Name _____ Date _____ Period _____

Newton's Laws of Motion Webquest

Use www.thesciencequeen.net to answer this web quest. Click on students > physics > Laws of Motion to get the links.

Site 1: Newton Biography - http://www.bbc.co.uk/timelines/zwwgcdm

1. Describe Newton's relationship with his family.
   _____
2. Where did Newton go to school? _____
3. _____, Cambridge's first professor of mathematics, steered Newton away from the standard undergraduate texts and towards the big unsolved _____ of the day, such as _____ - a way of describing how things change
4. Why was Newton forced to go home? _____
5. What did Newton do to his eye? _____
   Why? _____
6. By using _____ instead of _____, Newton was able to create a more powerful instrument, 10 times _____than traditional telescopes.
7. Why was the Royal Society unable to reproduce Newton's results on light?
   _____
8. Why was Robert Hooke a lifelong enemy of Newton? _____
9. Describe Newton's temperament/personality. _____
10. Why did Newton consider Gottfried Leibniz his greatest rival in mathematics?
    _____
11. Why didn't people recognize Newton as creating calculus first?
    _____
12. The *Philosophiae Naturalis Principia Mathematica* took Newton _____ years to write. What ideas were contained in it?
    _____
13. When Newton was elected head of the Royal Scoiety, what did he do with Hooke's work?
    _____

14. Describe Newton as a leader. _____

15. Who wrote the Royal Society's committee report on who created calculus? (Can you say biased?) _____

Site 2: Newton's Laws of Motion (Make sure to use headphones or to turn off the sound!)
http://www.sciencechannel.com/newtons-laws-of-motion-interactive/

Click on Newton's 1st Law

16. What is uniform motion? _____

17. What force enabled the worm to stop? _____
18. What is Newton's 1st Law of Motion?
    _____

Click on Newton's 2nd Law

19. Newton's 2nd law describes what? _____

20. Newton's 2nd law can often be expressed as what formula? _____

Click on Newton's 3rd Law

21. What is Newton's 3rd Law? _____

Site 3: Amusement Park Physics

22. Which horses on a carousel are moving the fastest: the ones on the inside or the ones on the outside? Explain your choice.

23. Which Law of Motion explains what happens during a ride on the bumper cars? Give an example.

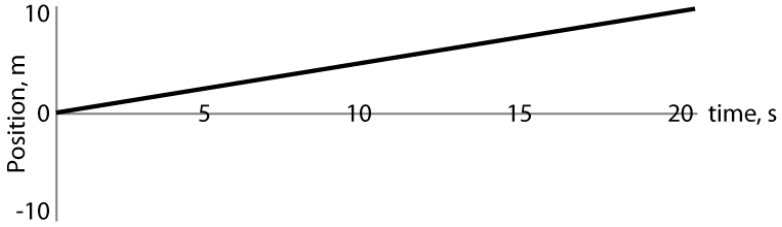
24. Where do riders have a feeling of "weightlessness" on a pendulum-type ride? At what point on the pendulum-type rides do riders feel the highest g-forces?

25. Explain the "weightless water" trick. Hint: Go to the Free Fall section.

26. Out of the 270 million people who visit amusement parks annually, how many require a trip to the emergency room

Site 4: Moving Man - https://phet.colorado.edu/en/simulation/moving-man

Adjust the variables for starting position, velocity and acceleration to match each graph. You might want to hide the acceleration window until you need it.



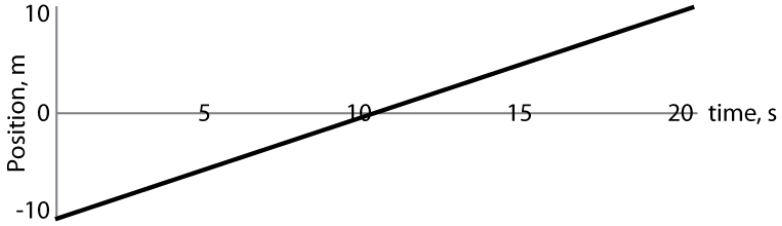
Graph 1

Position =_____m

Velocity =_____m/s

Acceleration =_____m/s^2

Teacher stamp



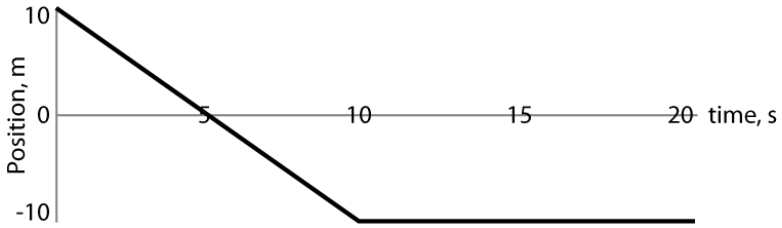
Graph 2

Position =_____m

Velocity =_____m/s

Acceleration =_____m/s^2

Teacher stamp



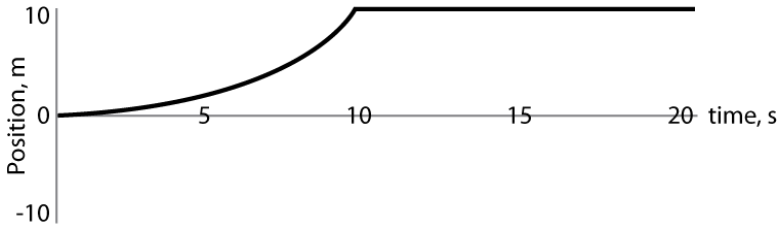
Graph 3

Position =_____m

Velocity =_____m/s

Acceleration =_____m/s^2

Teacher stamp



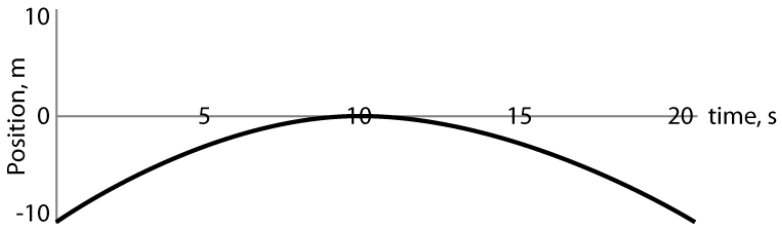
Graph 4

Position =_____m

Velocity =_____m/s

Acceleration =_____m/s^2

Teacher stamp



Graph 5

Position =_____m

Velocity =_____m/s

Acceleration =_____m/s^2

Teacher stamp

Site 5: Force & Motion https://phet.colorado.edu/en/simulation/forces-and-motion

(TUG OF WAR)

Make sure all of the boxes in the upper right hand corner are checked.

27. Create a scenario on the rope pull which in which the forces are **BALANCED**. Draw a picture of the **VECTOR ARROWS** and the **NET FORCE** (SUM OF FORCES) **ARROW** in the space below. What is the **NET FORCE** on the cart?___

28. Create a scenario on the rope pull in which the forces are **UNBALANCED**. Draw a picture of the **VECTOR ARROWS** and the **NET FORCE** (SUM OF FORCES) **ARROW** in the space below. What is the **NET FORCE** on the cart?___

*Click on the Motion Tab. Play around with the simulation so that you know how to use it. Make sure that all of the boxes in the upper right hand corner are checked (Force, Value, Masses, Speed) *There is no **FRICTION** in this scenario.*

29. Place the refrigerator on the skateboard. **APPLY** a force of approximately 100 N. Once the skateboard is moving let go. Answer the following questions.

    a) What happens to the **SPEED** of the Skateboard/Refrigerator when there is no longer a force being applied?

    b) Are the forces acting on the Skateboard/Refrigerator **BALANCED** or **UNBALANCED**?

    c) What are the **FORCES** acting on the Skateboard/Refrigerator?

    d) Will the Skateboard/Refrigerator ever stop moving? Why or why not? **EXPLAIN**!

30. Reset the simulation and click all of the boxes again. Place the refrigerator on the skateboard and **APPLY** a force of approximately 100 N. This time, **DO NOT** stop applying the FORCE to the refrigerator/skateboard. Answer the following questions.

    a) What happens to the **SPEED** of the Skateboard/Refrigerator when the **FORCE** is continuously applied?

    b) Are the forces acting on the Skateboard/Refrigerator **BALANCED** or **UNBALANCED**?

c) Will the Skateboard/Refrigerator ever stop changing? Why or why not? **EXPLAIN**!

Click on the Motion Tab. Play around with the simulation so that you know how to use it. Make sure that all of the boxes in the upper right hand corner are checked (Forces, Sum of Forces, Values, Masses, Speed) Play around with the simulation so you know how it works.

31. How does the presence of **FRICTION** affect the movement of the objects in the simulation?

32. **BEFORE** the object starts moving, what do you notice about the **FRICTION FORCE** and the **APPLIED FORCE? (Are the FORCES BALANCED or UNBALANCED?)**

33. **AFTER** the object starts moving, what do you notice about the **FRICTION FORCE** and the **APPLIED FORCE? (Are the FORCES BALANCED or UNBALANCED?)**

34. Place 1 50 kg box on the ground. How much **FORCE** is required to put the box in **MOTION**?

35. Place the 2nd 50 kg box on top of the 1st. **PREDICT** how much **FORCE** will be required to put the box in **MOTION.**_____

    Try it.

36. What was the **ACTUAL FORCE REQUIRED**?_____

37. How are these 2 **FORCES related?**_____

38. Can you use this to **PREDICT** how much force is required to move the **REFRIGERATOR**? **PREDICTION**_____**ACTUAL**_____