5th Grade Models & Designs

Read and answer each question carefully.

1) A student used a small stick to tap the corners of a black box. The lower left corner sounded different from the other three corners. Which of the following could be a model of the black box?

A) Model C
B) Model B
C) Model D
D) Model A
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2) According to this graph, how much farther can a go-cart travel if its wheel size is doubled?

![Graph showing distance traveled vs wheel diameter]

- A) 8 times farther
- B) the same distance
- C) 4 times farther
- D) 2 times farther

3) Which is the **main idea** behind working with black boxes and humdingers?

- A) Sometimes science does not help us understand the world around us.
- B) Sometimes things in science make noise.
- C) Sometimes science tries to explain things that cannot be seen.
- D) Sometimes working alone is better than working in a group.
4) When you increase the size of the wheels on a self-propelled go-cart, it will
   A) travel slower.
   B) travel straighter.
   C) travel the same.
   D) travel farther.

5) In the self-propelled go-cart activity, the energy to move the cart 2 meters comes from
   A) the axle.
   B) the wheels.
   C) rubber bands.
   D) traction.

6) What force caused your go-cart to completely stop after rolling down the ramp?
   A) gravity
   B) friction
   C) brakes
   D) traction

7) A team modified the design of their go-cart. After changing the design the cart would turn to the right instead of traveling in a straight line. What variable was most likely changed?
   A) the size of the wheels on one side
   B) the number of rubber bands
   C) the length of the axles
   D) the length of the body
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8) When you released a go-cart at the top of a ramp, what force caused the go-cart to roll?

   A) traction  
   B) friction  
   C) gravity  
   D) wheels

9) You have designed a model, and it does not work as you expected it would. What step in the design process should you use next?

   A) keep testing it until it works 
   B) evaluate your design  
   C) start all over  
   D) ask the teacher for help

10) The ramp used in the go-cart activity is an example of

   A) a fulcrum.  
   B) an inclined plane.  
   C) a lever.  
   D) a wheel and axle.

11) Engineers think, imagine, try things out and use materials. This is the ______ process.

   A) drawing  
   B) cooperative  
   C) observation  
   D) design
12) Friction between the axle and the bearing causes the go-cart to

A) go up and down.
B) go faster.
C) go around corners.
D) go slower.

13) Your go-cart wheels just spin around when you test it. You need more

A) traction.
B) gravity.
C) power.
D) wheels.

14) When you change **variables** in a design, you should

A) change only one thing at a time.
B) change how you test your design.
C) guess at what to change next.
D) make several changes at once.

15) A situation in which scientists work together is called

A) a consensus.
B) an investigation.
C) a design.
D) a collaboration.
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16) A simple machine made of a bar and a fulcrum is called

A) a wheel and axle.
B) a lever.
C) an inclined plane.
D) a pulley.

17) A representation that explains how something is built or how it works is called

A) a picture.
B) a drawing.
C) a model.
D) an answer.

18) Which model is not a system?

A) go-cart
B) wheel
C) hum dinger
D) black box

19) Ptolemy developed a model of the universe with the earth at the center. Copernicus later developed a new model of the universe with the sun at the center. What prediction could be made about future models of the universe?

A) Scientists will all agree on one model of the universe.
B) Models of the universe will show little change in the future.
C) New scientific discoveries may change our model of the universe.
20) What causes your bicycle to change the direction it is traveling?
   
   A) You are applying a force to the handlebars.
   B) You are applying a greater force to the pedals.
   C) You are applying a force to the brakes.
   D) You are applying less force to the wheels.

21) What will happen when you apply force to the brakes of your bicycle?

   A) Gravity will increase the speed of the bicycle.
   B) Friction will slow down the bicycle.
   C) There will be no change in the motion of the bicycle.
   D) You will change the direction of the bicycle.

22) What will happen when you use more force to pedal your bicycle?

   A) The bicycle is stopped by friction.
   B) The speed of the bicycle increases.
   C) The direction of the bicycle changes.
   D) The speed of the bicycle decreases.
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23) What can you do to get your car to go to the top of ramp 2?

A) turn ramp 2 around
B) move ramps farther apart
C) put rubber bands on your car for power
D) put more wheels on your car
24) Sam wanted to test what effect adding more rubber bands would have on his self-propelled car. Below is a graph of his test results. Based on his graph, what statement could Sam make?

A) If you add more rubber bands, your distance will always increase.
B) If you add too many rubber bands, your distance will decrease.
C) Adding more rubber bands will have no effect on distance.
D) If you add more rubber bands, your distance will always decrease.

25) A model that is an idea, not something real, is called a _________ model.

A) physical
B) workable
C) valuable
D) conceptual