Assessment Questions

Module 1.0: The STEM Bike

1) True or False: Determining Criteria and Constraints is unimportant to engineers.

2) Bikes are an example of _____ that has changed as the _____ was better adapted to the criteria and constraints of the game.
    a. Technology, Engineering
    b. Technology, Science
    c. Technology, Math
    d. Technology, Technology

Module 2.0: Ideal Pressure for Balance

1) True or False: Temperature cannot change the physical properties of matter.

2) How does the molecular motion of an object change?
    a) When a bike tire is heated the molecules slow down, when it is cooled they speed up.
    b) When a bike tire is heated the molecules speed up, when it is cooled they slow down.
    c) When a bike tire is heated the molecules speed up, when it is cooled they speed up.
    d) When a bike tire is heated the molecules slow down, when it is cooled they slow down.

3) Predict which of the following situations would improve the performance of a bike tire to proper inflation.
    a) The tire is overfilled but at night the air cools down.
    b) The tire is underfilled but at night the air cools down.
    c) The tire is filled correctly and the temperature during the day warms up.
    d) The tire is overfilled and the temperature during the day warms up.

Module 3.0: What's your Angle

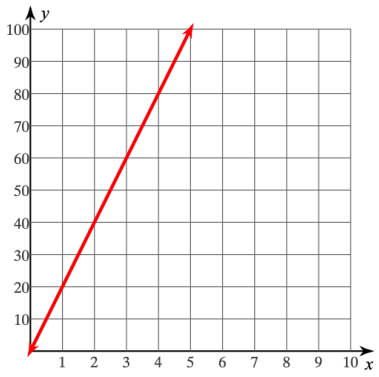
1) Which of the following side length measurements could <u>not</u> result in a triangle?
    a) 3 in, 4 in, 5 in
    b) 2 cm, 5 cm, 6 cm
    c) 7 mm, 10 mm, 15 mm
    d) 6 ft, 7 ft, 9 ft

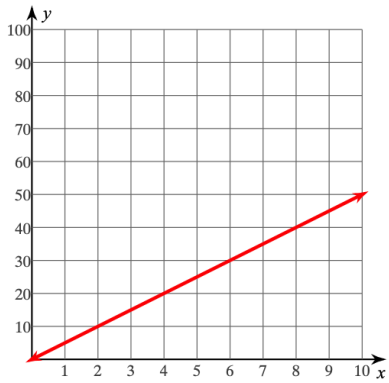
2) Which of the following angle measurements could result in a triangle?
    a) 30 degrees, 40 degrees, 50 degrees
    b) 40 degrees, 80 degrees, 180 degrees
    c) 20 degrees, 60 degrees, 100 degrees
    d) 50 degrees, 50 degrees, 50 degrees

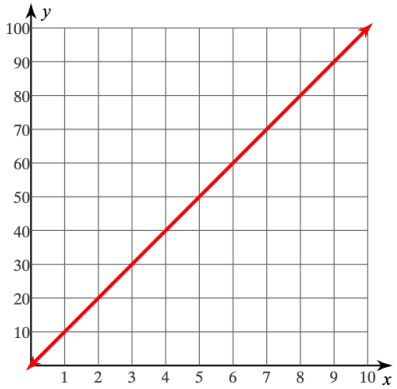
Module 4.0: Calories and Heart Rate

1) Using the equation C = (MET * weight)*Time, if someone doubles the amount of time they ride a bike, what happens to the number of calories burned?
    a) The number of calories stays the same
    b) The number of calories decreases by half
    c) The number of calories increases by half
    d) The number of calories quadruples

2) Which of the following graphs would represent the equation C = 10t (or y = 10x)?

a) 

b) 

c) 

Module 5.0: Changing Gears

1) Newton's Second Law of motion states that F = MA. If the force is increased, what happens to the acceleration?
    a) It decreases
    b) It increases
    c) It remains constant

2) Newton's Second Law of motion states that F = MA. Which of the following information is <u>not</u> needed to calculate the force of an object?
    a) Temperature
    b) Time
    c) Mass
    d) Distance

Module 6.0: Helmet Technology

1) Label each of the following as either a criteria or constraint for safety equipment:
    a) Protects the head from injury.

    b) Complies to race guidelines.

    c) Doesn't limit visual performance.

d) Protects the eyes from debris when racing on dirt.

e) It is comfortable.

2) Why are bike helmets important for both safety and performance?

Module 7.0: Energy of the Ride

1) Which statement is true about kinetic energy and velocity?
    a) As velocity increases, so does kinetic energy
    b) As kinetic energy increases, so does velocity.
    c) As kinetic energy increases, velocity decreases.
    d) As kinetic energy decreases, velocity increases.

2) True or False: The motion of an object is due to its energy.

Module 8.0: Advancements in Bike Technology

1) Which of the following is the best way to collect information when analyzing technology?
    a) Take measurements and test the equipment
    b) Record the color and style
    c) Note how the cost has changed over time
    d) Look it up online

2) What data is most effective to evaluate and improve the safety and performance of the bike?
    a. Quantitative
    b. Advancement
    c. Technology
    d. Discrete