Skill and Practice Sheet Answers

5A Preparing a Bibliography

Giving proper credit to sources is an important aspect of scientific work. This skill sheet can be used whenever students participate in library or Internet research.

5B Internet Research Skills

Part 1 Answers:

1. Example answer: "science museums" + "South Carolina" not "Columbia"
2. "dog breeds" + "inexpensive"
3. "producing electricity" not "coal" not "natural gas"

Part 2 Answers:

1. Answers will vary. Sites that may be authoritative include non-profit sites (recognizable by having "org" as the extension in the web address) or government sites such as www.nasa.gov (recognizable by the "gov" extension address) or college/university websites (recognizable by the "edu" extension address). These sites often provide information to large, diverse groups and are not typically supported by advertising. Sites that are supported by advertising can be authoritative, but may be biased in the information presented. Another characteristic of authoritative sites are that they are actively updated on a regular basis.
2. Answers will vary. Reasons a source may not seem to be authoritative include: the author of the site is not affiliated with an organization and does not have obvious credentials, and the information seems to be one-sided. Many science topic searches will lead to student papers published on the Internet. These may contain mistakes, or they may have been written by a younger student.
3. Answers will vary. Intended audiences can be young children, pre-teens, teenagers, adults, or select groups of people (women, men, people who like dogs, etc.).
4. Answers will vary.

5C Pythagorean Theorem

1. $c = 13$
2. $a = 8$
3. $b = 24$
4. $a = 4$
5. $c = 16$
6. $c = 25$

5D Pythagorean Triples

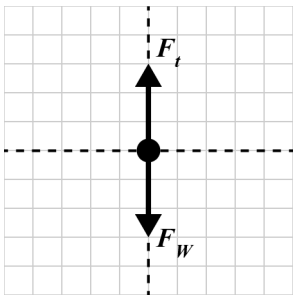
1. $5^2 + 12^2 = 13^2 = 169$; yes, this is a Pythagorean triple
2. $8^2 + 15^2 = 17^2 = 289$; yes, this is a Pythagorean triple
3. $1^2 + 2^2 \neq 3^2$; no, this is not a Pythagorean triple
4. $12^2 + 35^2 = 37^2 = 1369$; yes, this is a Pythagorean triple
5. $4^2 + 16^2 = (4\sqrt{17})^2$; yes (these segments form a right triangle), this is not a Pythagorean triple because the three segment lengths are not all whole numbers
6. $7^2 + 24^2 = 25^2 = 625$; yes, this is a Pythagorean triple
7. Answers are:
   a. The triple (18, 24, 30) was formed by multiplying the triple (3, 4, 5) by the whole number 6.
   b. example answers: (10, 24, 26) and (15, 36, 39)
   c. example answers: (16, 30, 34) and (24, 45, 51)

5E Free-Body Diagrams

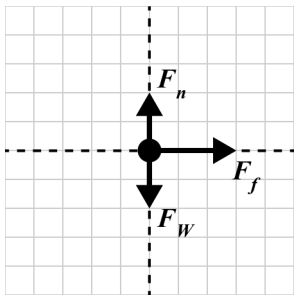
1. b
2. c
3. b
4. a

5. b

6.



7.



5F Friction

1. Answers are:
   a. rolling friction
   b. Sliding friction is generally greater than rolling friction, so it would probably take more force to transport the blocks in the sled.
   c. The friction force would increase, because more blocks would mean more weight force squeezing the two surfaces together.
   d. static friction
2. Answers are:
   a. viscous friction
   b. The friction force would increase because the boat would sit lower in the water.
3. Answers are:
   a. rolling friction and air friction
   b. rolling friction
4. Answers are:
   a. Student responses will vary. Encourage students to look for a sports car rather than a professional racing car. Racing car spoilers may serve a different purpose.
   b. Sports car spoilers are generally designed to increase down force on the rear of the car, causing greater friction between the rear tires and the road.
   c. Spoilers on hybrid cars and sport utility vehicles are usually designed to create a smoother, less turbulent airflow over the rear of the vehicle. This reduces drag (air friction). Sports car spoilers are most often designed to increase rolling friction, not to decrease air friction. Spoilers on different types of cars serve different purposes.

5G Torque

1. 117.6 N-m clockwise
2. Answers are:
   a. $m_2 = 2$ kilograms
   b. $\frac{m_1}{m_2} = 3$
   c. It should be placed to the right. The torque due to m_1 is greater than the torque due to m_2.
   d. $m_3 = 8$ centimeters
3. Answers are:
   a. 20 N force: 3.0 N-m clockwise or – 3.0 N-m
   15 N force: 3.75 N-m counterclockwise or + 3.75 N-m
   5 N force: 1.75 N-m clockwise or – 1.75 N-m
   b. 1.0 N-m clockwise or –1.0 N-m
   c. A 3.33 N upward force creates a counterclockwise torque of 1.0 N-m to balance the other torques.
4. Clockwise torque: [(15N)(0.30m)] + [(60N)(0.70m)] = -46.5 N-m
   Counterclockwise torque: [(200N)(0.10m)] + [(100N)(0.04m)] = 24 N-m

   Net torque: -46.5 Nm + 24 Nm = -22.5 N-m
   The lever is not in rotational equilibrium, because there is a net torque acting in the counterclockwise direction. A lever can be in rotational equilibrium, if it is rotating at a constant angular "speed," not increasing or decreasing.