It's Gravity with a Capital G - a Course Revue[†]

- It's Gravity with a capital G Makes the moon go around and around. And it's Gravity with a capital G Makes the apples all fall down. Capital G times M₁ times M₂ Divided by R to the power of two, yes It's Gravity with a capital G Makes the moon go around and around.
- If you go for a ride and you collide— The momentum is conserved. You may die in the mess but nevertheless, The momentum is conserved. Of course we all know that there may not be Conservation of kinetic energy. But if you go for a ride and you collide— The momentum is conserved.
- Now let's have some fun with a pendulum At the playground, swingin' so free. You'll oscillate, it'll feel so great, get rid of anxiety. Now the time it takes for a cycle is 2π root L over g, So lets have fun with a pendulum At the playground, swingin' so free.
- 4. Now there's a monkey in the tree,

right up there for all to see, And here comes a hunter with a gun. The hunter takes aim (that's the name of the game) And shoots the gun directly at the monkey's bum. Now the bullet and the monkey both fall with gAnd they meet at the same point in space— So much to his surprise, the poor little monkey dies, And the hunter...

(spoken)... The hunter? Let me tell you about the hunter. Much to the surprise of the hunter, there materialized upon the scene at the time of this dastardly deed... a **Game Warden**, who immediately arrested the hunter, charged him with the wrongful taking of an endangered species and hauled him into court, where he was tried by a jury of his peers, found guilty as charged, and sentenced by the judge to ten years of hard labor, dedicated to the restoration of the habitat for the wildlife of our planet.

... So the next time that you see a little monkey in a tree,

Tell the hunter not to shoot his gun.

5. The next thing that we saw was Newton's Second Law— This is the central feature of the course. With a mathematical flavor it describes the behavior Of a particle that is subject to a force. We say: "The change in the momentum of the particle will be An amount precisely equal to F dt"— And we'll promise not to say "F equals ma" When we describe the central feature of the course.

- 6. Now we're in the lecture hall with the super balls: What makes the little one fly so high? If we drop them on the ground, they rebound, And the little one flies up to the sky. Well just conserve the momentum And also the energy, So if we're in the lecture hall with the super balls, We'll know what makes the little one fly so high.
- 7. Now it's time to get the feel of a bicycle wheel, And spin yourself right up to speed.
 Apply a torque—it will take some work[‡]— But you'll get some angular velocity.
 If you integrate the torque with respect to t, You'll have the angular momentum.
 So go get the feel of a bicycle wheel, And spin yourself right up to speed.
- 8. Now at the playground, on the merry-go-round, In the rotating reference frame. Feel the pseudo forces (there are two, of course): "Coriolis" and "centrifugal" by name. Toss a bean bag to your friend, Why does it go in a curve? At the playground, on the merry-go-round, In the rotating reference frame.
- 9. Alas, we had no time to deal with Einstein's Theory of the Special Relativity.
 Where your clock will run slow if you decide to go On a trip, at high velocity.
 If at age twenty-one, you should have a son, And step aboard a spaceship for a star,
 Well when you return, you will learn That your son could be older than you are.

[†] Copies of this song are available from http://scott.physics.ucsc.edu/songs/gravity/.

[‡] The word 'work' should rhyme with 'fork' or 'cork' (and not with 'jerk'), in consonance with the spelling of the word.

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