

# Motion and Simple Machines

## Answer Key: Grades 7–8 Lesson Extensions

**Notes:**

- This answer key should be used as a guide for basic responses to the questions and instructions found in the grades 7–8 lesson extensions. The child should be encouraged to make his or her science journal tidy, beautiful, and exceptionally well done.
- Encourage the child to answer the questions in his or her own words, with definitions being a possible exception.
- There are two types of answers provided in this answer key:

**Sample answers:** Most questions are open-ended, so the child’s answers will neither match the provided text exactly nor include everything provided in the sample answer. However, some answers should match more closely (for example, vocabulary word definitions, copied charts, etc.).

**Answers will vary:** This is used when there will be great variation in the answers, which may be due in part to one lesson’s providing more information than another lesson. Refer to the text in the lesson to check these answers.

### Lesson 1

2. Pick one type of contact force and one type of non-contact force and define them in your journal. Describe why each belongs in that category and provide an example.

**Sample answers:**

One type of contact force is applied force. This force occurs when a person or another object exerts force upon something else. Applied force is a contact force because it involves physical contact between two objects. Example: pushing a box across the floor.

One type of non-contact force is gravitational force. This force attracts two objects toward one another. Gravitational force is considered a non-contact force because the two objects are not in physical contact with each other. Example: a ball falling to the ground.

3. Look at the images on the next page and write which types of force are represented in the pictures.

**Sample answers:**



spring



air resistance



applied



tension



electrical



magnetic



gravitational



frictional

### Lesson 2

2. Write the four types of friction in your science journal. Illustrate or describe each type of friction.

**Sample answers:**

Static Friction—happens when one object rests on another

Sliding Friction—happens when objects slide over each other

Rolling Friction—happens when an object rolls over a surface

Fluid Friction—happens when solid objects move through liquid or gas

### Lesson 3

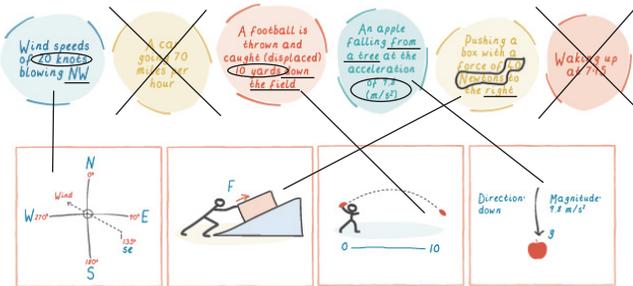
2. Define and describe the difference between scalar and vector quantities in your science journal.

**Sample answer:**

Scalar quantities consist of measurements that include only a numerical size. Vector quantities are used to measure direction as well as magnitude.

3. Look at the images of different vector and scalar quantities and match each one to the correct description. (Look at the various examples of vector and scalar quantities in the circles below. Cross out the scalar quantities. In the circles that describe vector quantities, circle the magnitude and underline the direction in each example. Remember, a vector has to have both! Then match the vector quantities to the box that best represents each description.)

Sample answers:



**Lesson 4**

2. Look around your home to see if you can find something that has a mass close to 100 grams so that you can see what 1 newton feels like. (No written answer required).
3. Write the equation for 1 newton in your science journal.

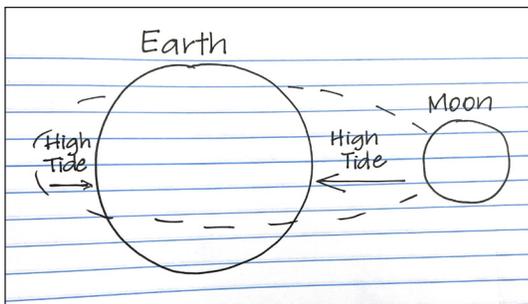
Sample answer:

$$1N = 1 \text{ kg} \times 1 \text{ m/s}^2$$

**Lesson 5**

2. Draw a diagram of the position of Earth and the moon related to high tide.

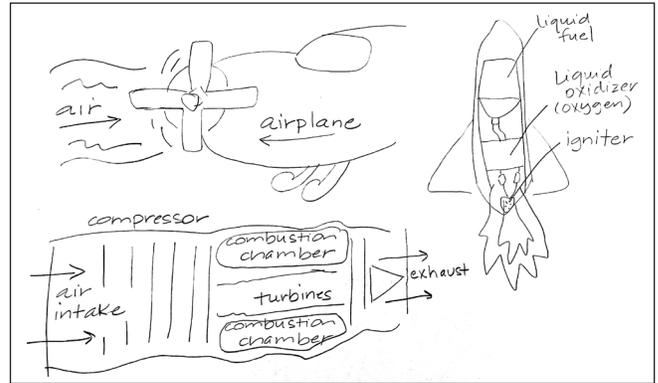
Sample answer:



**Lesson 6**

2. In your science journal, draw a diagram of how each of the following works: an airplane, a rocket, and a jet. Be sure to include Newton's Third Law of Motion.

Sample answer (see next column):



**Lesson 7**

2. Complete the experiment listed on the next page. Then record your observations in the space provided.

Answers will vary.

**Lesson 8**

2. Look around or think about complex machinery that you use often (like a lawn mower, can opener, car, etc.). Identify simple machines within and write them in your science journal.

Sample answer:

A stapler and a trampoline use springs. A garage door uses a pulley.

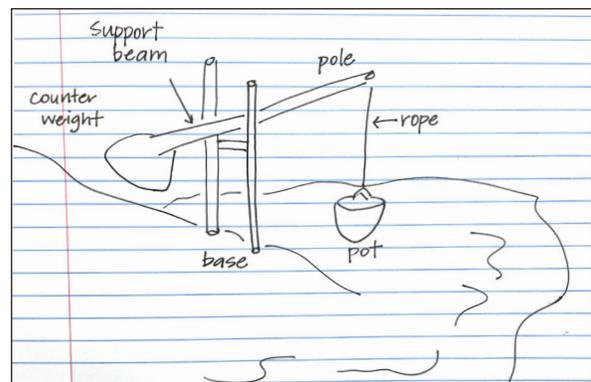
3. OPTIONAL: Choose another machine and research with a parent the history of how that machine developed over time to what we know it as today.

Answers will vary.

**Lesson 9**

2. Draw a diagram of a shaduf, then label the parts of this first class lever in your science journal.

Sample answer:



## Lesson 10

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2. In your science journal, describe how a canal is a type of inclined plane and describe the lock system of the Panama Canal.

### Sample answer:

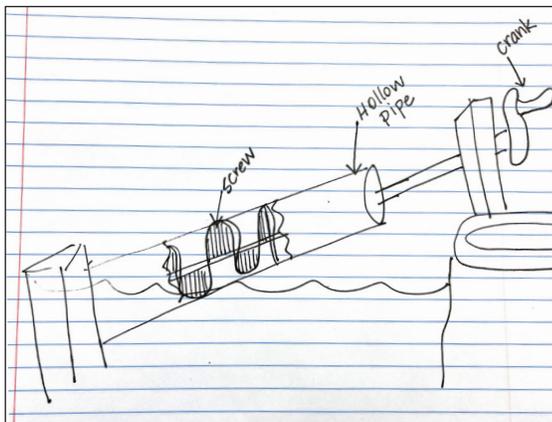
As we learned in our lesson today, all ramps are inclined planes. Canals can have an incline like a ramp if the water is not level throughout the entire canal. This happens in the Panama Canal. In order to help ships travel through the canal and move up the inclined plane, a series of locks, or compartments, are used. As ships move through the canal, they stop several times in these locks. As the water in each lock rises, so does the ship. When the ship reaches the right level, it can move into the next lock. This helps the ship travel up the inclined plane and out the other end of the canal.

## Lesson 11

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2. Draw and label the three main components of an Archimedes screw in your science journal.

### Sample answer:



3. With permission from your parent or teacher, research a current use of the Archimedes screw. Write a 5–8-sentence paragraph in your science journal describing how it is used.

Answers will vary.