DEVIL PHYSICS
BADDEST CLASS ON CAMPUS

TSOKOS READING ACTIVITY
Section 2-2A (5 Points)

1. Essential Idea:

   a. Classical physics requires a force to change a state of motion, as suggested by Newton in his laws of motion.

2. Nature Of Science:

   a. Using mathematics: Isaac Newton provided the basis for much of our understanding of forces and motion by formalizing the previous work of scientists through the application of mathematics by inventing calculus to assist with this.

   b. Intuition: The tale of the falling apple describes simply one of the many flashes of intuition that went into the publication of Philosophiæ Naturalis Principia Mathematica in 1687.

3. Theory Of Knowledge:

   a. Classical physics believed that the whole of the future of the universe could be predicted from knowledge of the present state.

   b. To what extent can knowledge of the present give us knowledge of the future?

4. Understandings:

   a. Objects as point particles

   b. Free-body diagrams

   c. Translational equilibrium

   d. Newton's laws of motion

   e. Solid friction

5. Applications And Skills:

   a. Representing forces as vectors

   b. Sketching and interpreting free-body diagrams

   c. Describing the consequences of Newton's first law for translational equilibrium

   d. Using Newton's second law quantitatively and qualitatively

   e. Identifying force pairs in the context of Newton's third law

   f. Solving problems involving forces and determining resultant force

   g. Describing solid friction (static and dynamic) by coefficients of friction

6. Guidance:

   a. Students should label forces using commonly accepted names or symbols (for example: weight or force of gravity or mg)

b. Free-body diagrams should show scaled vector lengths acting from the point of application

c. Examples and questions will be limited to constant mass

d. mg should be identified as weight

e. Calculations relating to the determination of resultant forces will be restricted to one- and two-dimensional situations

7. Data Booklet Reference:

a. $F = ma$

b. $F_f \leq \mu_s R$

c. $F_f = \mu_d R$

8. Utilization:

a. Motion of charged particles in fields (see Physics sub-topics 5.4, 6.1, 11.1, 12.2)

b. Application of friction in circular motion (see Physics sub-topic 6.1)

c. Construction (considering ancient and modern approaches to safety, longevity and consideration of local weather and geological influences)

d. Biomechanics (see Sports, exercise and health science SL sub-topic 4.3)

9. Aims:

a. Aim 6: experiments could include (but are not limited to): verification of Newton's second law; investigating forces in equilibrium; determination of the effects of friction

10. Read pg. 57-67 in your textbook.

11. Write a definition for each of the terms listed below.

a. Force -

b. Weight -

c. Tension -

d. Hooke's Law -

e. Force of Reaction or Contact Force -

f. Drag Forces - _____

_____

g. Upthrust - _____

_____

h. Dynamic or Kinetic Friction - _____

_____

i. Static Friction - _____

_____

j. Asperities (I didn't know this one) - _____

_____

k. Force of Dynamic Friction - _____

_____

l. Maximum Force of Static Friction - _____

_____

m. Free-body Diagram - _____

_____

n. Point Particle - _____

_____

o. Newton's First Law of Motion - _____

_____

p. Newton's Third Law of Motion - _____

_____

q. Equilibrium - _____

_____

12. Answer the following questions:

a. What is the difference between mass and weight? _____

_____

b. What is "gravitational field strength" and what are its units? _____

_____

c. Define a situation where forces, including dynamic frictional forces, are acting on a body. Then, in

the sketchpad below, use MS Shapes to draw a free-body diagram for your situation.

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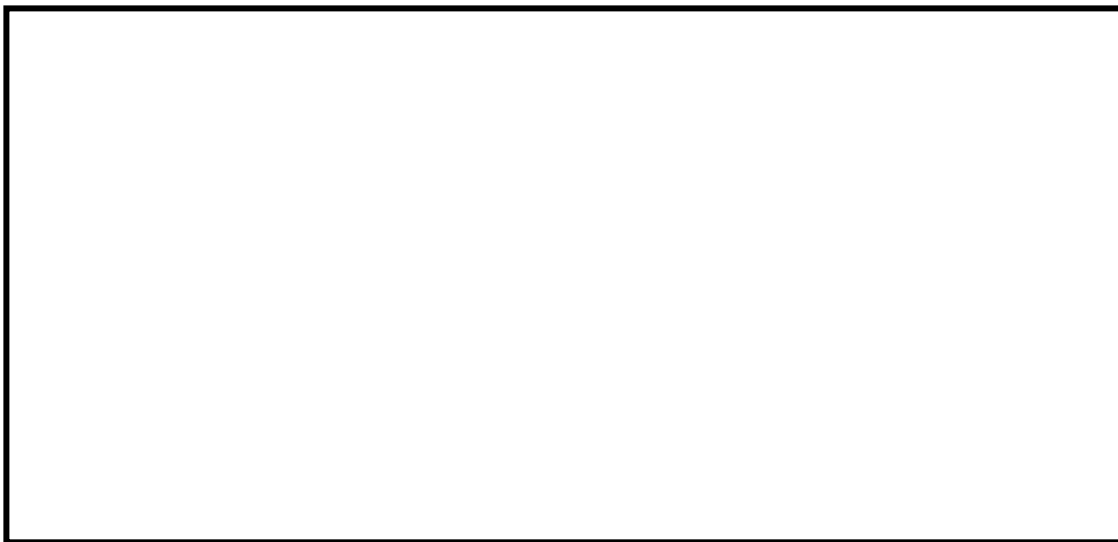
d. State the four 'so-called' friction forces.

    i. _____

_____

_____

    ii. _____

_____

_____

    iii. _____

_____

_____

iv. _____

_____

_____

_____

e. Define a situation where multiple forces are acting on a body in equilibrium. Then, in the sketchpad below, use MS Shapes to draw a free-body diagram for your situation.

_____

_____

13. Answers may be typed or neatly printed. Drawings may be freehand, but try to make use of the 'Shapes' or 'Insert Clipart" functions of MS Word. Try to make use of the MS Equations function as much as possible. If you submit this assignment electronically, the filename must be in the following format, "LastnameFirstinitialPerXReadActX-X".