

25 MORE PRACTICE PHYSICS SCENARIOS

1. After a big snow storm ski patrol at Mammoth Mountain goes out in the middle of the night with dynamite to start small avalanches. The snow does not want to fall and cause a small avalanche, but is forced to by the dynamite exploding. They do this because the snow accumulating at the top of the mountain has a lot of what? **(GRAVITATIONAL) POTENTIAL ENERGY or INERTIA**
2. Once the snow starts moving down the mountain it has a lot of what? **KINETIC ENERGY or INERTIA or MOMENTUM**
3. A pro surfer makes a sharper turn on a wave by pushing his board into the wave. The wave pushes back on the board forcing the surfer to turn back into the lip of the wave. What force does the wave apply to the surfer and the board? **CENTRIPETAL FORCE**
4. Your parents take a sharp right turn as you round a corner. You feel like you are being pushed to the left against the door of the car (you really want to go straight, but are attached to the car with the seat belt so you do not go flying straight out of the car). What force caused you to be pushed against the door of the car when you went around the turn? **CENTRIFUGAL FORCE or INERTIA* (BUT INERTIA IS NOT A FORCE, BUT EXPLAINS YOUR MOTION IN THE CAR)**
5. From the example above – What force does the seat belt apply to you as you go around the turn? **CENTRIPETAL FORCE**
6. During the X Games they have a motocross race in the stadium. A few of the turns are banked (slanted or tilted (**look this up**)) so that the riders can go faster around the turns without falling off the track. What force do the bank turns supply to the motorcycle? **CENTRIPETAL FORCE**
7. You drop a water balloon on the ground and it rolls away from where it landed. It starts to slow down and stop. What force caused it to slow down? **FRICTION (WITH THE GROUND)**
8. You drop a second water balloon, but this time it stops and explodes when it hits the ground. What concept explains why it stopped and popped when it hit the ground? **INERTIA**
9. Flynn Rider (from Disney's Tangled) is riding Maximus the horse when Maximus suddenly stops causing Flynn to fly off the front of the horse. What concept explains why Flynn went flying? **INERTIA**
10. How can Sonic the Hedgehog defy gravity as he runs around loops and around curved walls? **CENTRIFUGAL FORCE (needs a lot of: KINETIC ENERGY or INERTIA or MOMENTUM)**
11. In the Disney movie Up, the house is lifted up off the ground by many hundreds of thousands of balloons. As the house goes up what type of energy is increasing? **POTENTIAL ENERGY or KINETIC ENERGY IF YOU MEAN THE HOUSE WILL MOVE "UP" FASTER**
12. By adding more balloons to the house you are increase what type of energy? **POTENTIAL ENERGY or KINETIC ENERGY IF YOU MEAN THE HOUSE WILL MOVE "UP" FASTER**
13. Stunt men and women will often land on big air bags when they jump off of building. The air bag allows the stunt person to safely **ACCELERATE** over a great distance compared to hitting the ground without an air bag. This allows their force to be distributed over a larger distance and greater amount of time.

14. As a ski jumper goes down the 120 meter big hill ski jump her **KINETIC ENERGY (MOMENTUM or INERTIA)** is increasing and her **(GRAVITATIONAL) POTENTIAL ENERGY** will decrease.
15. Indiana Jones is whirling his whip around and around. His hand applies an inward force to keep the whip from flying away while swinging it in a circle? What force is Indiana Jones applying to the whip?
CENTRIPETAL FORCE
16. Neil is trying to fly his kite on the moon. Every time he throws up his kite and starts to run the kite falls out of the sky and back down onto the ground. What force is causing the kite to fall each time he throws it up?
GRAVITY
17. Neil realizes the kite will not work no matter how hard he tries or how fast he runs. Why? Does the moon have gravity? How do you know? **THERE IS NO ATMOSPHERE ON THE MOON TO SUPPORT OR LIFT THE KITE. YES, THE MOON HAS GRAVITY. THE GRAVITY OF THE MOON IS 1/6 AS STRONG AS EARTH. IF YOU WEIGHED 60 kg ON EARTH YOU WOULD WEIGH 10 kg ON THE MOON. REMEMBER, ALL MATTER MATTERS AND MATTER ATTRACTS OTHER MATTER – LAW OF UNIVERSAL GRAVITY–**
18. How could Neil make the kite stay up off the ground on the moon? **ADD ROCKETS TO IT or TIE IT TO THE LEM (LUNAR EXCURSION MODULE) WHEN IT TAKES OFF or HOLD IT AND RUN AROUND or APPLY SOME OTHER FORCE THAT WILL FORCE IT OFF THE GROUND.**
19. A man parked his stick shift car on a hill and went into his house for a nap. Ten minutes later the car starts to roll down the hill. The faster it goes down the hill, the harder it will be to stop. Why? What is increasing?
MORE INERTIA or MOMENTUM or KINETIC ENERGY
20. The next time the man parks the car he makes sure to turn the steering wheel so the front tire is resting against the curb. What does the curb have a lot of so that the car will not accidentally roll down the hill?
INERTIA or NORMAL FORCE
21. How are momentum and inertia different? In other words, in what situation can they not be used interchangeable to describe an object? **MOMENTUM IS ZERO WHEN AN OBJECT IS NOT MOVING ($P=MV$) (IF VELOCITY IS 0 THEN MOMENTUM IS 0). ALL OBJECTS (MATTER) HAS INERTIA. IF IT IS MOVING IT HAS INERTIA AND IF IT IS STILL (LIKE A SLEEPING ELEPHANT) IT HAS INERTIA. REMEMBER, THINGS LIKE TO BE AS THEY ARE. THEY DO NOT WANT TO CHANGE. IF SOMETHING IS MOVING IT WANTS TO KEEP ON GOING UNLESS SOMETHING FORCES IT TO STOP. IF SOMETHING IS RESTING (LIKE A LARGE ELEPHANT) IT WANTS TO STAY REST AND NOT MOVE UNLESS SOMEONE OF SOMETHING “FORCES” IT TO MOVE.**
22. The Statue of Liberty did not move or get washed away during Hurricane Sandy. Why? **INERTIA**
23. When water skiing you can make a big wide turn to the left or right and still stay up. What force keeps pulling you back towards the middle? **CENTRIPETAL FORCE (THE ROPE PULLS YOU BACK TO THE MIDDLE OF THE ARC YOU ARE MAKING)**
24. What force would force you outwards (in a straight line) when you let go of the rope when making a big turn while water skiing? **CENTRIFUGAL FORCE**

25. Amanda watches as a man on a motorcycle rides around and around and upside down in a big circular metal cage. She notices the motorcycle does not fall as it goes around the cage or upside down. What force pushes the rider out against the walls and keeps the rider from falling when upside down?

CENTRIFUGAL FORCE