### Documenting Student Learning:

- We have developed a simple rubric for faculty to use to document student learning.
- Faculty use a minimum of 10 questions to assess achievement of KU Core learning outcomes.
- A database of “department approved/tested” questions and records of past student results are kept on Blackboard.
- Student results are tabulated and reported.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent &gt; 89%</td>
<td>27</td>
</tr>
<tr>
<td>Very Good 80% to 89%</td>
<td>47</td>
</tr>
<tr>
<td>Good 70% to 79%</td>
<td>59</td>
</tr>
<tr>
<td>Satisfactory 60% to 69%</td>
<td>18</td>
</tr>
<tr>
<td>Unsatisfactory &lt; 60%</td>
<td>4</td>
</tr>
</tbody>
</table>

- Form includes space for faculty discussion of results and suggestions for changes.
- We look forward to more detailed analysis once more data has been collected. This could tell us whether some questions are more discriminating than others.

### Moving Forward:

- From a professors’ point of view the course is now more fun to teach because I spend more time actually working with students.
- The logistical issues have also been greatly simplified by the use of course shells on Blackboard.
- Student learning, satisfaction and retention seem higher.
- Next step will be longitudinal tracking of students performance down stream.

### Flipped Format in Physics 211:

#### Before Class:

- Students are responsible for familiarizing themselves with the material before class through assigned readings and videos.
- For each concept there is also an example problem worked out on video and a few blackboard questions to test the reading.

#### Using Class Time for Deeper Engagement:

- **Group Work:** Most of class time is spent working on group problems. Faculty and undergraduate TAs help guide the groups.

- **Engaging Discussion:** To keep the discussion moving, the instructor will take work from a random group and share it with the whole class on the doc cam. Students then vote about whether they think the answers are correct.

- **Developing Critical Thinking:** A suite of critical thinking questions have been developed to push the students to move beyond pattern matching.

### Making Labs More Meaningful in Physics 216:

#### Before Lab:

- Students have assigned reading and videos as well as a quiz.

#### During Lab:

- The pre-lab work means that the students spend more time on “tweaking” with the equipment and re-checking their measurements.
- These are essential first skills of an experimental scientist.

#### Assessing Labs:

- Student lab reports are graded using a rubric on Blackboard. This has decreased the time GTAs spend grading & provided the head TA a way to give GTAs feedback on the grading.

- The grading of the labs is not only faster and more useful to the students but also more uniform.
- We no longer need to “renormalize” each TAs grades at the end of the semester, which means that students have a much better idea of how they are doing during throughout the semester.

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