	Class	Date	
	Concept-De Practice	velopment e Page	4-1
Free Fall Speed			
1. Aunt Minnie gives you \$10 per seconds?	ond for 4 seconds. How my	uch money do you h	ave
 A ball dropped from rest picks up s for 4 seconds, how fast is it going? 	peed at 10 m per second.	After it falls	
3. You have \$20, and Uncle Harry give How much money do you have after	es you \$10 each second for er 3 seconds?	r 3 seconds.	
4. A ball is thrown straight down with how fast is it going?	an initial speed of 20 m/s	s. After 3 seconds,	
5. You have \$50 and you pay Aunt Min	nnie \$10/second. When w	ill your money run o	out?
6. You shoot an arrow straight up at 5	0 m/s. When will it run ou	it of speed?	
7. So what will be the arrow's speed 5	seconds after you shoot i	t?	
8. What will its speed be 6 seconds af	er you shoot it? 7 seconds	<u></u>	I
Free Fall Distance			
1. Speed is one thing; distance anothe shoot up at 50 m/s when it runs ou	er. <i>Where</i> is the arrow you t of speed?		
2. How high will the arrow be 7 secon	ds after being shot up at 5	50 m/s?	
3. a. Aunt Minnie drops a penny into before hitting the water. How fab. What is the penny's everage and	a wishing well and and it st is it going when it hits?	FROM REST, Ur = lot	
c. How far down is the water surfa	ce?		
4. Aunt Minnie didn't get her wish, so a penny straight down into it at 10	she goes to a deeper wish m/s. How far does this pe	محص ^م hing well and throws nny go in 3 seconds	> ?
$\overline{U} = \frac{U_s + U}{2}$ (THEN C	$= \frac{v_{a} + iot}{2} O_{o}$	Distinguish t "how far,"	vetween " how fast, and " how long "! V
CONCEPTUAL PHYSICS	,		



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Free Fall



Non-Accelerated Motion

1. The sketch shows a ball rolling at constant velocity along a level floor. The ball rolls from the first position shown to the second in 1 second. The two positions are 1 meter apart. Sketch the ball at successive 1-second intervals all the way to the wall (neglect resistance).



- a. Did you draw successive ball positions evenly spaced, farther apart, or closer together? Why?
- b. The ball reaches the wall with a speed of _____ m/s and takes a time of _____ seconds.
- 2. Table I shows data of sprinting speeds of some animals. Make whatever computations are necessary to complete the table. Table 1

ds	ANIMAL	DISTANCE	TIME	SPEED
	CHEETAH	75 m	3 s	25 m/s
	GREYHOUND	160 m	10 s	
e I	GAZELLE	1 km		100 km/h
	TURTLE		30 s	1 cm/s

Accelerated Motion

3. An object starting from rest gains a speed v = at when it undergoes uniform acceleration. The distance it covers is $d = 1/2 at^2$. Uniform acceleration occurs for a ball rolling down an inclined plane. The plane below is tilted so a ball picks up a speed of 2 m/s each second; then its acceleration $a = 2 \text{ m/s}^2$. The positions of the ball are shown for 1-second intervals. Complete the six blank spaces for distance covered, and the four blank spaces for speeds.



- a. Do you see that the total distance from the starting point increases as the square of the time? This was discovered by Galileo. If the incline were to continue, predict the ball's distance from the starting point for the next 3 seconds.
- b. Note the increase of distance between ball positions with time. Do you see an odd-integer pattern (also discovered by Galileo) for this increase? If the incline were to continue, predict the successive distances between ball positions for the next 3 seconds.

Now you're ready for "Merrily We Roll Along!" in the lab manual!

CONCEPTUAL PHYSICS