Exploring Creation with Physical Science 3rd Edition – Errata File

This file contains the corrections for the 4th (March 2021) Printing of the **Textbook**. The printing for the Textbook, Solutions and Tests Manual, and Student Notebook may not be the same. Corrections for the Solutions and Tests Manual and Student Notebook are in separate files.

Pages 30 and 31 – Figures 1.28 and 1.29 are the wrong graphs. See the end of this file for replacement pages.

Page 252 – Example 7.3A Steps 3&4 – This W stands for weight and therefore, it should be italicized and match the W in step 2.

Page 265 – Addition of the answer to the 2nd part of question 7.10.

7.10 To answer the second part of the question, we need to determine the total force on the block. Since we know the mass and acceleration, we can calculate the total force with Equation 7.2.

Step 1 List the knowns and unknown and check units.

m = 10 kg

a = 1.5 m/s^2 east

F = ? in N

Step 2 Write the equation (7.2).

$F = m \times a$

Steps 3 & 4 Add knowns from step 1 to equation. Double check units and solve.

F = (10 kg) × (1.5 m/s^2) = 15 N

Now remember, this is the total force to which the block is subjected. It is the result of *two* forces: the force applied by the child (*Fa*) and the frictional force (*Ff*). Since friction opposes motion, the total force is the difference between the two. Also, since the block is moving, the frictional force will be the kinetic frictional force which is given in the problem.

Step 1 List the knowns and unknown and check units.

F = 15 N

F_{kf} = 20 N

F_a = ?

Step 2 Write the equation and rearrange for the unknown.

$F = F_a - F_{kf}$ so $F_a = F + F_{kf}$

Steps 3 & 4 Add knowns from step 1 to equation. Double check units and solve.

F_a = 15 N + 20 N = 35 N

So, the child is applying a force with a strength of 35 Newtons. Its direction is east since that's the direction the child wants the block to move. Thus, the actual force used is 35 N east.

Page 292 – In the first sentence on the page...The SI unit of power is the watt (W). The capital W inside the parentheses should be the same font as the W in Example 8.4 A. Step 1: P = ? in W. This W is a symbol, with no flourishes on the W.

Page 306 – 3 edits:

1. 8.10 Step 1: P = ? in W. This W is the symbol for watt and should also be the same as above on page 292.

2. 8.10 Step 2: P = *W*/t. This W represents work so it should be italicized.

3. 8.10 Step 3&4: 18.75 W – this W is the symbol for watt and should be the same as above on page 292.

Page 379 – OYO 10.8 – the A. and B. should be reversed so B. is on the top.

Page 499 – In the third section of Infographic 14.2, change the ‘Rings’ title in the brown box, from Cyclobutane C_4H_{10} to Cyclobutane $\mathbf{C_4H_8}$.

Page 516 – At the end of Study Guide question #9, it should read: “…such as the one shown in Figure 14.7.”

Circle Graphs

Circle graphs (also called pie charts) are useful for showing how a part of something relates to the whole. In other words, they are good graphs to use when your data can be expressed as percentages of the total. For example, if you are trying to determine the composition of an unknown mixture of gases, you might show your results using a pie chart, such as the one shown in Figure 1.27.

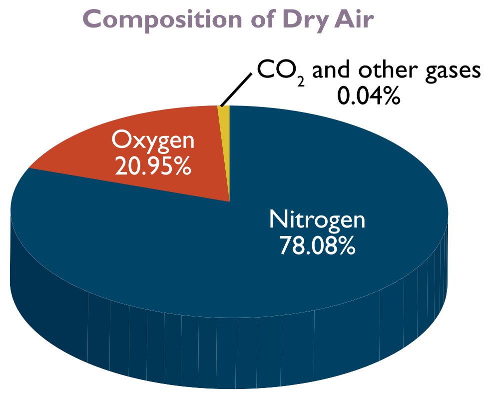

FIGURE 1.27
Pie Chart of the Composition of Dry Air
Circle graphs show how different parts of something relate to the whole.

In Figure 1.27, notice that the gases that make up the air we breathe are shown as a percentage. You can easily see that dry air is made up of more nitrogen than anything else. Isn't it interesting to realize that when you take a breath, only 20.95% of what you're breathing is oxygen! It was this percentage of air that Joseph Priestley identified as combustible in his candle burning experiments.

Line Graphs

If you conduct an experiment in which you hypothesize that when you change the independent variable the dependent variable will also change, then a line graph (also called a scatter plot graph) is the best graph to show your data. Line graphs are the most commonly used graphs in science experiments because they can show even the smallest patterns or trends.

It is important to create the line graph correctly, though, so that the data can be properly analyzed. You should only use line graphs if your independent variable is quantitative data (data with numbers) just like the data shown in Figure 1.28. So how do you make good line graphs? Let's make one using the data shown in Table 1.4.

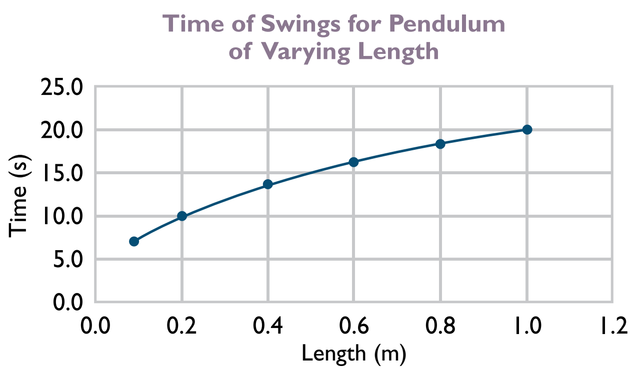

FIGURE 1.28
Line Graph of Swing Time for Pendulum of Varying Length
Line graphs can show even the smallest patterns or trends, so they are most common in science.

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Graphing Activity

The key to correctly creating line graphs is to always graph the independent variable—the variable the experimenter controls—on the x-axis, and the dependent variable—the variable that responds when the independent variable is changed—on the y-axis. Remember that line graphs have an x-axis (horizontal axis) and a y-axis (vertical axis) and the points on the graph are the data points. With the data in Table 1.4 Figure 1.25, then, we would make our x-axis be the length of the pendulum because that was the variable the investigator manipulated. The y-axis would then be the average time for 10 full swings because that is the responding variable. Remember to choose a scale that will show all the data without being too large or too small. And finally plot the individual points of data. You should have a graph that looks like the one below.

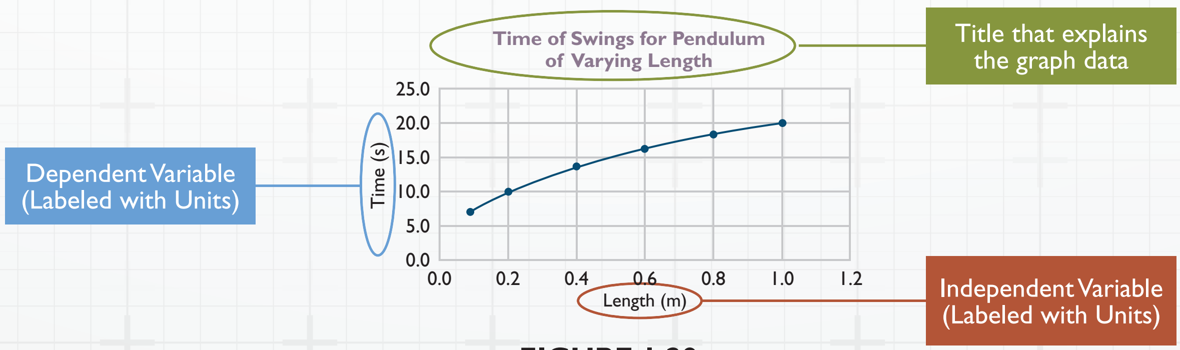

FIGURE 1.29
Important Parts of Line Graphs
Line graphs should have a title, labeled axes (with units), and scales that show all the data using as much of the space as possible.

Notice that the data makes an almost straight line that rises to the right. This tells us that as the length of the pendulum increases, the time to complete 10 full swings also increases. This is called a direct relationship and relationships between variables in experiments are what scientists look for. When you take a physics course, you will be able to do more with this data and see even more detailed relationships than the one shown here. For now, look at Figure 1.29 to remind yourself of what to include in line graphs when you make them for this course. Then try the pendulum experiment yourself by completing Experiment 1.2. You should include making data tables and graphs to analyze your data. You will find more help for this in your student notebook.