Physics
RELEASED Items[1]
2018–2019
Answer Key

Question Number	Question Type	Correct Answer	Percent Correct[2]	Objective
1	MC	D	62%	Phy.1.1.3
2	MC	A	78%	Phy.1.1.2
3	MC	A	74%	Phy.1.1.3
4	MC	B	41%	Phy.1.1.1
5	MC	D	44%	Phy.1.2.1
6	MC	B	60%	Phy.1.2.2
7	MC	A	45%	Phy.1.2.3
8	MC	D	69%	Phy.1.2.4
9	MC	C	76%	Phy.1.2.5
10	MC	A	59%	Phy.1.3.1
11	MC	D	37%	Phy.1.3.2
12	MC	A	55%	Phy.1.3.1
13	MC	D	64%	Phy.1.3.2
14	MC	D	54%	Phy.2.1.1
15	MC	C	50%	Phy.2.1.2
16	MC	B	83%	Phy.2.1.3

Question Number	Question Type	Correct Answer	Percent Correct[2]	Objective
17	MC	C	80%	Phy.2.1.1
18	MC	A	58%	Phy.2.1.2
19	MC	D	76%	Phy.2.2.1
20	MC	A	77%	Phy.2.1.3
21	MC	A	66%	Phy.2.2.1
22	MC	D	54%	Phy.2.2.2
23	MC	C	44%	Phy.2.2.3
24	MC	B	78%	Phy.2.3.5
25	MC	C	31%	Phy.2.3.3
26	MC	D	50%	Phy.2.3.4
27	MC	B	51%	Phy.2.3.5
28	MC	B	73%	Phy.2.3.2
29	MC	A	70%	Phy.2.3.4
30	MC	D	60%	Phy.2.3.5
31	MC	C	45%	Phy.3.1.1
32	MC	B	31%	Phy.3.1.2
33	MC	C	65%	Phy.3.1.3
34	MC	D	48%	Phy.3.1.4

Question Number	Question Type	Correct Answer	Percent Correct[2]	Objective
35	MC	C	63%	Phy.3.1.1
36	MC	B	58%	Phy.3.1.4
37	MC	B	47%	Phy.3.2.1
38	MC	D	45%	Phy.3.2.2
39	MC	B	40%	Phy.3.2.3
40	MC	A	69%	Phy.3.2.2

[1]These released items were administered to students during a previous test administration. This sample set of released items may not reflect the breadth of the standards assessed and/or the range of item difficulty found on the NC Final Exam. Additional information about the NC Final Exam is available in the *Assessment Specification* for each exam located at http://www.ncpublicschools.org/accountability/common-exams/specifications/.

[2]Percent correct is the percentage of students who answered the item correctly during a previous administration.

Clarifying Objectives Descriptions

Only clarifying objective descriptions addressed by the released items in this document are listed below. A complete list of North Carolina *Essential Standards* for Science may be reviewed at http://www.ncpublicschools.org/curriculum/science/scos/support-tools/#standards.

Phy.1.1.1 (Forces and Motion)
Analyze motion graphically and numerically using vectors, graphs, and calculations.

Phy.1.1.2 (Forces and Motion)
Analyze motion in one dimension using time, distance, displacement, velocity, and acceleration.

Phy.1.1.3 (Forces and Motion)
Analyze motion in two dimensions using angle of trajectory, time, distance, displacement, velocity, and acceleration.

Phy.1.2.1 (Forces and Motion)
Analyze forces and systems of forces graphically and numerically using vectors, graphs, and calculations.

Phy.1.2.2 (Forces and Motion)
Analyze systems of forces in one dimension and two dimensions using free body diagrams.

Phy.1.2.3 (Forces and Motion)
Explain forces using Newton's laws of motion as well as the universal law of gravitation.

Phy.1.2.4 (Forces and Motion)
Explain the effects of forces (including weight, normal, tension and friction) on objects.

Phy.1.2.5 (Forces and Motion)
Analyze basic forces related to rotation in a circular path (centripetal force).

Phy.1.3.1 (Forces and Motion)
Analyze the motion of objects involved in completely elastic and completely inelastic collisions by using the principles of conservation of momentum and conservation of energy.

Phy.1.3.2 (Forces and Motion)
Analyze the motion of objects based on the relationship between momentum and impulse.

Phy.2.1.1 (Energy: Conservation and Transfer)
Interpret data on work and energy presented graphically and numerically.

Phy.2.1.2 (Energy: Conservation and Transfer)
Compare the concepts of potential and kinetic energy and conservation of total mechanical energy in the description of the motion of objects.

Phy.2.1.3 (Energy: Conservation and Transfer)
Explain the relationship among work, power, and energy.

Phy.2.2.1 (Energy: Conservation and Transfer)
Analyze how energy is transmitted through waves, using the fundamental characteristics of waves: wavelength, period, frequency, amplitude, and wave velocity.

Phy.2.2.2 (Energy: Conservation and Transfer)
Analyze wave behaviors in terms of transmission, reflection, refraction and interference.

Phy.2.2.3 (Energy: Conservation and Transfer)
Compare mechanical and electromagnetic waves in terms of wave characteristics and behavior (specifically sound and light).

Phy.2.3.2 (Energy: Conservation and Transfer)
Differentiate the behavior of moving charges in conductors and insulators.

Phy.2.3.3 (Energy: Conservation and Transfer)
Compare the general characteristics of AC and DC systems without calculations.

Phy.2.3.4 (Energy: Conservation and Transfer)
Analyze electric systems in terms of their energy and power.

Phy.2.3.5 (Energy: Conservation and Transfer)
Analyze systems with multiple potential differences and resistors connected in series and parallel circuits, both conceptually and mathematically, in terms of voltage, current and resistance.

Phy.3.1.1 (Interactions of Energy and Matter)
Explain qualitatively the fundamental properties of the interactions of charged objects.

Phy.3.1.2 (Interactions of Energy and Matter)
Explain the geometries and magnitudes of electric fields.

Phy.3.1.3 (Interactions of Energy and Matter)
Explain how Coulomb's law relates to the electrostatic interactions among charged objects.

Phy.3.1.4 (Interactions of Energy and Matter)
Explain the mechanisms for producing electrostatic charges, including charging by friction, conduction, and induction.

Phy.3.2.1 (Interactions of Energy and Matter)
Explain the relationship between magnetic domains and magnetism.

Phy.3.2.2 (Interactions of Energy and Matter)
Explain how electric currents produce various magnetic fields.

Phy.3.2.3 (Interactions of Energy and Matter)
Explain how transformers and power distributions are applications of electromagnetism.