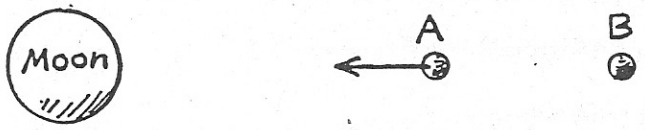
Name ~~Class Copy~~ per Date

CONCEPTUAL Physics PRACTICE PAGE

Chapter 8 Gravity

Our Ocean Tides

1. Consider two equal-mass blobs of water, A and B, initially at rest in the moon's gravitational field. The vector shows the gravitational force of the moon on A.



a. Draw a force vector on B due to the moon's gravity.

b. Is the force on B more or less than the force on A? _____

c. Why? _____

d. The blobs accelerate toward the moon. Which has the greater acceleration? (A) (B)

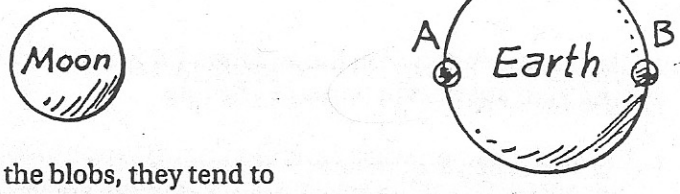
e. Because of the different accelerations, with time
(A gets farther ahead of B) (A and B gain identical speeds) and the distance between A and B
(increases) (stays the same) (decreases).

f. If A and B were connected by a rubber band, with time the rubber band would
(stretch) (not stretch).

g. This (stretching) (non-stretching) is due to the (difference) (non-difference) in the moon's gravitational pulls.

h. The two blobs will eventually crash into the moon. To orbit around the moon instead of crashing into it, the blobs should move
(away from the moon) (tangentially). Then their accelerations will consist of changes in
(speed) (direction)

2. Now consider the same two blobs located on opposite sides of the earth.



a. Because of differences in the moon's pull on the blobs, they tend to
(spread away from each other) (approach each other).

b. Does this spreading produce ocean tides? (Yes) (No)

c. If earth and moon were closer, gravitational force between them would be
(more) (the same) (less), and the difference in gravitational forces on the near and far parts of the ocean would be (more) (the same) (less).

d. Because the earth's orbit about the sun is slightly elliptical, earth and sun are closer in December than in June. Taking the sun's tidal force into account, on a world average, ocean tides are greater in
(December) (June) (no difference).

Hewitt Drew-It!

Name _____ Date _____

CONCEPTUAL Physics PRACTICE PAGE

Mechanics Overview

1. The sketch shows the elliptical path described by a satellite about the earth. In which of the marked positions, A—D, (put S for "same everywhere") does the satellite experience the maximum . . .

   a. gravitational force?_____

   b. speed? _____

   c. momentum?_____

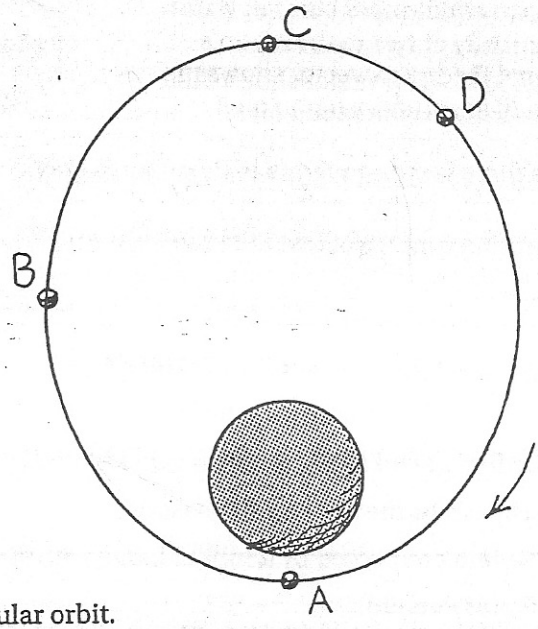
   d. kinetic energy?_____

   e. gravitational potential energy?_____

   f. total energy (KE + PE)?_____

   g. acceleration?_____

   h. angular momentum?_____



2. Answer the above questions for a satellite in circular orbit.

   a._____ b._____ c._____ d._____ e._____ f._____ g._____ h._____

3. In which position(s) is there momentarily no work being done on the satellite by the force of gravity? Why?

   _____

4. Work changes energy. Let the equation for work, $W = Fd$, guide your thinking on these: Defend your answers in terms of $W = Fd$.

   a. In which position will a several-minutes thrust of rocket engines pushing the satellite forward do the most work on the satellite and give it the greatest change in kinetic energy? (Hint: think about where the most distance will be traveled during the application of a several-minutes thrust?)

   _____

   b. In which position will a several-minutes thrust of rocket engines pushing the satellite forward do the least work on the satellite and give it the least boost in kinetic energy?

   _____

   c. In which positon will a several-minutes thrust of a retro-rocket (pushing opposite to the satellite's direction of motion) do the most work on the satellite and change its kinetic energy the most?

   _____