Answer Key

Inert Inertia

1. The washer continues to move in a forward motion.
2. Both the toy car and the washer were put into motion because of the ramp (force of gravity). According to Newton's First Law, objects that are in motion stay in motion. However, the car was acted upon by another force, the book wall, and therefore stopped. The washer was also in motion and continued its motion because it was not attached to the car.

3-4. The higher the ramp, the faster the car would move and the farther the washer would travel after the car struck the wall.

5. Answers may vary.
6. Jacob's scooter stops when it hits the curb, but he continues to move and flies through the air.
7. Answer will vary.

Forcing the Force

1. The students should have discovered that the inclined plane required less force to lift the weight. The pulley only used one string and that is the same as lifting the weight without a pulley. If additional pulleys and strings are used then the force would reduce.
2. Answers will vary.
3. Answers will vary. Students will probably say the inclined plane because this experiment concluded that the inclined plane took less force to lift the weight.
4. Answers will vary but should include that simple machines make "work" easier.
5. Answers will vary.

Newton Has the Joules

1. Force is a push or a pull applied to an object.
2. Work is done when you apply a force to an object over a distance.
3. 1,396 joules. To find Jacob's mass, divide 90 pounds by 2.21 to get 40.7 kilograms. Multiply 40.7 kilograms by 9.8 newtons to get 398.9 newtons. Multiply 398.9 newtons by 3.5 meters to get 1,396 newton-meters. Convert newton-meters to joules.
4. The tree house detectives must also consider friction and the weight of the rope and any other materials used to lift Jacob up into the tree house.

Stop in the Name of Energy!

1. The checker received its potential energy from the person placing it at the top of each strip.
2. Answers will vary.
3. The amount of friction was stronger on some strips.
4. We strive to overcome friction so machines can become more efficient.
5. Answers will vary, but should include answers such as oil for engines, bike gears, driving on wet roads, and so on.