

## Remembrance of the Ten Virgins (Tuesday, April 6) Hee-sha-dag Da-sun Gooy-se-roo

### A Bible Study (Adaptable for upper elementary-high school)

Have students read the parable and discuss questions (reproduce for the class).

**Matthew 25:1-13** *This parable was based on wedding customs of the time. They typically took place in the evening, though the exact time was kept secret. Prior to the ceremony the groom would go to the bride's home and lead her, along with the villagers, in a procession to the wedding. This was also the tradition in old-world Armenian weddings. The virgins in this story were waiting for the groom, and were probably bridesmaids who had the responsibility to prepare the bride to meet the groom.*

1. What made the "wise virgins" different from the "foolish virgins"?
  - a. They had been Girl Scouts.
  - b. They didn't fall asleep.
  - c. They were always prepared.
  - d. They made responsible decisions.
2. What would you call the refusal of the five women to share their oil?
 

a. wise	d. just
b. shrewd	e. unjust
c. selfish	f. mean
3. What did the bridegroom mean when he said, "I don't know you?"
  - a. "I don't recognize you."
  - b. "You don't have an invitation."
  - c. "True friends would take my coming more seriously."
  - d. "You're too late."
4. How do you feel about Jesus saying that the door to the kingdom gets closed for some?
  - a. It doesn't sound like something a loving God would do.
  - b. They had their chance and blew it.
  - c. We should just be glad people get invited at all.
  - d. I'm glad this is God's business.
5. What is the point of this parable?
  - a. Each of us needs our own relationship with the Lord.
  - b. You can't obtain faith in Christ just by being around others who do.
  - c. There is a limited opportunity to enter God's kingdom.
  - d. The second coming of Christ will arrive unexpectedly.
  - e. Be prepared for Christ's return.
6. What does it mean to keep watch?
  - a. try to figure out the signs of Christ's return
  - b. patiently wait for a future event
  - c. actively prepare in the present
  - d. be ready when Jesus comes back
7. What does Jesus expect Christians to do with their lives in anticipation of the return?



**THE UNIVERSITY OF CHICAGO**  
**PHYSICS DEPARTMENT**

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**PHYSICS 341**  
**LECTURE 1**

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**1.1. Kinematics**

Position  $\mathbf{r}(t)$  and velocity  $\mathbf{v}(t)$  are defined by

$$\mathbf{v}(t) = \frac{d\mathbf{r}(t)}{dt}$$

Acceleration  $\mathbf{a}(t)$  is defined by

$$\mathbf{a}(t) = \frac{d\mathbf{v}(t)}{dt} = \frac{d^2\mathbf{r}(t)}{dt^2}$$

For constant acceleration  $\mathbf{a}$ , the velocity and position are given by

$$\mathbf{v}(t) = \mathbf{v}_0 + \mathbf{a}t$$

$$\mathbf{r}(t) = \mathbf{r}_0 + \mathbf{v}_0 t + \frac{1}{2}\mathbf{a}t^2$$

Example: A particle starts at  $\mathbf{r}_0 = 0$  with initial velocity  $\mathbf{v}_0 = v_0 \hat{x}$  and constant acceleration  $\mathbf{a} = a \hat{x}$ . The velocity and position are

$$v_x(t) = v_0 + at$$

$$x(t) = v_0 t + \frac{1}{2}at^2$$

Example: A particle starts at  $\mathbf{r}_0 = 0$  with initial velocity  $\mathbf{v}_0 = v_0 \hat{y}$  and constant acceleration  $\mathbf{a} = a \hat{x}$ . The velocity and position are

$$v_x(t) = at$$

$$v_y(t) = v_0$$

$$x(t) = \frac{1}{2}at^2$$

$$y(t) = v_0 t$$

The trajectory is a parabola in the  $xy$ -plane.

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**1.2. Dynamics**

Newton's second law states that the net force  $\mathbf{F}$  acting on a particle of mass  $m$  is equal to the mass times the acceleration:

$$\mathbf{F} = m\mathbf{a}$$

Example: A particle of mass  $m$  is acted upon by a constant force  $\mathbf{F} = F \hat{x}$ . The acceleration is  $\mathbf{a} = \frac{F}{m} \hat{x}$ . The velocity and position are given by the kinematic equations.

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**1.3. Energy**

The work done by a force  $\mathbf{F}$  on a particle moving from position  $\mathbf{r}_i$  to  $\mathbf{r}_f$  is defined as

$$W = \int_{\mathbf{r}_i}^{\mathbf{r}_f} \mathbf{F} \cdot d\mathbf{r}$$

The kinetic energy  $K$  of a particle of mass  $m$  moving with velocity  $\mathbf{v}$  is defined as

$$K = \frac{1}{2}m\mathbf{v} \cdot \mathbf{v}$$

The work done by a force is equal to the change in kinetic energy:

$$W = \Delta K$$

Example: A particle of mass  $m$  starts at rest and is acted upon by a constant force  $\mathbf{F} = F \hat{x}$ . The work done by the force is

$$W = \int_0^x F dx = Fx$$

The kinetic energy is

$$K = \frac{1}{2}mv^2 = Fx$$

The velocity is

$$v = \sqrt{2Fx/m}$$


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**1.4. Conservation of Energy**

If the net force acting on a particle is conservative, the total mechanical energy  $E$  is conserved. The total mechanical energy is the sum of the kinetic energy  $K$  and the potential energy  $U$ :

$$E = K + U$$

For a conservative force  $\mathbf{F} = -\nabla U$ , the work done by the force is equal to the negative change in potential energy:

$$W = -\Delta U$$

Therefore, the total mechanical energy is conserved:

$$\Delta E = \Delta K + \Delta U = 0$$

Example: A particle of mass  $m$  is acted upon by a conservative force  $\mathbf{F} = -\nabla U$ . The total mechanical energy is conserved.

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**1.5. Angular Momentum**

The angular momentum  $\mathbf{L}$  of a particle of mass  $m$  moving with velocity  $\mathbf{v}$  at position  $\mathbf{r}$  is defined as

$$\mathbf{L} = \mathbf{r} \times m\mathbf{v}$$

The torque  $\boldsymbol{\tau}$  acting on a particle is defined as

$$\boldsymbol{\tau} = \mathbf{r} \times \mathbf{F}$$

The time rate of change of angular momentum is equal to the torque:

$$\frac{d\mathbf{L}}{dt} = \boldsymbol{\tau}$$

Example: A particle of mass  $m$  is acted upon by a central force  $\mathbf{F} = F \hat{r}$ . The torque is zero, and the angular momentum is conserved.

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**1.6. Summary**

Kinematics:  $\mathbf{v} = d\mathbf{r}/dt$ ,  $\mathbf{a} = d\mathbf{v}/dt = d^2\mathbf{r}/dt^2$

Dynamics:  $\mathbf{F} = m\mathbf{a}$

Energy:  $W = \int \mathbf{F} \cdot d\mathbf{r}$ ,  $K = \frac{1}{2}m\mathbf{v} \cdot \mathbf{v}$ ,  $W = \Delta K$

Conservation of Energy:  $E = K + U$ ,  $\Delta E = 0$

Angular Momentum:  $\mathbf{L} = \mathbf{r} \times m\mathbf{v}$ ,  $\boldsymbol{\tau} = \mathbf{r} \times \mathbf{F}$ ,  $d\mathbf{L}/dt = \boldsymbol{\tau}$