



## Lab Equipment

Compiled by David M. Harrison, March 19, 2005. Revision of April 7, 2005: each room will require a balance.

In this document we begin fleshing out the cost of required equipment for the Physics Practicals. There are many many assumptions which are questionable.

Not discussed here are physical plant renovations or furniture.

I assume the “Plan B” configuration. In this plan we will have Learning Teams of up to 4 students; each Practical Group will have up to 8 Learning Teams; there will be 6 Practical Groups for each time slot, each in a separate room. I also assume that we will have sufficient resources that all students will be doing the same activity at the same time. Thus we will need  $8 \times 6 = 48$  setups.

I shall assume that *none* of our current equipment will be used. This is clearly not true. For the *Discovery Practicals* a fair amount of our current equipment could be used. Other issues in this assumption include:

- We use low-friction wheeled carts instead of air tracks. If we decide to use air tracks, we will certainly use our current ones but will need to buy more.
- When we are studying waves I can imagine keeping our current apparatus for the *Standing Waves and Acoustic Resonance* and *Speed of Sound in a Pure Gas* experiments, although we will need more copies.

Pasco has a *Comprehensive Physics Complete* bundle which sells for **\$11,357**. Much of the equipment in this bundle is not suitable, and we will certainly want other equipment which is not part of the bundle. Nonetheless, this number is a starting point.

In addition to the bundle, each setup will require:

- A computer interface. The Pasco 750 interface is **\$1,141**.
- A Windoze PC. **\$1000**.
- An oscilloscope. **\$1100**. As the numbers become more realistic, we will need a careful inventory of how many of our existing scopes are suitable for the Practicals.
- A “dumb” whiteboard. **\$100**.

Thus each setup will cost on the order of **\$14,700**.

So, to fully equip the 48 *Pods* plus 2 spares in the rooms will cost about  $50 \times \$14,700 =$  **\$735,000.**

In addition, each of the 6 rooms will require additional equipment. A preliminary list, with prices largely pulled out of thin air, is:

- A projector. **\$5000.**
- A screen. **\$100.**
- A printer. **\$1000.**
- A smartboard. **\$2500.**
- A balance. **\$500.**
- Transceivers for wireless network connection. **\$250.**
- A PC for the Instructors. **\$1000.**
- Control panel so that the smartboard or *any* of the PC's in the room can be projected onto the screen. **\$1000.**

Thus in addition to equipment for the pods, each room will require about **\$11,000.**

For six rooms, then, we will require about **\$66,000.**

So, the total cost for the pods and the rooms will be about **\$800,000.**

Finally, although the above numbers are very uncertain my guess is that they are a lower bound.