

Wednesday, February 18

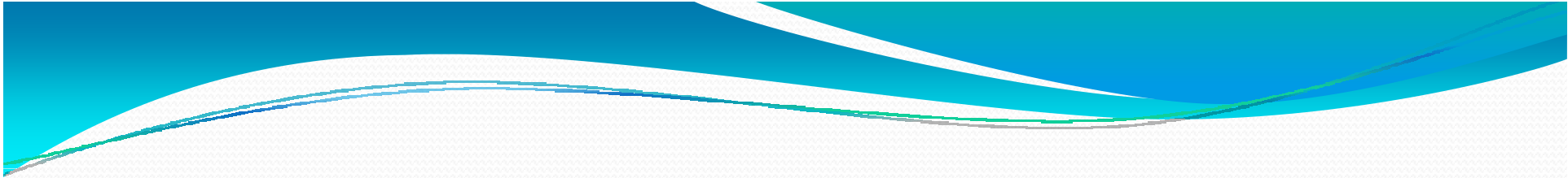
Block 1.7862

Moving on to dynamics
Low technology version



Goal

With the materials at your table, devise three ways to measure forces.



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Conservation of Momentum

- On your paper write down a few ideas about how you begin the study of momentum
- Look at the seven methods described on the page rank order them from most useful (1) to least useful (7) as a way to begin the study of momentum.

Beginnings of studying momentum

- 5.8 (a) State Newton's 3rd 1-7
- 2.5 (b) Lab interactions observations 1-5
- 1.7 (c) Remind of everyday experiences 1-6
- 5 (d) Define momentum & conservation 1-7
- 3 (e) Student predict; you demonstrate 2-6
- 4 (f) Define momentum; lab observe interactions 2-6
- 5 (g) Define momentum & conservation; lab verify 2-7



Learning Cycle

- Based on cognitive psychology
 - Beginning with Jean Piaget's Model of Intellectual Development
 - Four stages of Development
 - Three stages require concrete experiences
- New topics require concrete experience for a start
 - Do you read the instruction manual before using a new toy?
- Adapted to teaching and learning in the 1960s
- Shown to be valuable at all levels of education in 1970s
 - Including University physics



Karplus Learning Cycle

- Exploration
 - Students complete experiments that encourage them to observe phenomena & relationships.
- Concept Introduction
 - A physical principle is introduced that unifies and explains the observations.
 - Instructor led discussion
- Concept Application
 - In lab setting students apply the newly introduced concept to experiments.
 - Leads to observations that cannot be explained & next learning cycle



Research

- Works with students at all levels of education
- For each concept requires more time than lecturing
- Understanding is higher for concepts that are covered.
- Does not hurt the brighter students.
- Improves understanding for a broad spectrum of students' abilities.

Many variations

