Errata for the First Printing of
Exploring Creation With Physics, 2nd Edition

With the help of students and teachers, we have found a few typos in the first printing of the second edition.

STUDENT TEXT

Introductory Remarks:

p. 3 In the second paragraph on the page, the object discussed is not really a cube. It should be called a box

Module #1:

CD ONLY In the section entitled "Speed and Velocity," near the top, the phrase:

…is 60.0 meters · 30.0 seconds… should read:

…is 60.0 meters ÷ 30.0 seconds…

CD ONLY In Experiment 1.2, step #7, the phrase:

…Dt. Take your value for Dv and divide it by Dt.… should read:

…Δt. Take your value for Δv and divide it by Δt…

p. 8 In the first line of Example 1.1, the phrase

A child is 5.0 meters away from a wall and rolls a balls towards it.

Should read:

A child is 5.0 meters away from a wall and rolls a ball towards it.

p. 19 In the second line above Example 1.4, the phrase

…and then do the "On Your Own" problems that follows in order…

Should read:

…and then do the "On Your Own" problems that follow in order…

Module #2:

p. 41 In the fourth line above Example 2.2, the phrase

initial velocity, final velocity, acceleration, and distance.

Should read:

initial velocity, final velocity, acceleration, and displacement.

p. 43 In the third equation on the page, the "a" should be in boldface type.

p. 46 In both equations labeled (2.18), the "a" should be in boldface type.

p. 50 In the illustration, the velocity of the plane should have units of miles/hr.

p. 61 Near the end of the 13th line from the bottom, the word "help" should be replaced with "held"

Module #3:

CD ONLY In the section entitled "Vectors," near the bottom, the phrase:

…learned that to solve for q in the above equation… should read

…learned that to solve for θ in the above equation.…

p. 79 At the beginning of the fourth line of text, the phrase:

*…of vector **A**, because its tells you…* Should read:

…of vector **A**, because it tells you…

p. 90 In the fourth line from the top of the page, the equation:

$-90^o + 180.0^o = 90^o$

Should read:

$-90^o + 180^o = 90^o$

Since 180 is exact by the definition given in Figure 3.1, there is no need to add a decimal place to it. It has an infinite number of decimal places.

p. 91 In the experiment, step #14 should read:

14. Use the protractor to measure the angle the arrow makes with the positive x-axis at Phoenix.

Module #4:

p. 113 In the last two equations on the page, **x** should be replaced with **Δx**, because **Δx** is the proper symbol for displacement.

p. 113 In the last equation on the page, there should be no negative sign on the 9.8 m/sec^2.

p. 114 In the first equation on the page, the argument of cosine should be 45.0^o.

p. 124 At the end of step #2, there should not be a space between "table" and the period at the end of the sentence.

p. 135 In the second equation on the page, the term (0)·(2.75 sec) should read (0)·(1.31 sec). This typo does not affect the answer.

p. 139 In question #3, "gunnery sergeant" should be replaced with "crew," as there is no gunnery sergeant position in the navy.

Module #5:

CD ONLY In the section entitled "An Equation for the Frictional Force," The bold-faced sentence should have a closed parenthesis after μ_s.

p. 148 The force in "On Your Own" problem 5.3 should be 15 Newtons, not 15.0 Newtons.

p. 155 In Figure 5.5, the molecules at the surface of the box should really be brown, while the molecules at the surface of the floor should be gray. That would make them consistent with the rest of the figure.

p. 164 The beginning of the last sentence of the first paragraph on this page should be "Since 530…" It currently reads "Since 580..."

pp. 169 - 170 In the last equation, the mass should be *4.1 kg*, since the math works out to 4.05… That means the equation on p. 170 should change as well. With the mass being 4.1 kg, the weight should be *4.0×10^1 Newtons*. The answer needs to be in scientific notation, since it needs two significant figures.

Module #6:

CD ONLY In the section entitled "Translational Motion and Measuring Weight 2," "32 m/sec^2" should be replaced by "32 ft/sec^2"

p. 187 In the eighth line from the bottom, the acceleration should read 32 ft/sec2

p. 188 Near the middle of the the 7^{th} line from the bottom, the phrase "or course" should be replaced with "of course"

p. 195 The 7^{th} line from the bottom should begin, "to indicate this, because it is used to get the *magnitude* of the torque…" the word "to" was left out.

p. 203 In the first drawing for Example 6.6, there should be a string connecting the cars.

p. 206 The second equation on the page should be $T_{1y} = T_1 \cdot \sin(45^o) = 0.71 \cdot T_1$.

p. 211 At the bottom of the page, the equation should use the symbol μ_k instead of μ_s.

p. 213 Since we are dealing with motion, the equation at the top of the page should read:

$$37 \text{ Newtons} = \mu_k \cdot (91 \text{ Newtons})$$

Module #7:

p. 221 In the fourth line of the third paragraph, the word "strong" should be replaced with "string."

p. 222 In the second line of Example 7.1, the phrase:

what are magnitudes of the centripetal force and…

Should read:

what are the magnitudes of the centripetal force and…

Module #8:

p. 261 In the fourth line below the drawing of the roller coaster, the phrase:

The easiest way to do this to find a place where either…

Should read:

The easiest way to do this is to find a place where either…

p. 278 In the last equation for 8.3, there should be an "=" before 2.6×10^3

p. 282 In the fifth and sixth equations on the page, 0.65 should be 0.67. This does not affect the answer.

p. 286 In problem #9, the time should be 2.40 minutes. This gives three significant figures, and that's how many are used for time in the solution.

Module #9:

CD ONLY "euation (9.7)" should be replaced with "Equation (9.7)."

In the section entitled "Angular Momentum, the units for angular momentum should be $\frac{\text{kg} \cdot \text{m}^2}{\text{sec}}$, not $\frac{\text{kg} \cdot \text{m}}{\text{sec}}$

p. 295 In the second line of the text, the phrase:

Even though the two object collide with each other,

Should read:

Even though the two objects collide with each other,

p. 296 In the tenth line of the text, the phrase

…and the ball's momentum change substantially,

Should read

…and the ball's momentum changed substantially,

p. 298 In the second paragraph under the experiment, line seven, the phrase:

After the collusion, the momentum had to be the same,

Should read

After the collision, the momentum had to be the same,

p. 303 The left side of the second to the last equation should read -6.8×10^3, because when you multiply the numbers above, you have only three significant figures for each term. Then, when you add the terms, you can only report your answer to the hundreds place. This changes the final equation and the final answer. The final answer, then, should be 4.3 m/sec.

Module #10:

p. 322 Last paragraph on this page, fourth line up, should say "force equal to but opposite the weight of the object…"

p. 332 In Example 10.3, the student is pulling on a *spring*. Thus, the second sentence in the example should read:

After the spring has stretched to its new equilibrium position,

In that same example, the force in the second line after the first set of equations should read $\mathbf{F} = 3.4 \times 10^2$ Newtons.

p. 333 In the sixth line from the bottom, a comma is missing. The proper punctuation is: In order to compress the spring, however, kinetic energy had…

Module #11:

p. 366 In the last line of the example, the sentence:

The lighting, therefore, was formed 341 m away from the physicist.

Should read:

The lightning, therefore, was formed 341 m away from the physicist

p. 376 In the sixth line of the text, the phrase:

…electrons is force to pass through a screen

Should read:

…electrons is forced to pass through a screen

p. 380 In the last equation for the answer to problem 11.4, the answer should be 12 m/sec, not 11.9 m/sec. The underlined answer should also be 12 m/sec. When we solve the first term in the final equation, $\frac{511\ \text{Hz}}{494\ \text{Hz}} \cdot 346.7\ \frac{\text{m}}{\text{sec}}$, we can keep only three significant figures. Thus, it is 359 m/sec. Then, when we subtract 346.7 m/sec, we must report our answer to the ones place, because the least precise number (359) goes to the ones place. That's why the answer must be rounded to 12 m/sec.

Module #12:

p. 404 In steps 15 and 16, the line referenced is incorrect. They should each indicate that you are to draw the line relative to the line you drew in step 1.

p. 416 In problem 12.6, one index of refraction (1.5) has only two significant figures. Thus, the answer can have only two. This means the correct answer is 58º.

Module #13:

p. 427 In step #15 of the experiment, the first word (pull) should be capitalized.

p. 432 The first line should say that the proton is more than 1,800 times as massive as the electron.

p. 435 In the second and fourth equations on this page, a parenthesis is missing after the

unit for k.

p. 436 In the last equation on this page, a parenthesis is missing after the unit for k.

p. 437 In the second equation on this page, a parenthesis is missing after the unit for k.

p. 438 The second equation should read:

$$B_y = (4.7 \times 10^{11}\ \text{Newtons}) \cdot \sin(315.0°) = -3.3 \times 10^{11}\ \text{Newtons}$$

p. 440 The last three words on the page should be "Figure 13.3, a"

p. 442 In Example 13.3, the charges should be listed as -0.30 C and +0.60 C. In other words, the charge unit should be C, not mC. This change doesn't really affect this example, but it affects Example 13.4.

p. 444 In Example 13.4, the charges should be listed as -0.30 C and +0.60 C. In other words, the charge unit should be C, not mC.

p. 445 In the second problem of Example 13.4, the charge should be -0.0060-mC.

Module #14:

p. 462 In the equation for ΔV, the initial potential should be 6.4×10^7 V, as calculated in the first two equations on the page. This changes ΔV to 1.8×10^7 V, which changes ΔPE to -1.0×10^5 J.

Module #15:

p. 488 To be consistent with the rest of the text, the Δt in the ninth line of text should be in quotes.

p. 507 Because of the rules of addition for significant figures, $1/R_{effective}$ should be 0.150 $1/\Omega$, which makes $R_{effective}$ 6.67 Ω.

Module #16:

p. 532 The line directly above the figure should read:

I were to draw the magnetic field of the earth, it would look like Figure 16.5.

p. 539 The first line of the second paragraph should read:

In the next section, we are going to see the usefulness of Faraday's Law of Electromagnetic…

"see" was left out

p. 542 The definition of direct current should say "flows" not "flow".

p. 546 The last seven words of #15 should say "magnet is the same in each case".

Extra Practice Problems for Module #6:

p. 569 The angle for problem 1 should be 45^{o}, not 45.0^{o}.

Extra Practice Problems for Module #9:

p. 573 Question #6 should ask for the velocity, not the speed.

p. 573 Question #8 should ask for the speed, not the velocity.

SOLUTIONS AND TESTS GUIDE

Answers to the Review Questions for Module #11

p. 11 In problem #5, the fourth difference should read "Sound waves travel more quickly in solids than in liquids and more quickly in liquids than in gases, whereas light waves generally travel more slowly the more dense the medium."

Solutions to the Practice Problems for Module #2:

p. 26 The first equation should read:

$$\mathbf{v}^2 = \mathbf{v}_o^2 + 2\mathbf{a} \cdot \Delta\mathbf{x}$$

The "**a**" was left out.

Solutions to the Practice Problems for Module #4:

p. 37 The answer to the second equation on the page should be 2.3×10^3 m. It was incorrectly written as 2.3×10^2 m. This does not affect the final answer, as the proper value was used in subsequent steps.

p. 38 The answer to #4 should be *0.17 sec*. The equation works out to 0.1656, which rounds UP to 0.17.

p. 41 The answer to #8 should be *60 ft*. Since you are adding two terms, you must work out the terms with significant figures in mind, and then add. $63 \cdot 2.5 = 160$ when you take significant figures into account, and $\frac{1}{2} \cdot (-32) \cdot (2.5)^2 = 1.0 \times 10^2$. The precision of each is to the tens place, so when you add them, your answer can only go out to the tens place

Solutions to the Practice Problems for Module #6:

p. 53 The weight that starts the 3rd line of the page should be 210 N, not 220 N. That weight is used in the solution, so the answer is not affected.

p. 55 For question #9, here is a better way of calculating the acceleration. This keeps consistent with our use of significant figures.

$$f + -w \cdot \sin(\theta) = m\mathbf{a}$$

$$95 \text{ Newtons} + -(290 \text{ Newtons}) \cdot \sin(23°) = (30.1 \text{ kg}) \cdot \mathbf{a}$$

$$95 \text{ Newtons} + -110 \text{ Newtons} = (30.1 \text{ kg}) \cdot \mathbf{a}$$

a = -20 Newtons / 30.1 kg = -0.7 m/sec^2

Sample Calculations for Experiment 6.1:

p. 56 The last line of data should read, "Minimum weight while elevator is falling: 171.1 lbs."

In addition, the average reported in the sample calculation should be 47.54, which changes the angle to 27.98^o and μ to 0.5313.

Solutions to the Practice Problems for Module #7:

p. 60 The answer to the first equation in #8 should be 2.65×10^9 *m*, as the data have three significant figures. This changes all of the other equations, making the speed equal to 1.73×10^4 *m/sec.* The final answer, then, is 1.89×10^{27} *kg.*

p. 61 The answer to question #10, should say 2.24 hours instead of 2.2 hours.

Solutions to the Practice Problems for Module #8:

p. 63 The answer to the first problem needs three significant figures. Thus, it should be 1.40×10^2 J.

p. 64 The value inside the square root should be 350 instead of 340 for question 3.

p. 65 The value inside the square root should be 290 instead of 292 for question 4.

Solutions to the Practice Problems for Module #9:

p. 72 The last equation for #6 should have a positive 18 in the numerator. This does not affect the final answer.

Solutions to the Practice Problems for Module #11:

p. 80 The answer to #2 should be *0.2157*. Since there are four significant figures in each number of the equation, there should be four in the answer.

p. 82 The answer to #7 should be *16 m/sec*. In the term where 551 is divided by 578 and multiplied by 346.7, you have only three significant figures. Since the next step is subtraction, you need to round that to 331. That means the result of the subtraction can be reported only to the ones place.

Solutions to the Practice Problems for Module #12:

p. 87 The answer to #7 should be *1.70*. Since there are three significant figures in each number of the equation, there should be three in the answer.

Solutions to the Practice Problems for Module #13:

p. 92 The units for the answer to 5b should be Newtons / C.

Solutions to the Practice Problems for Module #14:

p. 98 The third equation should be:

$$\Delta PE = q\Delta V = (1.5\ \text{C}) \cdot (-8\times10^{9}\ \frac{\text{N}\cdot\text{m}}{\text{C}}) = -1\times10^{10}\ \text{N}\cdot\text{m} = -1\times10^{10}\ \text{J}$$

Solutions to the Extra Practice Problems for Module #2:

p. 110 The solution to problem #5 should be -4 ft/sec^2. The units in the underlined portion of the answer should be changed to ft/sec^2 as well.

p. 111 In problems 8 and 9, the very last sentences should both end, "or 270 ft/sec down." In addition, the acceleration should be -32 ft/sec^2 and the displacement -1,140 ft, since both are directed down.

Solutions to the Extra Practice Problems for Module #6:

p. 128 The second equation in the problem should read:

$$T_{2y} = (10.3\ \text{lbs})\cdot\sin(105°) = 9.95\ \text{lbs}$$

This does affect the weight calculation to make 19.9 lbs. This does not affect the solution. However, the angle must be defined properly, which makes it 105º rather than 75º. This is where the third significant figure comes from.

p. 130 The solution to problem #6 should be:

$$(0.29\ \text{N})\cdot(0.400\ \text{m}) + (0.39\ \text{N})\cdot(0.250\ \text{m}) + (0.20\ \text{N})\cdot(0.050\ \text{m}) - (0.098\ \text{N})\cdot r - (0.49\ \text{N})\cdot(0.400\ \text{m}) = 0$$

$$0.12\ \text{N}\cdot\text{m} + 0.098\ \text{N}\cdot\text{m} + 0.010\ \text{N}\cdot\text{m} - (0.098\ \text{N})\cdot r - 0.20\ \text{N}\cdot\text{m} = 0$$

$$0.03\ \text{N}\cdot\text{m} - (0.098\ \text{N})\cdot r = 0$$

$$r = 0.3\ \text{m}$$

The answer, then, should be 0.3 m. The mistake in the book is that the lever arm for the 40.0 g mass was 0.200 m, while the diagram shows it should be 0.250 m.

p. 131 The solution to problem #8 should be -7.0 m/sec^2.

Solutions to the Extra Practice Problems for Module #7:

p. 136 In the last equation for problem #8, the denominator should not be squared. It does not affect the answer, as it was not squared when the math was done.

p. 137 The answer to the first equation should be 3.639 x 10^{11} m. It should then be plugged into the equation for Δt, but it does not affect the answer.

Solutions to the Extra Practice Problems for Module #9:

p. 145 In problem #7, the numerator for $\mathbf{v}_{both}$ should be 1.15×10^5, which changes the answer to 83.2 m/sec.

Solutions to the Extra Practice Problems for Module #15:

pp. 171-172 In problem #8, the single-digit resistances are listed as 5.0 Ω and 4.0 Ω. As a result, the solution should have the resistances to the tenths place as well. This changes the significant figures:

$$\frac{1}{R_{effective}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5} = \frac{1}{5.0\,\Omega} + \frac{1}{15\,\Omega} + \frac{1}{4.0\,\Omega} + \frac{1}{5.0\,\Omega} + \frac{1}{20\,\Omega} = 0.77\,\frac{1}{\Omega}$$

$$R_{effective} = 1.3\,\Omega$$

Even though 20 has only one significant figure, we are adding, so we look at decimal place. All of the inverses go to the hundredths place, so that is why we can report the sum to 0.77, which allows us to report the effective resistance to two significant figures. This changes the equations at the top of the next page to:

$$V = IR$$

$$I = \frac{V}{R} = \frac{1.5\ V}{1.3\ \Omega} = 1.2\,A$$

$$P = IV = (1.2\,A)\cdot(1.5\,V) = 1.8\ W$$

This makes the answer 1.8 W.

Test for Module #2:

p. 177 and pullout tests page 3 In question 12, the word “travel” should replace the word “skid.” When a car skids, the brakes really aren’t providing the negative acceleration, friction is.

Test for Module #6:

p. 185 and pullout tests page 11 In question 8, the child sitting on the swing is pictured on the SAME page, not the next page, as the question states.

Test for Module #8:

p. 190 and pullout tests page 15 #13 should start, "A 345-gram box slides down"

Test for Module #11:

p. 195 and pullout tests page 21 Question 3 should be reworded as follows:

Given substances A and B above, if A is a solid and B is a liquid, in which does sound travel faster?

Solutions to the Test for Module #1:

p. 207 The equation for question #7 should start out as:

$$\mathbf{v} = \frac{\Delta \mathbf{x}}{\Delta t}$$

Solutions to the Test for Module #8:

p. 238 The final answer for #10 should be 5.3 m/sec.

p. 239 The points for problem #12 should read, "*(2 pts: one for equating kinetic energy and the work done by friction, one for the displacement*)"

p. 240 The numerator of the last equation on the page should be **1.83×10^3**. This does not affect the answer.

p. 239 and 240 All references to a "ball" should be replaced with "box" in problem #13

Solutions to the Test for Module #9:

p. 242 The equation for Δp in the solution to problem 10 should not have squared seconds in the denominator. It should read:

$$\Delta \mathbf{p} = \mathbf{p}_{\text{final}} - \mathbf{p}_{\text{initial}} = -13\,\frac{\text{kg}\cdot\text{m}}{\text{sec}} - 9.5\,\frac{\text{kg}\cdot\text{m}}{\text{sec}} = -23\,\frac{\text{kg}\cdot\text{m}}{\text{sec}}$$

p. 243 In the last equation for problem #12, the units on 3.7 should be m/sec. The "kg" part of the unit should not be there.

p. 244 In the last equation on the page, the denominator should be 0.98, not 9.8. This does not affect the answer, as the correct number was used in the calculation.

Solutions to the Test for Module #11:

p. 248 The answer to question #3 should be reworded as follows:

Sound speed increases from gas to liquid to solid. Thus, sound travels faster in substance A.

Solutions to the Test for Module #15:

p. 263 The answer to problem #14 should be *667 Watts*. The parallel resistors were not calculated with proper significant figures. Using the proper significant figures rules, the left-hand parallel set is 8.13 Ω and the right-hand set is 6.49 Ω. This changes the total resistance to 21.6 Ω, which changes the current to 5.56 A, which changes the final answer to 667 Watts.

Solutions to Quarterly Test #1:

p. 276 Since the two measurements in the equation at the top of the page each have three significant figures, the answer should have three. Thus, the answer to problem #10 should be *-3.02 m/sec^2*.

p. 279 Since the acceleration due to gravity has only two significant figures, the answer to problem #24 should have only two. Thus, the answer should be *2.6x10^3 ft*.

p. 280 Because of the significant figures rules, the answer to problem #25 should be *90 ft*.

Solutions to Quarterly Test #2:

p. 286 Problem #19: Since all measurements in the equation have three significant figures, the answer should have three. Thus, the answer should be *4.27 x 10^8 m*.

p. 287 To keep things consistent with the way significant figures are handled, the answer to #21 should be *4.7 m/sec*. Minor differences like this are not important, however.

p. 288 The second equation on the page is missing the closing square bracket under the square root sign.

p. 288 The grading suggestion should read, "(2 pts: one for equating kinetic energy and the work done by friction, one for the distance)"

Solutions to Quarterly Test #3:

p. 291 In the first equation on the page, there should be no "kg" unit with 5.7. Instead, the "kg" unit with 58.0 should cancel the "kg" unit in the denominator.

p. 292 In the second equation on the page, the number in the denominator should be 0.075. The typo was not used in the calculation, so the answer is not affected.

p. 294 In the equation for #18, the units on 21.3 were left out. They should be "m/sec."

Solutions to Quarterly Test #4:

p. 297 Problem #4: The answer should be -2.0 C.

p. 297 Problem #5: The answer should read, "The greatest acceleration will occur where the force is the greatest. In an electric field, this occurs where the line density is the greatest, directly next to A or B."

p. 297 Problem #6: This should be worth **2** pts: ½ for each force, and one for the answer. This makes the total possible points for the test **37** (p. 302).

p. 301 Problem #19: the third set of parallel resistors should have a resistance of 9.90 Ω, which makes the total resistance 23.4 Ω, which makes the current 5.13 A, which makes the power 6.16 Watts.