3)</b>    |                     |
| <b>Benchmarking Participants</b> |                                 |                     |                                |                     |                              |                     |                     |
| Moscow City, Russian Fed.        | 24 (1.0)                        | 585 (3.9)           | 47 (1.1)                       | 567 (3.3)           | 29 (1.4)                     | 551 (3.1)           | 10.1 (0.06)         |

Students Like Learning Earth Science

| Earth Science                    | Very Much Like Learning Earth Science |                     | Somewhat Like Learning Earth Science |                     | Do Not Like Learning Earth Science |                     | Average Scale Score |
|----------------------------------|---------------------------------------|---------------------|--------------------------------------|---------------------|------------------------------------|---------------------|---------------------|
|                                  | Percent of Students                   | Average Achievement | Percent of Students                  | Average Achievement | Percent of Students                | Average Achievement |                     |
| Morocco                          | 40 (0.9)                              | 415 (3.3)           | 46 (0.6)                             | 384 (2.9)           | 14 (0.9)                           | 385 (4.7)           | 10.9 (0.05)         |
| Portugal                         | 38 (1.7)                              | 534 (3.2)           | 47 (1.2)                             | 515 (3.3)           | 15 (1.1)                           | 505 (4.2)           | 10.7 (0.08)         |
| Georgia                          | 33 (1.7)                              | 460 (5.3)           | 49 (1.3)                             | 446 (3.9)           | 18 (1.2)                           | 444 (8.1)           | 10.4 (0.07)         |
| Kazakhstan                       | 30 (1.3)                              | 485 (4.5)           | 58 (1.2)                             | 475 (3.7)           | 12 (0.8)                           | 477 (7.2)           | 10.5 (0.05)         |
| Romania                          | 29 (1.8)                              | 492 (6.2)           | 52 (1.5)                             | 462 (5.9)           | 19 (1.4)                           | 473 (8.4)           | 10.3 (0.08)         |
| Lithuania                        | 23 (1.4)                              | 544 (3.8)           | 48 (1.1)                             | 532 (3.4)           | 29 (1.6)                           | 532 (4.0)           | 9.8 (0.07)          |
| Russian Federation               | 22 (1.0)                              | 548 (5.2)           | 52 (1.0)                             | 542 (4.1)           | 26 (0.9)                           | 544 (5.8)           | 9.9 (0.05)          |
| France                           | 19 (1.0)                              | 509 (4.5)           | 53 (1.1)                             | 491 (3.0)           | 28 (1.4)                           | 472 (3.7)           | 9.7 (0.06)          |
| Cyprus                           | 19 (0.8)                              | 502 (4.0)           | 37 (1.1)                             | 489 (3.4)           | 45 (1.1)                           | 480 (2.8)           | 9.2 (0.05)          |
| Finland                          | 17 (0.8)                              | 573 (3.7)           | 50 (0.9)                             | 547 (3.9)           | 34 (1.1)                           | 529 (3.3)           | 9.5 (0.05)          |
| Hungary                          | 16 (1.1)                              | 544 (5.3)           | 39 (1.1)                             | 525 (3.7)           | 45 (1.8)                           | 529 (3.1)           | 9.2 (0.08)          |
| Lebanon                          | -                                     | -                   | -                                    | -                   | -                                  | -                   | -                   |
| Sweden                           | -                                     | -                   | -                                    | -                   | -                                  | -                   | -                   |
| <b>International Average</b>     | <b>26 (0.4)</b>                       | <b>510 (1.4)</b>    | <b>48 (0.3)</b>                      | <b>492 (1.2)</b>    | <b>26 (0.4)</b>                    | <b>488 (1.6)</b>    |                     |
| <b>Benchmarking Participants</b> |                                       |                     |                                      |                     |                                    |                     |                     |
| Moscow City, Russian Fed.        | 17 (1.1)                              | 570 (4.7)           | 47 (1.3)                             | 568 (3.5)           | 36 (1.8)                           | 565 (3.4)           | 9.5 (0.08)          |

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students.