**Extra PhySci Force and Motion Review Problems**

***Don’t forget about the vocabulary and Newton’s 3 laws (be ready to know what each is an identify examples).***

1. T-pain and Jason Derluo were in science lab making their cars to study force and motion. They raced their cars. T-pain’s car went 5 meters in 10 seconds. Jason’s car went 2 meters in 15 seconds. T-pain’s car was 1.2 kg, Jason’s car was 0.8 kg. Answers the following questions

1. What was the speed of both their cars?

Speed = d/t

T-pain=5m/10sec=0.5m/s

Jason=2m/15sec=0.133m/s

1. Which car has more momentum? (Don’t just guess do the math problem)

Momentum=massxspeed

T-pain=0.5m/s x 1.2 kg = 0.36ks\*m/s

Jason = 0.133m/s x 0.8 kg = 0.106 kg\*m/s

T-pain has more momentum

2. Ms. Pilarz was late on her way to school because she forgot her Diet Coke. She accelerated her car from the parking lot to KHHS with a final speed of 50 m/s in 200 seconds. What was her acceleration?

a = sf-si/t

a = 50m/s – 0 m/s / 200 s = 0.25 m/s2

3. Taylor Swift was cruising with Nelly. They went over a hill at 50 m/s and 2 seconds later were at the bottom of the hill traveling 80 m/s. What is the acceleration of their car?

a= sf-si/t

a=80 m/s – 50 m/s / 2s = 15 m/s2

4. 2 Chainz accidently dropped his daughter 3 Bracelet’s toy from teddy bear into his dog’s mouth, 2 meters away. While in motion, the teddy bear traveled at an average speed of 10 m/s. How long was the teddy bear in the air?

t=d/s

t= 2m / 10 m/s = 0.2 s

5. If 2 Chainz dropped the teddy bear off of the shelf and it accelerated at a rate of 9.8 m/s2, how long will it take before it reaches a speed of 49 m/s?

a = sf-si / t

9.8 m/s2 = (49 m/s – 0 m/s) / t

Simplify into…. Solve for the two speeds

9.8 m/s2 = 49 m/s / t

Now get t by itself… so I need to shift it around… multiply it by both sides…

9.8 m/s2 x t = 49 m/s

Now get t by itself… divide by 9.8

t = 5 s

6. Nelly was hanging out in his air force ones. While he was singing in them his voice traveled 500 m/s. How far away are you in you hear his voice 10 seconds after he starts singing?

d = s x t

d = 500 m/s x 10 sec = 5,000 m

7. Ms. Pilarz’s dog Cooper, who weighs 5kg, is an excellent swimmer and likes to do laps in her pool. If Cooper pushes off the diving board with a force of 500 N, at what rate will he accelerate from the diving board?

a = F / m

a = 500 N / 5 kg = 100 m/s2

8. Kelsey’s dog Shelby likes to lift heavy bones from the floor. The heaviest bone she has picked up is 10 kg and she did so with an acceleration of 2 m/s2. How much force did she use to raise the bone?

F = m x a

F = 10 kg x 2 m/s2 = 20 N

9. Bill Nye was on Dancing with the Stars with his girlfriend Ms. Pilarz, she picked him up and swung him around at an acceleration of 7.5 m/s2. He exerted a 100 N force, what was his mass?

m = F / a

m = 100N / 7.5 m/s2 = 13.33 kg

10. Mrs. Fair swung a hammer at a zombie that was 500 grams with a 100 m/s velocity. What was the momentum that she hit the zombie with?

M = m x s

M = 500 g x 100 m/s = 50,000 g \* m/s

11. A bowling ball travelled down the lane with a momentum of 100 kg\*m/s and is traveling at 15 m/s. What is the mass of the bowling ball?

m = M / s

m = 100 kg\*m/s / 15 m/s = 6.67 kg

12. If Ed Sheeren was learning how skip across the stage. He was practicing down the street and in 10 minutes he went 25 meters. How far could he have gone in 60 minutes?

d = s x t

I know the end time I want to use but I don’t have the speed… so I need to solve for that first…

s = d / t

s = 25 m / 10 min = 2.5 m/min

Ok so I know that speed he was going in the first place… now I can plug that in to see his distance, going that speed, at for 60 minutes

d = s x t

d = 2.5 m/min x 60 min = 150 m

13.  Cooper was back in the pool and wanted to race around. The pool is 8 meters in length and he could swim across is 10 times in 1 hour. What was his speed?

s = d / t

Don’t forget that you need to figure out total distance first…. So 8 meters x 10 times across = 80 meters total

s = 80m / 1 hour = 80 m/hr

14. Eric Church was driving his speed boat that was accelerating at a rate of 5 m/s2. If its initial velocity is 1.5 m/s, what is its velocity after 45 seconds (so v final I’m solving for)?

a = sf – si / t

So first I plug in what I know…

5 m/s2 = (sf – 1.5 m/s) / 45 s

So let’s get rid of 45 s by multiplying both sides by it…

225 m/s = sf – 1.5 m/s

Ok now let’s get rid of 1.5 m/s… so I add that to both sides…

226.5 m/s = sf

So we are only left with speed final… you’ve got your answer…

Sf = 226.5 m/s

15. 2 Chainz was on his way to propose to Ms. Pilarz, he drove a 5,000 kg car down fruitridge at a rate of 50 m/s. What is the momentum of the car?

M = m x s

M = 5,000 kg x 50 m/s = 250,000 kg\*m/s

16. If Drake was pushing piano keys with a force of 5N and the key had a mass of 1 kg. What is the acceleration?

a = F / m

a = 5N / 1 kg = 5 m/s2

17. Snookie was pushing her baby carrier down the road from 0 mph to 50 mph in 2 hours. What is its rate of acceleration?

a = sf – si / t

a = (50 mph – 0 mph) / 2 hours = 25 mph2

18. Toby Keith is running in his cowboy boots. He chased a cowgirl down the road 20 meters north, then she turned and he ran 30 meters west, he chased her for 20 minutes. What was his average velocity?

Remember velocity is calculated the same as speed…

v = d / t

But keep in mind total distance…

v = (20m + 30m) / 20 min = 2.5 m/min

19. Drake is looking to find Ke$ha’s love. Ke$ha and her car weigh 150 kg and his speeding away in her car at 80 m/s. Drake is chasing her in his speedster that weighs 200 kg and is traveling at a velocity of 40 m/s. Who has more momentum?

M = m x s

Ke$ha = 150kg x 80m/s = 12,000 kg\*m/s

Drake = 200kg x 40m/s = 8,000 kg\*m/s

So… Ke$ha has more momentum

20. Again don’t forget to study vocabulary and Newton’s laws. Test Tomorrow!! (Key below)