

## Pre-Formatted Reports: Benchmark Test Item Analysis - New Format

### Data Selections

**Institution(s):** All School Types, All Schools  
**Benchmark Administration:** 10/27/14, 2014-15 Mid-Semester Physical Science  
**Trend Profile:** 2014-2015  
**Subject:** Life and Physical Sciences  
**Test Focus:** Life and Physical Sciences  
**Test Level:** All Benchmark Test Levels  
**Test Category:** District Benchmark  
**Grade:** All Grade Levels  
**Enrollment:** Current

Number of questions: 40  
 Number of test-taking students: 377

### Student Responses

| Question - Type      | Correct |       | Incorrect  | Most Common Mistake |       | Point Value | Points Achieved / Possible | P-Value/Item Mean | Discrimination |
|----------------------|---------|-------|------------|---------------------|-------|-------------|----------------------------|-------------------|----------------|
|                      | Rate    | Value | Total Rate | Rate                | Value |             |                            |                   |                |
| 1 - Multiple Choice  | 68%     | D     | 32%        | 15%                 | C     | 1           | 258 / 377                  | 0.68              | 0.40           |
| 2 - Multiple Choice  | 75%     | B     | 25%        | 12%                 | C     | 1           | 282 / 377                  | 0.75              | 0.31           |
| 3 - Multiple Choice  | 32%     | B     | 68%        | 30%                 | C     | 1           | 121 / 377                  | 0.32              | 0.47           |
| 4 - Multiple Choice  | 47%     | C     | 53%        | 23%                 | B     | 1           | 176 / 377                  | 0.47              | 0.28           |
| 5 - Multiple Choice  | 18%     | C     | 82%        | 43%                 | A     | 1           | 68 / 377                   | 0.18              | 0.17           |
| 6 - Multiple Choice  | 35%     | A     | 65%        | 31%                 | D     | 1           | 131 / 377                  | 0.35              | 0.23           |
| 7 - Multiple Choice  | 44%     | C     | 56%        | 42%                 | D     | 1           | 166 / 377                  | 0.44              | 0.27           |
| 8 - Multiple Choice  | 58%     | D     | 42%        | 31%                 | C     | 1           | 218 / 377                  | 0.58              | 0.42           |
| 9 - Multiple Choice  | 70%     | A     | 30%        | 21%                 | B     | 1           | 263 / 377                  | 0.70              | 0.37           |
| 10 - Multiple Choice | 41%     | C     | 59%        | 24%                 | B     | 1           | 155 / 377                  | 0.41              | 0.35           |
| 11 - Multiple Choice | 69%     | D     | 31%        | 11%                 | C     | 1           | 261 / 377                  | 0.69              | 0.44           |
| 12 - Multiple Choice | 51%     | B     | 49%        | 19%                 | A     | 1           | 191 / 377                  | 0.51              | 0.37           |
| 13 - Multiple Choice | 56%     | C     | 44%        | 18%                 | A     | 1           | 210 / 377                  | 0.56              | 0.37           |
| 14 - Multiple Choice | 30%     | A     | 70%        | 46%                 | B     | 1           | 112 / 377                  | 0.30              | 0.28           |
| 15 - Multiple Choice | 38%     | A     | 62%        | 23%                 | D     | 1           | 145 / 377                  | 0.38              | 0.27           |
| 16 - Multiple Choice | 41%     | B     | 59%        | 40%                 | A     | 1           | 153 / 377                  | 0.41              | 0.41           |
| 17 - Multiple Choice | 48%     | C     | 52%        | 20%                 | D     | 1           | 182 / 377                  | 0.48              | 0.52           |
| 18 - Multiple Choice | 62%     | A     | 38%        | 19%                 | D     | 1           | 232 / 377                  | 0.62              | 0.21           |
| 19 - Multiple Choice | 32%     | B     | 68%        | 33%                 | C     | 1           | 120 / 377                  | 0.32              | 0.27           |
| 20 - Multiple Choice | 25%     | B     | 75%        | 45%                 | D     | 1           | 93 / 377                   | 0.25              | -0.07          |

# NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION

PreFormatted Reports

|                      |            |   |            |     |   |   |                  |      |       |
|----------------------|------------|---|------------|-----|---|---|------------------|------|-------|
| 21 - Multiple Choice | 85%        | B | 15%        | 5%  | A | 1 | 322 / 377        | 0.85 | 0.45  |
| 22 - Multiple Choice | 23%        | A | 77%        | 29% | B | 1 | 88 / 377         | 0.23 | -0.03 |
| 23 - Multiple Choice | 27%        | B | 73%        | 37% | D | 1 | 100 / 377        | 0.27 | 0.37  |
| 24 - Multiple Choice | 57%        | A | 43%        | 20% | B | 1 | 214 / 377        | 0.57 | 0.44  |
| 25 - Multiple Choice | 16%        | D | 84%        | 35% | A | 1 | 60 / 377         | 0.16 | 0.13  |
| 26 - Multiple Choice | 24%        | D | 76%        | 40% | C | 1 | 92 / 377         | 0.24 | 0.05  |
| 27 - Multiple Choice | 83%        | C | 17%        | 6%  | D | 1 | 314 / 377        | 0.83 | 0.40  |
| 28 - Multiple Choice | 12%        | B | 88%        | 36% | C | 1 | 44 / 377         | 0.12 | -0.06 |
| 29 - Multiple Choice | 33%        | B | 67%        | 36% | A | 1 | 123 / 377        | 0.33 | 0.18  |
| 30 - Multiple Choice | 72%        | A | 28%        | 11% | D | 1 | 271 / 377        | 0.72 | 0.38  |
| 31 - Multiple Choice | 34%        | B | 66%        | 25% | A | 1 | 130 / 377        | 0.34 | 0.33  |
| 32 - Multiple Choice | 10%        | A | 90%        | 43% | B | 1 | 39 / 377         | 0.10 | -0.09 |
| 33 - Multiple Choice | 37%        | C | 63%        | 29% | A | 1 | 138 / 377        | 0.37 | 0.20  |
| 34 - Multiple Choice | 29%        | C | 71%        | 37% | A | 1 | 110 / 377        | 0.29 | 0.11  |
| 35 - Multiple Choice | 27%        | B | 73%        | 30% | A | 1 | 100 / 377        | 0.27 | 0.21  |
| 36 - Multiple Choice | 63%        | B | 37%        | 21% | C | 1 | 239 / 377        | 0.63 | 0.40  |
| 37 - Multiple Choice | 17%        | C | 83%        | 38% | A | 1 | 63 / 377         | 0.17 | 0.08  |
| 38 - Multiple Choice | 19%        | D | 81%        | 53% | B | 1 | 70 / 377         | 0.19 | 0.12  |
| 39 - Multiple Choice | 45%        | B | 55%        | 27% | D | 1 | 170 / 377        | 0.45 | 0.07  |
| 40 - Multiple Choice | 18%        | A | 82%        | 59% | D | 1 | 67 / 377         | 0.18 | 0.18  |
| <b>Summary</b>       | <b>42%</b> |   | <b>58%</b> |     |   |   | <b>157 / 377</b> |      |       |

P-value represents an item's difficulty as evaluated by dividing the total number of correct responses by the total number of students tested. P-value is calculated for true/false, multiple choice, gridded or hot spot-single response items.

Item Mean is the average score for student responses to an open response question or to a multi-part question. Item Mean is calculated for inline response, matching or hot spot-multiple selections items.

Discrimination or Item Total Score Correlation is the correlation between the question score and the overall test score and indicates the extent to which success on an item corresponds to success on the test.

## Standards Alignment to NC Standards

| Question                   | ID                    | Standard Description  |
|----------------------------|-----------------------|---|
| <b>1 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities. |
| <b>2 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities. |
| <b>3 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities. |
| <b>4 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities. |

|                             |                       |   |
|-----------------------------|-----------------------|---|
| <b>5 - Multiple Choice</b>  | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>6 - Multiple Choice</b>  | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>7 - Multiple Choice</b>  | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>8 - Multiple Choice</b>  | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>9 - Multiple Choice</b>  | <b>NCES.PSc.1.2.1</b> | Explain how gravitational force affects the weight of an object and the velocity of an object in freefall.  |
| <b>10 - Multiple Choice</b> | <b>NCES.PSc.1.2.1</b> | Explain how gravitational force affects the weight of an object and the velocity of an object in freefall.  |
| <b>11 - Multiple Choice</b> | <b>NCES.PSc.1.2.3</b> | Explain forces using Newton's three laws of motion.   |
| <b>12 - Multiple Choice</b> | <b>NCES.PSc.1.2.3</b> | Explain forces using Newton's three laws of motion.   |
| <b>13 - Multiple Choice</b> | <b>NCES.PSc.3.1.1</b> | Explain thermal energy and its transfer.  |
| <b>14 - Multiple Choice</b> | <b>NCES.PSc.3.1.2</b> | Explain the law of conservation of energy in a mechanical system in terms of kinetic energy, potential energy and heat.   |
| <b>15 - Multiple Choice</b> | <b>NCES.PSc.3.3.5</b> | Explain the practical applications of magnetism.  |
| <b>16 - Multiple Choice</b> | <b>NCES.PSc.3.1.2</b> | Explain the law of conservation of energy in a mechanical system in terms of kinetic energy, potential energy and heat.   |
| <b>17 - Multiple Choice</b> | <b>NCES.PSc.3.1.3</b> | Explain work in terms of the relationship among the applied force to an object, the resulting displacement of the object and the energy transferred to an object. |
| <b>18 - Multiple Choice</b> | <b>NCES.PSc.3.1.3</b> | Explain work in terms of the relationship among the applied force to an object, the resulting displacement of the object and the energy transferred to an object. |
| <b>19 - Multiple Choice</b> | <b>NCES.PSc.1.2.3</b> | Explain forces using Newton's three laws of motion.   |
| <b>20 - Multiple Choice</b> | <b>NCES.PSc.3.1.4</b> | Explain the relationship among work, power and simple machines both qualitatively and quantitatively.   |
| <b>21 - Multiple Choice</b> | <b>NCES.PSc.3.1.1</b> | Explain thermal energy and its transfer.  |
| <b>22 - Multiple Choice</b> | <b>NCES.PSc.2.1.2</b> | Explain the phases of matter and the physical changes that matter undergoes.  |
| <b>23 - Multiple Choice</b> | <b>NCES.PSc.3.1.4</b> | Explain the relationship among work, power and simple machines both qualitatively and quantitatively.   |
| <b>24 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>25 - Multiple Choice</b> | <b>NCES.PSc.3.2.1</b> | Explain the relationships among wave frequency, wave period, wave velocity and wavelength through calculation and investigation.                                  |
| <b>26 - Multiple Choice</b> | <b>NCES.PSc.3.1.4</b> | Explain the relationship among work, power and simple machines both qualitatively and quantitatively.   |
| <b>27 - Multiple Choice</b> | <b>NCES.PSc.3.1.4</b> | Explain the relationship among work, power and simple machines both qualitatively and quantitatively.   |
| <b>28 - Multiple Choice</b> | <b>NCES.PSc.3.2.4</b> | Illustrate the wave interactions of reflection, refraction, diffraction, and interference.  |
| <b>29 - Multiple Choice</b> | <b>NCES.PSc.3.2.4</b> | Illustrate the wave interactions of reflection, refraction, diffraction, and interference.  |
| <b>30 - Multiple Choice</b> | <b>NCES.PSc.3.2.4</b> | Illustrate the wave interactions of reflection, refraction, diffraction, and interference.  |
| <b>31 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |
| <b>32 - Multiple Choice</b> | <b>NCES.PSc.1.1.2</b> | Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.                                       |

---

|  |  |
|--|--|
| <b>33 - Multiple Choice NCES.PSc.3.3.3</b> | Explain how current is affected by changes in composition, length, temperature, and diameter of wire.                            |
| <b>34 - Multiple Choice NCES.PSc.3.2.4</b> | Illustrate the wave interactions of reflection, refraction, diffraction, and interference.                                       |
| <b>35 - Multiple Choice NCES.PSc.3.2.4</b> | Illustrate the wave interactions of reflection, refraction, diffraction, and interference.                                       |
| <b>36 - Multiple Choice NCES.PSc.1.2.2</b> | Classify frictional forces into one of four types: static, sliding, rolling, and fluid.  |
| <b>37 - Multiple Choice NCES.PSc.1.2.2</b> | Classify frictional forces into one of four types: static, sliding, rolling, and fluid.  |
| <b>38 - Multiple Choice NCES.PSc.3.2.1</b> | Explain the relationships among wave frequency, wave period, wave velocity and wavelength through calculation and investigation. |
| <b>39 - Multiple Choice NCES.PSc.3.2.1</b> | Explain the relationships among wave frequency, wave period, wave velocity and wavelength through calculation and investigation. |
| <b>40 - Multiple Choice NCES.PSc.3.1.4</b> | Explain the relationship among work, power and simple machines both qualitatively and quantitatively.                            |

---