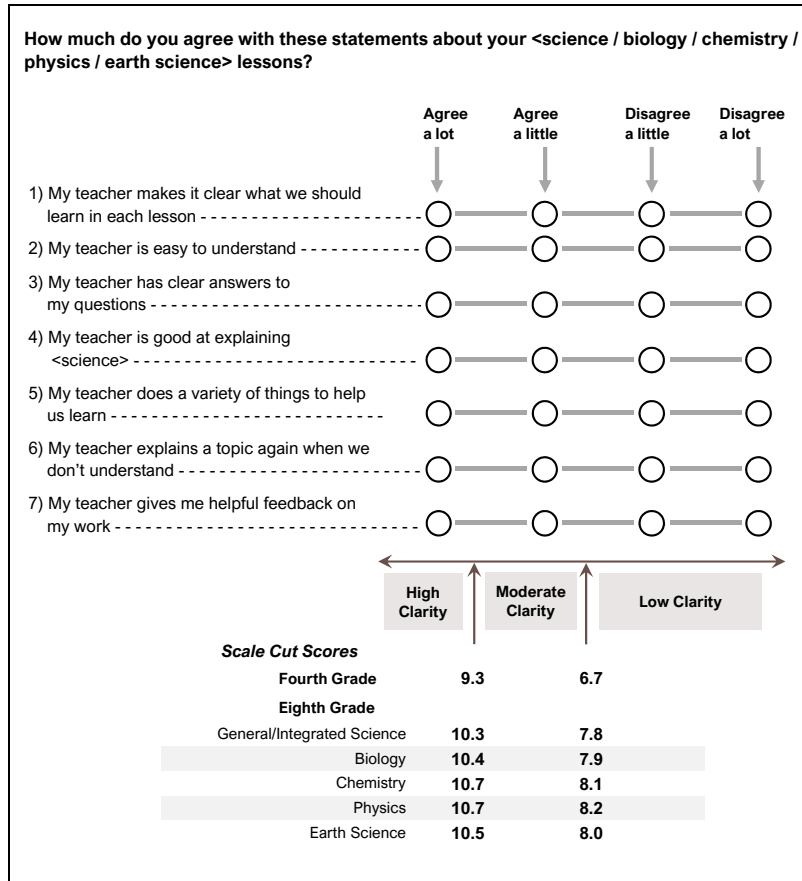


Exhibit 5.3.1: Instructional Clarity in Science Lessons

About the Scale

Students were scored according to their responses to seven statements on the *Instructional Clarity in Science Lessons* scale. Cut scores divide the scale into three categories. Students who reported **High Clarity of Instruction** in their science lessons had a score at or above the cut score corresponding to “agreeing a lot” with four of the seven statements and “agreeing a little” with the other three, on average. Students who reported **Low Clarity of Instruction** in their science lessons had a score at or below the cut score corresponding to “disagreeing a little” with four of the seven statements and “agreeing a little” with the other three, on average. All other students reported **Moderate Clarity of Instruction** in their science lessons. 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.



## Exhibit 5.3.2: Instructional Clarity in Science Lessons

| Country                          | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |             |
|----------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|-------------|
|                                  | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |             |
| Albania                          | r                           | 91 (1.1)            | 501 (4.5)                       | 8 (1.0)             | 457 (9.5)                  | 1 ~                 | ~ ~                 | 11.2 (0.04) |
| Armenia                          |                             | 86 (0.9)            | 466 (2.3)                       | 12 (0.8)            | 439 (5.3)                  | 2 ~                 | ~ ~                 | 11.0 (0.04) |
| Australia                        |                             | 64 (1.2)            | 554 (2.9)                       | 30 (1.1)            | 556 (3.4)                  | 7 (0.5)             | 546 (5.4)           | 9.8 (0.05)  |
| Azerbaijan                       |                             | 77 (0.8)            | 439 (3.3)                       | 18 (0.8)            | 396 (4.7)                  | 4 (0.4)             | 371 (7.7)           | 10.5 (0.04) |
| Bahrain                          |                             | 78 (1.0)            | 489 (4.0)                       | 18 (0.9)            | 454 (7.2)                  | 4 (0.3)             | 416 (7.6)           | 10.5 (0.05) |
| Belgium (Flemish)                |                             | 65 (1.2)            | 494 (2.6)                       | 31 (1.0)            | 489 (3.3)                  | 4 (0.5)             | 462 (9.1)           | 9.9 (0.05)  |
| Belgium (French)                 |                             | 59 (1.1)            | 486 (3.0)                       | 35 (0.9)            | 480 (3.3)                  | 7 (0.6)             | 472 (6.1)           | 9.6 (0.05)  |
| Bosnia & Herzegovina             | r                           | 71 (1.0)            | 459 (4.4)                       | 26 (1.0)            | 451 (4.4)                  | 3 (0.4)             | 442 (9.3)           | 10.3 (0.04) |
| Brazil                           | r                           | 68 (0.9)            | 454 (4.0)                       | 26 (0.8)            | 421 (5.3)                  | 6 (0.3)             | 369 (5.4)           | 9.9 (0.03)  |
| Bulgaria                         |                             | 82 (1.3)            | 533 (5.0)                       | 16 (1.2)            | 522 (9.1)                  | 2 ~                 | ~ ~                 | 10.6 (0.06) |
| Canada                           |                             | 71 (0.8)            | 531 (2.1)                       | 25 (0.7)            | 515 (3.1)                  | 4 (0.3)             | 490 (6.5)           | 10.2 (0.03) |
| Chile                            |                             | 68 (1.0)            | 489 (2.5)                       | 27 (1.0)            | 477 (3.9)                  | 5 (0.4)             | 433 (9.9)           | 10.1 (0.05) |
| Chinese Taipei                   |                             | 58 (1.2)            | 578 (1.9)                       | 33 (0.9)            | 572 (2.7)                  | 10 (0.7)            | 556 (4.7)           | 9.5 (0.06)  |
| Cyprus                           |                             | 62 (1.3)            | 495 (3.5)                       | 27 (0.8)            | 482 (4.1)                  | 11 (1.0)            | 483 (4.7)           | 9.6 (0.07)  |
| Czech Republic                   |                             | 62 (1.1)            | 529 (2.7)                       | 32 (0.9)            | 527 (2.7)                  | 6 (0.5)             | 518 (4.5)           | 9.7 (0.05)  |
| Denmark                          |                             | 44 (1.4)            | 531 (3.1)                       | 43 (1.0)            | 522 (3.1)                  | 14 (1.0)            | 515 (4.0)           | 8.9 (0.07)  |
| England                          |                             | 69 (1.0)            | 563 (3.4)                       | 26 (0.8)            | 559 (3.3)                  | 5 (0.5)             | 534 (9.2)           | 10.0 (0.04) |
| Finland                          |                             | 62 (1.1)            | 551 (2.7)                       | 32 (1.0)            | 541 (3.8)                  | 6 (0.4)             | 523 (8.0)           | 9.7 (0.04)  |
| France                           |                             | 54 (1.3)            | 496 (3.4)                       | 39 (1.2)            | 488 (3.4)                  | 7 (0.6)             | 470 (6.8)           | 9.4 (0.06)  |
| Georgia                          |                             | 84 (0.9)            | 477 (3.2)                       | 14 (0.8)            | 436 (5.0)                  | 2 ~                 | ~ ~                 | 10.9 (0.05) |
| Germany                          |                             | 60 (1.1)            | 527 (3.1)                       | 33 (0.9)            | 515 (3.7)                  | 7 (0.6)             | 479 (7.7)           | 9.6 (0.05)  |
| Hong Kong SAR                    |                             | 59 (1.0)            | 556 (4.5)                       | 31 (0.9)            | 533 (4.6)                  | 10 (0.8)            | 528 (6.1)           | 9.6 (0.05)  |
| Hungary                          |                             | 66 (1.1)            | 532 (3.5)                       | 28 (0.9)            | 520 (4.2)                  | 7 (0.5)             | 507 (8.2)           | 9.9 (0.05)  |
| Iran, Islamic Rep. of            |                             | 87 (0.7)            | 442 (4.3)                       | 11 (0.7)            | 402 (8.6)                  | 2 ~                 | ~ ~                 | 10.9 (0.04) |
| Ireland                          |                             | 64 (1.4)            | 530 (3.3)                       | 31 (1.2)            | 537 (4.4)                  | 5 (0.5)             | 537 (8.6)           | 9.8 (0.06)  |
| Italy                            |                             | 64 (1.1)            | 517 (2.6)                       | 31 (0.9)            | 506 (3.3)                  | 5 (0.5)             | 495 (7.3)           | 9.8 (0.05)  |
| Japan                            |                             | 50 (1.6)            | 559 (2.4)                       | 42 (1.3)            | 555 (3.2)                  | 7 (0.8)             | 552 (5.4)           | 9.4 (0.08)  |
| Jordan                           |                             | 76 (1.6)            | 436 (5.4)                       | 18 (1.2)            | 392 (6.1)                  | 6 (0.6)             | 347 (9.3)           | 10.5 (0.08) |
| Kazakhstan                       |                             | 60 (1.2)            | 488 (3.8)                       | 36 (1.1)            | 448 (3.4)                  | 4 (0.3)             | 423 (8.9)           | 9.7 (0.05)  |
| Korea, Rep. of                   |                             | 69 (1.3)            | 589 (2.6)                       | 26 (1.0)            | 572 (4.2)                  | 5 (0.6)             | 572 (6.9)           | 10.0 (0.06) |
| Kosovo                           |                             | 86 (1.0)            | 413 (3.4)                       | 12 (0.9)            | 366 (8.3)                  | 2 ~                 | ~ ~                 | 11.0 (0.05) |
| Kuwait                           |                             | 74 (1.3)            | 397 (5.5)                       | 22 (1.1)            | 360 (8.0)                  | 4 (0.4)             | 330 (13.0)          | 10.3 (0.06) |
| Latvia                           |                             | 49 (1.6)            | 528 (3.3)                       | 41 (1.3)            | 527 (3.5)                  | 9 (0.9)             | 530 (6.2)           | 9.2 (0.06)  |
| Lithuania                        |                             | 64 (1.1)            | 547 (2.9)                       | 31 (1.0)            | 528 (3.6)                  | 6 (0.5)             | 519 (7.2)           | 9.8 (0.04)  |
| Macao SAR                        |                             | 55 (0.6)            | 546 (1.9)                       | 36 (0.6)            | 526 (1.7)                  | 9 (0.4)             | 512 (4.3)           | 9.4 (0.02)  |
| Montenegro                       |                             | 75 (0.8)            | 474 (2.2)                       | 22 (0.8)            | 444 (3.8)                  | 4 (0.3)             | 411 (8.2)           | 10.3 (0.03) |
| Morocco                          |                             | 81 (1.2)            | 407 (5.8)                       | 16 (1.1)            | 332 (6.2)                  | 2 ~                 | ~ ~                 | 10.6 (0.06) |
| Netherlands                      |                             | 66 (1.2)            | 522 (2.8)                       | 29 (1.1)            | 516 (4.0)                  | 5 (0.5)             | 489 (8.2)           | 9.9 (0.05)  |
| New Zealand                      |                             | 58 (1.1)            | 521 (3.4)                       | 33 (1.0)            | 525 (2.8)                  | 9 (0.6)             | 520 (6.0)           | 9.4 (0.05)  |
| North Macedonia                  |                             | 85 (0.9)            | 456 (4.0)                       | 12 (0.8)            | 410 (5.8)                  | 3 (0.3)             | 385 (10.1)          | 10.9 (0.04) |
| Norway (5)                       |                             | 61 (1.1)            | 534 (2.6)                       | 34 (1.0)            | 532 (3.2)                  | 5 (0.5)             | 523 (6.6)           | 9.7 (0.04)  |
| Oman                             | r                           | 70 (0.9)            | 457 (4.6)                       | 23 (0.7)            | 409 (4.9)                  | 6 (0.4)             | 374 (6.0)           | 10.1 (0.04) |
| Poland                           |                             | 44 (1.3)            | 549 (3.2)                       | 44 (1.0)            | 555 (2.5)                  | 12 (0.9)            | 545 (3.3)           | 8.9 (0.06)  |
| Portugal                         |                             | 76 (0.9)            | 516 (2.4)                       | 21 (0.8)            | 503 (3.7)                  | 3 (0.3)             | 484 (10.2)          | 10.3 (0.04) |
| Qatar                            |                             | 73 (0.8)            | 493 (3.3)                       | 20 (0.6)            | 452 (5.4)                  | 7 (0.5)             | 407 (8.8)           | 10.2 (0.04) |
| Romania                          |                             | 85 (1.3)            | 535 (4.2)                       | 13 (1.1)            | 528 (9.4)                  | 2 ~                 | ~ ~                 | 10.9 (0.05) |
| Saudi Arabia                     | r                           | 74 (1.0)            | 456 (3.9)                       | 19 (0.8)            | 404 (6.1)                  | 7 (0.5)             | 373 (6.5)           | 10.3 (0.05) |
| Serbia                           |                             | 81 (1.0)            | 517 (3.0)                       | 17 (0.9)            | 492 (4.5)                  | 3 (0.3)             | 483 (10.3)          | 10.6 (0.05) |
| Singapore                        |                             | 64 (0.9)            | 616 (2.7)                       | 29 (0.7)            | 596 (3.6)                  | 7 (0.4)             | 589 (5.9)           | 9.8 (0.04)  |
| Slovak Republic                  |                             | 67 (1.4)            | 519 (4.1)                       | 28 (1.1)            | 532 (3.8)                  | 5 (0.5)             | 518 (9.3)           | 9.9 (0.06)  |
| Slovenia                         |                             | 60 (1.1)            | 531 (2.6)                       | 36 (1.0)            | 527 (2.8)                  | 4 (0.3)             | 503 (7.5)           | 9.7 (0.04)  |
| South Africa (5)                 |                             | 61 (1.3)            | 332 (5.9)                       | 31 (1.0)            | 272 (6.4)                  | 8 (0.6)             | 253 (18.2)          | 9.6 (0.06)  |
| Spain                            |                             | 75 (1.0)            | 510 (2.0)                       | 20 (0.8)            | 494 (3.3)                  | 4 (0.4)             | 495 (6.6)           | 10.3 (0.04) |
| Sweden                           |                             | 55 (1.5)            | 535 (3.8)                       | 39 (1.2)            | 538 (3.1)                  | 6 (0.5)             | 514 (9.3)           | 9.5 (0.06)  |
| Türkiye (5)                      |                             | 78 (1.1)            | 578 (3.1)                       | 18 (0.8)            | 545 (5.9)                  | 4 (0.5)             | 542 (10.8)          | 10.3 (0.05) |
| United Arab Emirates             |                             | 76 (0.4)            | 518 (1.8)                       | 19 (0.3)            | 459 (2.9)                  | 5 (0.2)             | 410 (5.5)           | 10.4 (0.02) |
| United States                    |                             | 68 (0.8)            | 549 (2.8)                       | 26 (0.7)            | 523 (4.0)                  | 6 (0.3)             | 487 (6.8)           | 10.0 (0.04) |
| Uzbekistan                       |                             | 80 (1.1)            | 428 (3.6)                       | 16 (0.9)            | 371 (4.3)                  | 4 (0.4)             | 333 (7.7)           | 10.7 (0.06) |
| <b>International Average</b>     |                             | <b>68 (0.1)</b>     | <b>505 (0.5)</b>                | <b>26 (0.1)</b>     | <b>483 (0.6)</b>           | <b>6 (0.1)</b>      | <b>471 (1.1)</b>    |             |
| <b>Benchmarking Participants</b> |                             |                     |                                 |                     |                            |                     |                     |             |
| Ontario, Canada                  |                             | 72 (1.4)            | 535 (3.0)                       | 24 (1.2)            | 523 (4.7)                  | 4 (0.5)             | 490 (10.9)          | 10.2 (0.06) |
| Quebec, Canada                   |                             | 67 (1.4)            | 513 (2.6)                       | 29 (1.2)            | 504 (4.3)                  | 4 (0.4)             | 487 (9.4)           | 10.0 (0.05) |
| Abu Dhabi, UAE                   |                             | 69 (0.9)            | 478 (2.6)                       | 23 (0.7)            | 408 (3.8)                  | 7 (0.4)             | 367 (7.1)           | 10.0 (0.04) |
| Dubai, UAE                       |                             | 79 (0.6)            | 574 (2.1)                       | 18 (0.6)            | 541 (3.6)                  | 3 (0.2)             | 507 (7.2)           | 10.5 (0.03) |
| Sharjah, UAE                     |                             | 81 (1.1)            | 520 (3.5)                       | 15 (0.9)            | 465 (6.3)                  | 4 (0.4)             | 431 (10.7)          | 10.7 (0.05) |

This TIMSS context questionnaire scale was established in 2023 based on the combined response distribution of countries that participated in TIMSS 2023. 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.

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

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

## Exhibit 5.3.3: Instructional Clarity in Science Lessons

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.

Exhibit 5.3.3.a: Instructional Clarity in General/Integrated Science Lessons

| Country                          | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |
|----------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|
|                                  | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |
| Australia                        | 38 (1.1)                    | 541 (4.1)           | 41 (0.9)                        | 525 (3.3)           | 21 (1.1)                   | 501 (4.8)           | 9.5 (0.06)          |
| Bahrain                          | 61 (1.3)                    | 473 (2.8)           | 26 (1.0)                        | 449 (3.9)           | 13 (0.6)                   | 419 (5.9)           | 10.4 (0.05)         |
| Brazil                           | 57 (0.9)                    | 431 (2.7)           | 32 (0.7)                        | 423 (3.1)           | 11 (0.7)                   | 424 (6.6)           | 10.2 (0.04)         |
| Chile                            | 43 (1.6)                    | 464 (3.2)           | 44 (1.1)                        | 458 (3.0)           | 13 (1.1)                   | 453 (5.2)           | 9.8 (0.07)          |
| Chinese Taipei                   | 37 (1.4)                    | 586 (3.3)           | 46 (1.1)                        | 567 (2.8)           | 18 (1.3)                   | 559 (5.0)           | 9.5 (0.07)          |
| England                          | 35 (1.2)                    | 552 (5.4)           | 46 (1.1)                        | 538 (4.6)           | 19 (1.0)                   | 510 (5.9)           | 9.4 (0.05)          |
| Hong Kong SAR                    | 42 (1.5)                    | 548 (5.2)           | 45 (1.1)                        | 524 (5.3)           | 13 (0.8)                   | 491 (7.3)           | 9.8 (0.06)          |
| Iran, Islamic Rep. of            | 61 (1.2)                    | 427 (3.8)           | 31 (0.8)                        | 410 (4.3)           | 9 (0.7)                    | 406 (5.5)           | 10.4 (0.05)         |
| Ireland                          | 44 (2.2)                    | 538 (5.4)           | 36 (1.3)                        | 538 (4.5)           | 20 (1.5)                   | 520 (4.5)           | 9.7 (0.10)          |
| Israel                           | 40 (1.5)                    | 490 (4.7)           | 34 (0.8)                        | 483 (4.5)           | 26 (1.6)                   | 481 (5.1)           | 9.4 (0.09)          |
| Italy                            | 38 (1.7)                    | 506 (3.5)           | 43 (1.2)                        | 504 (3.4)           | 19 (1.4)                   | 494 (5.4)           | 9.5 (0.08)          |
| Japan                            | 28 (1.4)                    | 567 (3.9)           | 55 (1.1)                        | 558 (3.1)           | 17 (1.2)                   | 541 (6.9)           | 9.3 (0.07)          |
| Jordan                           | 68 (1.2)                    | 432 (3.9)           | 23 (0.9)                        | 397 (4.8)           | 8 (0.6)                    | 385 (6.1)           | 10.8 (0.05)         |
| Korea, Rep. of                   | 50 (1.3)                    | 558 (2.9)           | 39 (1.0)                        | 537 (3.1)           | 11 (0.9)                   | 521 (5.9)           | 10.1 (0.06)         |
| Kuwait                           | 68 (1.6)                    | 435 (6.0)           | 22 (1.0)                        | 413 (7.5)           | 9 (1.0)                    | 397 (10.1)          | 10.6 (0.07)         |
| Malaysia                         | 53 (1.1)                    | 445 (3.8)           | 40 (0.9)                        | 414 (3.8)           | 7 (0.5)                    | 371 (9.2)           | 10.3 (0.04)         |
| Norway (9)                       | 37 (1.2)                    | 512 (3.3)           | 44 (0.9)                        | 497 (2.7)           | 20 (1.0)                   | 467 (3.9)           | 9.5 (0.05)          |
| Oman                             | 61 (1.0)                    | 482 (2.7)           | 29 (0.7)                        | 440 (3.6)           | 10 (0.5)                   | 422 (6.1)           | 10.4 (0.04)         |
| Palestinian Nat'l Auth.          | 63 (1.1)                    | 418 (2.9)           | 25 (0.7)                        | 378 (3.3)           | 12 (0.8)                   | 364 (6.7)           | 10.5 (0.05)         |
| Qatar                            | 58 (2.0)                    | 495 (4.5)           | 28 (1.4)                        | 488 (5.9)           | 14 (1.1)                   | 456 (6.6)           | 10.3 (0.09)         |
| Saudi Arabia                     | 71 (1.1)                    | 437 (3.5)           | 21 (0.8)                        | 414 (5.2)           | 8 (0.5)                    | 404 (6.9)           | 10.9 (0.05)         |
| Singapore                        | 54 (1.2)                    | 623 (5.5)           | 38 (1.0)                        | 587 (6.4)           | 8 (0.8)                    | 590 (14.0)          | 10.3 (0.05)         |
| South Africa (9)                 | 52 (1.3)                    | 364 (4.2)           | 36 (0.8)                        | 354 (5.1)           | 12 (0.7)                   | 375 (6.2)           | 10.0 (0.05)         |
| Türkiye                          | 68 (1.3)                    | 541 (3.5)           | 23 (0.8)                        | 510 (4.9)           | 9 (0.9)                    | 504 (8.8)           | 10.7 (0.06)         |
| United Arab Emirates             | 62 (0.7)                    | 507 (2.4)           | 27 (0.4)                        | 487 (2.4)           | 11 (0.4)                   | 450 (4.1)           | 10.5 (0.03)         |
| United States                    | 47 (1.3)                    | 531 (4.3)           | 36 (0.8)                        | 510 (4.3)           | 17 (1.1)                   | 502 (4.7)           | 9.9 (0.07)          |
| <b>International Average</b>     | <b>51 (0.3)</b>             | <b>496 (0.8)</b>    | <b>35 (0.2)</b>                 | <b>477 (0.9)</b>    | <b>14 (0.2)</b>            | <b>462 (1.3)</b>    |                     |
| <b>Benchmarking Participants</b> |                             |                     |                                 |                     |                            |                     |                     |
| Abu Dhabi, UAE                   | 57 (1.1)                    | 478 (4.3)           | 30 (0.6)                        | 441 (3.6)           | 14 (0.9)                   | 404 (5.2)           | 10.2 (0.05)         |
| Dubai, UAE                       | 58 (1.2)                    | 563 (3.4)           | 32 (0.8)                        | 544 (3.9)           | 10 (0.7)                   | 515 (6.0)           | 10.4 (0.05)         |
| Sharjah, UAE                     | 70 (1.8)                    | 510 (5.8)           | 22 (1.1)                        | 492 (6.3)           | 8 (0.8)                    | 470 (9.7)           | 10.8 (0.08)         |

## Separate Science Results

Exhibit 5.3.3b: Instructional Clarity in Biology Lessons

| Country                      | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |             |
|------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|-------------|
|                              | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |             |
| Austria                      | 35 (1.2)                    | 515 (3.9)           | 44 (1.1)                        | 516 (2.5)           | 21 (1.5)                   | 506 (5.1)           | 9.4 (0.07)          |             |
| Azerbaijan                   | r                           | 65 (1.3)            | 428 (3.2)                       | 25 (1.1)            | 409 (4.8)                  | 10 (0.7)            | 403 (5.2)           | 10.7 (0.05) |
| Cote d'Ivoire                |                             | 60 (1.6)            | 175 (6.6)                       | 35 (1.3)            | 172 (8.2)                  | 5 (0.6)             | 182 (17.1)          | 10.4 (0.06) |
| Cyprus                       |                             | 43 (1.3)            | 489 (4.3)                       | 34 (1.0)            | 464 (3.2)                  | 23 (1.3)            | 451 (4.8)           | 9.6 (0.07)  |
| Czech Republic               |                             | 39 (1.5)            | 532 (2.8)                       | 45 (1.1)            | 529 (2.3)                  | 16 (1.1)            | 529 (4.4)           | 9.7 (0.06)  |
| Finland                      | r                           | 36 (1.0)            | 552 (3.4)                       | 46 (0.9)            | 539 (4.0)                  | 17 (0.9)            | 524 (5.0)           | 9.6 (0.05)  |
| France                       |                             | 30 (1.5)            | 492 (4.0)                       | 50 (1.1)            | 494 (3.7)                  | 20 (1.5)            | 492 (4.3)           | 9.3 (0.07)  |
| Georgia                      |                             | 73 (1.2)            | 462 (2.8)                       | 21 (1.0)            | 442 (4.2)                  | 5 (0.5)             | 443 (6.1)           | 11.1 (0.05) |
| Hungary                      |                             | 40 (1.6)            | 528 (4.0)                       | 41 (1.0)            | 516 (4.0)                  | 19 (1.4)            | 529 (4.7)           | 9.6 (0.08)  |
| Kazakhstan                   |                             | 45 (1.4)            | 465 (3.6)                       | 47 (1.2)            | 431 (3.4)                  | 8 (0.6)             | 446 (7.0)           | 10.1 (0.05) |
| Lithuania                    |                             | 37 (1.5)            | 523 (3.8)                       | 41 (1.0)            | 518 (3.6)                  | 22 (1.4)            | 530 (4.2)           | 9.5 (0.08)  |
| Morocco                      |                             | 59 (1.2)            | 333 (3.9)                       | 30 (0.7)            | 321 (3.7)                  | 11 (0.8)            | 328 (6.0)           | 10.4 (0.05) |
| Portugal                     |                             | 48 (1.7)            | 511 (2.9)                       | 39 (1.1)            | 504 (3.0)                  | 13 (1.1)            | 508 (4.6)           | 10.0 (0.07) |
| Romania                      | r                           | 59 (1.6)            | 477 (4.2)                       | 29 (1.1)            | 467 (5.0)                  | 12 (1.1)            | 480 (7.5)           | 10.4 (0.07) |
| Sweden                       | r                           | 33 (1.4)            | 544 (4.3)                       | 44 (1.0)            | 532 (4.0)                  | 23 (1.3)            | 520 (4.7)           | 9.4 (0.07)  |
| Uzbekistan                   |                             | 77 (1.2)            | 405 (4.1)                       | 19 (1.0)            | 384 (4.2)                  | 4 (0.4)             | 382 (9.4)           | 11.2 (0.04) |
| <b>International Average</b> | <b>49 (0.3)</b>             | <b>464 (1.0)</b>    | <b>37 (0.3)</b>                 | <b>452 (1.0)</b>    | <b>14 (0.3)</b>            | <b>453 (1.7)</b>    |                     |             |
| Malta                        | y                           | --                  | --                              | --                  | --                         | --                  | --                  | --          |

This TIMSS context questionnaire scale was established in 2023 based on the combined response distribution of countries that participated in TIMSS 2023. 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 2023 using a comparable approach.

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

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

A "y" indicates data are available for less than 40% of the students.

A dash (-) indicates comparable data not available.

## Exhibit 5.3.3: Instructional Clarity in Science Lessons

## Separate Science Results

(Continued)

Exhibit 5.3.3c: Instructional Clarity in Chemistry Lessons

| Country                      | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |
|------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|
|                              | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |
| Austria                      | 34 (1.3)                    | 522 (3.7)           | 40 (1.1)                        | 514 (2.8)           | 25 (1.5)                   | 507 (5.1)           | 9.5 (0.07)          |
| Azerbaijan                   | r 59 (1.4)                  | 428 (3.1)           | 28 (1.1)                        | 406 (4.5)           | 13 (0.9)                   | 417 (5.4)           | 10.5 (0.06)         |
| Cote d'Ivoire                | 60 (1.3)                    | 184 (8.3)           | 34 (1.1)                        | 182 (8.8)           | 6 (0.6)                    | 186 (16.5)          | 10.6 (0.05)         |
| Cyprus                       | r 48 (1.1)                  | 489 (3.8)           | 33 (1.0)                        | 467 (3.9)           | 20 (1.0)                   | 448 (4.6)           | 10.0 (0.05)         |
| Czech Republic               | 35 (1.4)                    | 531 (2.7)           | 44 (0.9)                        | 530 (2.1)           | 20 (1.4)                   | 528 (4.0)           | 9.7 (0.07)          |
| Finland                      | r 34 (1.1)                  | 562 (3.6)           | 43 (0.9)                        | 539 (3.5)           | 23 (1.1)                   | 521 (4.2)           | 9.6 (0.06)          |
| France                       | 28 (1.6)                    | 503 (4.7)           | 47 (1.4)                        | 494 (3.4)           | 26 (1.8)                   | 485 (4.8)           | 9.3 (0.09)          |
| Georgia                      | 69 (1.3)                    | 461 (2.7)           | 23 (1.1)                        | 451 (4.1)           | 8 (0.7)                    | 433 (8.0)           | 10.9 (0.05)         |
| Hungary                      | 36 (1.5)                    | 533 (3.5)           | 41 (1.1)                        | 522 (3.6)           | 24 (1.7)                   | 513 (5.0)           | 9.6 (0.08)          |
| Kazakhstan                   | 40 (1.2)                    | 473 (3.6)           | 50 (1.1)                        | 434 (3.4)           | 10 (0.7)                   | 446 (5.6)           | 10.1 (0.04)         |
| Lithuania                    | 39 (1.5)                    | 531 (3.7)           | 40 (1.0)                        | 519 (3.3)           | 21 (1.2)                   | 513 (4.1)           | 9.7 (0.07)          |
| Morocco                      | r 59 (1.1)                  | 337 (3.6)           | 30 (0.8)                        | 317 (3.0)           | 11 (0.7)                   | 320 (5.2)           | 10.5 (0.05)         |
| Portugal                     | 44 (1.5)                    | 515 (3.0)           | 39 (0.9)                        | 505 (2.4)           | 17 (1.3)                   | 497 (3.9)           | 10.0 (0.07)         |
| Romania                      | r 51 (1.7)                  | 477 (4.0)           | 31 (1.1)                        | 471 (4.9)           | 18 (1.5)                   | 479 (5.9)           | 10.1 (0.09)         |
| Sweden                       | s 33 (1.4)                  | 547 (4.7)           | 44 (1.2)                        | 535 (4.3)           | 23 (1.4)                   | 519 (4.7)           | 9.6 (0.07)          |
| Uzbekistan                   | 73 (1.0)                    | 403 (4.1)           | 22 (0.9)                        | 390 (4.8)           | 5 (0.4)                    | 398 (7.1)           | 11.1 (0.04)         |
| <b>International Average</b> | <b>46 (0.3)</b>             | <b>468 (1.0)</b>    | <b>37 (0.3)</b>                 | <b>455 (1.1)</b>    | <b>17 (0.3)</b>            | <b>451 (1.6)</b>    |                     |
| Malta                        | y --                        | --                  | --                              | --                  | --                         | --                  | --                  |

Exhibit 5.3.3d: Instructional Clarity in Physics Lessons

| Country                      | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |
|------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|
|                              | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |
| Austria                      | 31 (1.6)                    | 518 (4.3)           | 40 (1.2)                        | 517 (3.1)           | 30 (1.9)                   | 511 (4.7)           | 9.3 (0.09)          |
| Azerbaijan                   | r 61 (1.3)                  | 430 (3.3)           | 28 (0.9)                        | 403 (4.3)           | 12 (0.8)                   | 410 (5.9)           | 10.6 (0.06)         |
| Cote d'Ivoire                | 60 (1.4)                    | 185 (8.1)           | 34 (1.1)                        | 180 (8.6)           | 6 (0.6)                    | 195 (19.2)          | 10.7 (0.04)         |
| Cyprus                       | r 45 (1.2)                  | 490 (4.0)           | 32 (0.8)                        | 465 (4.1)           | 23 (1.0)                   | 451 (3.6)           | 9.8 (0.06)          |
| Czech Republic               | 34 (1.3)                    | 535 (2.8)           | 44 (1.0)                        | 530 (2.3)           | 23 (1.4)                   | 522 (3.8)           | 9.6 (0.07)          |
| Finland                      | r 33 (1.3)                  | 560 (4.1)           | 42 (0.9)                        | 544 (3.7)           | 24 (1.3)                   | 524 (4.6)           | 9.6 (0.07)          |
| France                       | 28 (1.6)                    | 503 (4.7)           | 47 (1.4)                        | 494 (3.4)           | 26 (1.8)                   | 485 (4.8)           | 9.3 (0.08)          |
| Georgia                      | r 65 (1.4)                  | 463 (3.2)           | 25 (1.0)                        | 445 (3.8)           | 10 (0.8)                   | 440 (6.0)           | 10.8 (0.06)         |
| Hungary                      | 34 (1.4)                    | 535 (4.3)           | 39 (0.9)                        | 516 (3.8)           | 27 (1.8)                   | 520 (4.4)           | 9.5 (0.09)          |
| Kazakhstan                   | 41 (1.3)                    | 471 (4.1)           | 49 (1.2)                        | 437 (2.7)           | 10 (0.7)                   | 438 (7.0)           | 10.1 (0.05)         |
| Lithuania                    | 35 (1.3)                    | 535 (4.2)           | 39 (0.8)                        | 515 (3.6)           | 25 (1.4)                   | 516 (4.8)           | 9.6 (0.07)          |
| Malta                        | r 53 (0.8)                  | 530 (2.1)           | 30 (0.8)                        | 502 (4.0)           | 17 (0.6)                   | 479 (4.6)           | 10.2 (0.03)         |
| Morocco                      | r 59 (1.1)                  | 338 (3.7)           | 30 (0.8)                        | 316 (3.5)           | 11 (0.7)                   | 316 (5.2)           | 10.6 (0.04)         |
| Portugal                     | 44 (1.5)                    | 515 (3.0)           | 39 (0.9)                        | 505 (2.4)           | 17 (1.3)                   | 497 (3.9)           | 10.0 (0.07)         |
| Romania                      | r 55 (1.5)                  | 480 (4.3)           | 29 (1.0)                        | 471 (4.6)           | 16 (1.1)                   | 469 (6.7)           | 10.3 (0.07)         |
| Sweden                       | r 33 (1.6)                  | 549 (5.1)           | 43 (1.3)                        | 532 (4.0)           | 25 (1.4)                   | 522 (4.6)           | 9.5 (0.07)          |
| Uzbekistan                   | 73 (1.1)                    | 405 (3.8)           | 22 (0.9)                        | 388 (5.1)           | 5 (0.6)                    | 384 (7.9)           | 11.2 (0.04)         |
| <b>International Average</b> | <b>46 (0.3)</b>             | <b>473 (1.0)</b>    | <b>36 (0.2)</b>                 | <b>456 (1.0)</b>    | <b>18 (0.3)</b>            | <b>452 (1.7)</b>    |                     |

Exhibit 5.3.3e: Instructional Clarity in Earth Science Lessons

| Country                      | High Clarity of Instruction |                     | Moderate Clarity of Instruction |                     | Low Clarity of Instruction |                     | Average Scale Score |
|------------------------------|-----------------------------|---------------------|---------------------------------|---------------------|----------------------------|---------------------|---------------------|
|                              | Percent of Students         | Average Achievement | Percent of Students             | Average Achievement | Percent of Students        | Average Achievement |                     |
| Austria                      | 32 (1.2)                    | 513 (4.0)           | 43 (1.1)                        | 517 (2.9)           | 25 (1.6)                   | 514 (4.9)           | 9.4 (0.07)          |
| Azerbaijan                   | r 64 (1.4)                  | 426 (3.3)           | 25 (0.9)                        | 409 (3.9)           | 11 (0.8)                   | 410 (4.8)           | 10.7 (0.06)         |
| Cote d'Ivoire                | 61 (1.4)                    | 184 (6.6)           | 35 (1.2)                        | 183 (11.5)          | 4 (0.4)                    | 193 (21.4)          | 10.6 (0.05)         |
| Cyprus                       | r 36 (0.9)                  | 480 (4.8)           | 34 (0.9)                        | 468 (3.9)           | 31 (1.0)                   | 454 (3.8)           | 9.3 (0.05)          |
| Czech Republic               | 35 (1.4)                    | 526 (3.0)           | 44 (0.9)                        | 532 (2.4)           | 21 (1.3)                   | 533 (3.5)           | 9.6 (0.07)          |
| Finland                      | 35 (1.1)                    | 554 (3.5)           | 46 (0.8)                        | 542 (3.5)           | 19 (0.9)                   | 516 (5.0)           | 9.7 (0.05)          |
| France                       | 30 (1.5)                    | 492 (4.0)           | 51 (1.1)                        | 494 (3.7)           | 19 (1.5)                   | 493 (4.3)           | 9.4 (0.07)          |
| Georgia                      | 67 (1.4)                    | 459 (3.2)           | 24 (0.9)                        | 448 (3.8)           | 9 (0.9)                    | 445 (5.7)           | 10.9 (0.06)         |
| Hungary                      | 39 (1.4)                    | 531 (3.9)           | 41 (0.9)                        | 516 (3.8)           | 20 (1.4)                   | 525 (4.7)           | 9.7 (0.07)          |
| Kazakhstan                   | 42 (1.5)                    | 470 (4.0)           | 48 (1.3)                        | 433 (3.4)           | 10 (0.7)                   | 446 (6.0)           | 10.1 (0.05)         |
| Lithuania                    | 41 (1.3)                    | 525 (3.4)           | 41 (0.9)                        | 518 (3.7)           | 18 (1.3)                   | 526 (4.6)           | 9.8 (0.06)          |
| Morocco                      | r 57 (1.2)                  | 334 (3.9)           | 31 (0.8)                        | 323 (3.7)           | 12 (0.7)                   | 322 (5.5)           | 10.4 (0.05)         |
| Portugal                     | 48 (1.7)                    | 511 (2.9)           | 39 (1.1)                        | 504 (3.0)           | 13 (1.1)                   | 508 (4.6)           | 10.1 (0.07)         |
| Uzbekistan                   | r 71 (1.2)                  | 403 (3.9)           | 24 (1.0)                        | 390 (5.1)           | 5 (0.5)                    | 388 (7.5)           | 11.1 (0.05)         |
| <b>International Average</b> | <b>47 (0.4)</b>             | <b>458 (1.1)</b>    | <b>37 (0.3)</b>                 | <b>448 (1.3)</b>    | <b>15 (0.3)</b>            | <b>448 (2.0)</b>    |                     |
| Malta                        | x 42 (1.3)                  | 518 (4.4)           | 38 (1.2)                        | 498 (4.4)           | 20 (1.0)                   | 493 (5.8)           | 9.8 (0.05)          |
| Romania                      | y --                        | --                  | --                              | --                  | --                         | --                  | --                  |
| Sweden                       | --                          | --                  | --                              | --                  | --                         | --                  | --                  |

This TIMSS context questionnaire scale was established in 2023 based on the combined response distribution of countries that participated in TIMSS 2023. 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 2023 using a comparable approach.

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

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

A dash (-) indicates comparable data not available.