

## PHY138Y1Y: Physics for the Life Sciences I

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"[The universe] is written in that great book which ever lies before our eyes. [But] we cannot understand it if we do not first learn the language and grasp the symbols in which it is written. This book is written in the mathematical language, and the symbols are triangles, circles, and other geometrical figures, without whose help it is humanly impossible to comprehend a single word of it."

-- Galileo

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If you haven't already done so, pick up the:

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- "Survival Guide" for the lab
- "Information Sheet" for PHY138

Outside MP124. This is on the 1<sup>st</sup> floor of the North Wing of McLennan. From the main lobby, walk North and you will see them.

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## Error in the Printed Lab Schedule

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- Pxxx2 starts during the week of Oct. 10
- Pxxx1 starts during the week of Oct. 17

The on-line version is correct.

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## Coming Soon to the Textbook Store

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- MasteringPhysics for Knight*
- Student Workbook*

These will be available separately from the shrink-wrapped package for the course.

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## MasteringPhysics

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- We had a small glitch in enabling the software for you. It was fixed on Monday afternoon.
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## MasteringPhysics

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- You should set up your account now!
  - First assignment:
    - Pre-Course Assessment
    - Due this Friday by 5 PM
  - Pre-Class Quiz Chpts. 2 - 4
    - Due Monday, September 19 by 10 AM
  - Problem Set Chpts 2- 4
    - Due Friday, September 23 by 5 PM
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## Tutorials & Labs

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- Tutorials begin next week on Wed., Thurs, or Fri.
  - Effective **immediately** if you want to change your tutorial see Dr. Savaria, MP129E.
  - Labs begin the week of October 10.
  - You may change your **lab** section with ROSI until I announce otherwise.
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## About the Pre-Class Quizzes and Problem Sets

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- They will help you to learn Physics
  - Your knowledge of Physics is demonstrated on Tests and the Final Exam
  - If you do not do the Problem Sets and Pre-Class Quizzes *yourself*, you will not learn nearly as much Physics
    - Then, you will not do as well in the course.
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## Review: Doing Well at University

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- Time Management
  - Take responsibility for yourself
  - Study groups
  - Don't ignore problems
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## Review: Learning Physics

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- Concepts first, then applying them to problems
    - Memorising formulas is not a good learning strategy
  - Each concept builds on previous ones
    - They take some time to assimilate
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## Assumptions of Classical Physics

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- The world is mechanistic, a "clockwork"
- It is describable by *Laws*
- The Laws are mathematical

Is the universe *really* like this?

Probably not, but the assumptions are remarkably effective!

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## Physics' Description of the Universe

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- Mathematics as a *language*.
- Everyday words with precise definitions.

New Age folks: "Thought is a form of energy."

Energy

Chinese Medicine: *Chi* or *Qi*  
Often translated as "internal energy."

氣

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## Operational Definition

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Concepts are defined in terms of a particular procedure or operation performed by the investigator.

- Intelligence
    - The result on the Stanford-Binet IQ test.
  - Second
    - 9,122,631,770 periods of radiation emitted by a particular transition of Cs-133.
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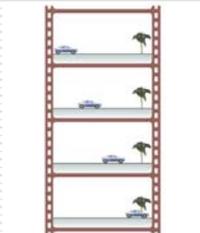
## First Quarter of PHY138

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- Mechanics
    - The study of the effects of energy and forces on the motion of physical objects
    - We will study those areas with applications to the life sciences or that will be needed in later quarters
  - Review of Grade 12, proceeding to a deeper description
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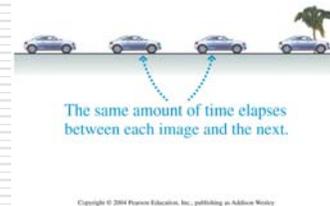
### Figure 1.2

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### Figure 1.3

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Which car is going faster, 1 or 2? Assume there are equal intervals of time between the frames of both movies.



Which car is going faster, 1 or 2? Assume there are equal intervals of time between the frames of both movies.



2 is going faster

## Forming a Model



Which car is going faster, 1 or 2? Assume there are equal intervals of time between the frames of both movies.



Three motion diagrams are shown. Which is a dust particle settling to the floor at constant speed, which is a ball dropped from the roof of a building, and which is a descending rocket slowing to make a soft landing on Mars?

- |         |         |         |  |
|---------|---------|---------|--|
| (a) 1 ● | (b) 1 ● | (c) 1 ● | 1. (a) is dust, (b) is ball, (c) is rocket |
| 2 ●     | 2 ●     | 2 ●     | 2. (a) is ball, (b) is dust, (c) is rocket |
| 3 ●     | 3 ●     | 3 ●     | 3. (a) is rocket, (b) is dust, (c) is ball |
| 4 ●     | 4 ●     | 4 ●     | 4. (a) is rocket, (b) is ball, (c) is dust |
| 5 ●     | 5 ●     | 5 ●     | 5. (a) is ball, (b) is rocket, (c) is dust |
| 6 ●     | 6 ●     | 6 ●     |  |

Three motion diagrams are shown. Which is a dust particle settling to the floor at constant speed, which is a ball dropped from the roof of a building, and which is a descending rocket slowing to make a soft landing on Mars?

- |         |         |         |  |
|---------|---------|---------|--|
| (a) 1 ● | (b) 1 ● | (c) 1 ● | 1. (a) is dust, (b) is ball, (c) is rocket |
| 2 ●     | 2 ●     | 2 ●     | 2. (a) is ball, (b) is dust, (c) is rocket |
| 3 ●     | 3 ●     | 3 ●     | 3. (a) is rocket, (b) is dust, (c) is ball |
| 4 ●     | 4 ●     | 4 ●     | 4. (a) is rocket, (b) is ball, (c) is dust |
| 5 ●     | 5 ●     | 5 ●     | 5. (a) is ball, (b) is rocket, (c) is dust |
| 6 ●     | 6 ●     | 6 ●     |  |

Figure 1.5 (a)

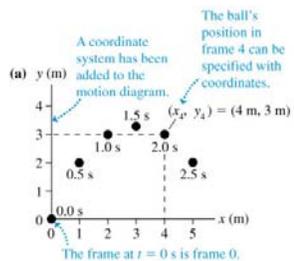


Figure 1.5 (b)

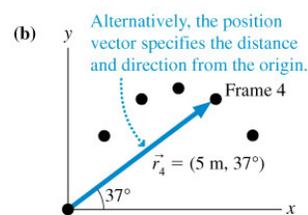
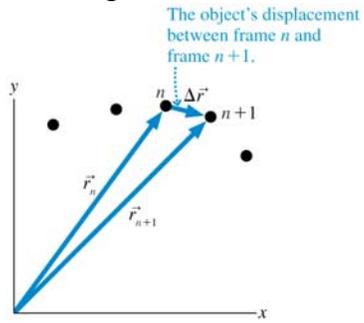
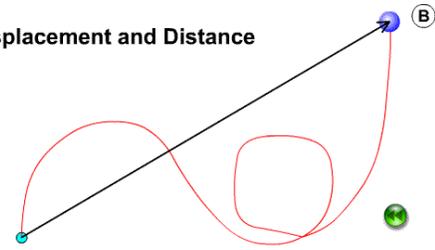


Figure 1.10



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### Displacement and Distance



(A) **distance = the length of the curved line**  
**displacement = the length and direction of the straight line**

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