What are objectives good for?

• Have a master plan, a “roadmap”
• Top Down planning
  – Broad objectives for class
  – Objectives for large units
  – Specific behavioral objectives
• Ensure assessment at all levels of knowing
  – Bloom’s Taxonomy
Current trends in learning objectives:

• Shift from learning discrete facts to complex performance--reflected in a greater emphasis from cognitive psychology as opposed to behavioral psychology

• Behaviorism--bottom up approach

• Cognitive (Constructivist) approach believes in teaching for and assessing higher level skills in the learning process
Bloom’s Taxonomy provides a useful way of describing the complexity of a cognitive objective by classifying it into one of six hierarchical categories ranging from the most simple to the most complex.
Guidelines for writing objectives:

• Learning objectives should be MEASURABLE
• Use verbs that are specific and indicate observable responses
• General objectives should provide a comprehensive yet parsimonious overview of course content
• Specific objectives focus on content within each major unit of the class/course
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Rote-memory, learning facts.</td>
<td>Name each state capital.</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Summarize, interpret, or explain material</td>
<td>Summarize the use of symbols on a map.</td>
</tr>
<tr>
<td>Application</td>
<td>Use general rules and principles to solve new problems.</td>
<td>Write directions for traveling by numbered roads using a map.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Reduction of concepts into parts and explain the relationship of parts to the whole.</td>
<td>Describe maps in terms of function and form.</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Creation of new ideas or results from existing concepts.</td>
<td>Construct a map of a hypothetical country with given characteristics.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Judgment of value or worth.</td>
<td>Evaluate the usefulness of a map to enable travel from one place to another.</td>
</tr>
</tbody>
</table>
Examples of objectives at different levels

- Students will be able to identify important contributions of Skinner embedded in a multiple choice format
- Students will be able to apply the method of loci mnemonic when studying for their quiz
- Students can distinguish between fixed interval and variable interval reinforcement schedules
Examples of objectives at different levels

• Students will be able to synthesize information from the course and personal experience to create a sophisticated visual representation for effective instruction.

• Given an argument supporting the use of extrinsic rewards students will be able to break down the premises into those which are logical and those which are fallacies.
Bloom’s Taxonomy of Learning Outcomes


- **Six categories of cognitive learning:**
  - Knowledge (recall, knowledge of specifics, ways of dealing with specifics, facts, generalizations, theories & structures)
  - Comprehension (interpretation, extrapolation, summarizing)
  - Application (ability to use learned material in a practical manner, or within a new situation, using rules, principles)
  - Analysis (criticize, deconstruct, identify assumptions)
  - Synthesis (relating one theory to another, combining and reconstructing ideas, seeing relationships)
  - Evaluation (the ability to appraise, assign value, assess arguments, etc.)
Bloom’s Taxonomy: Verbs for Writing Instructional Objectives

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>arrange, define, duplicate, label, list, memorize, name, order, recognize, reproduce state</td>
<td>classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate</td>
<td>apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write.</td>
<td>analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.</td>
<td>arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, write.</td>
<td>appraise, argue, assess, attach, choose, compare, defend, estimate, judge, predict, rate, core, select, support, value, evaluate.</td>
</tr>
</tbody>
</table>
Bloom’s Taxonomy: Criticism

- Almost 50 years old.
- Behaviorist approach.
- Developed before we understood the cognitive processes involved in learning and performance.
- The categories or “levels” of Bloom’s taxonomy (Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation) are not supported by any research on learning.
Table of Specifications (or Test Blueprint)

- The method of ensuring congruence between classroom instruction and test content is the development and application of a table of specifications, which is also referred to as a test blueprint.
Table 7.5: Table of Specifications for Test on Chapter 2: Based on Content Areas
(Number of Items)

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scales of Measurement</td>
<td>2</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Measures of Central Tendency</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Measures of Variability</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Correlation &amp; Regression</td>
<td>2</td>
<td>3</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>
How does a teacher decide what to put on a test?

- **Consulting Published Sources** –
  - Using test questions from a publisher can lead to high-quality tests or very low quality tests:
    - typically checked for errors or potential problems (not true ALL the time, however!)
    - may not adequately reflect the material that was taught.
    - May not test at level YOU want or need

- **Using Instructional Objectives** –
  - Ideally, a test should cover the ALL objectives of the class.
The When and How of Testing

• More Frequent, Shorter Tests
  – Students tend to leave their studying until just before the test; the more often they are tested, the more they will study.

• Consider Testing Conditions
  – Poor conditions can depress test performance. Be attentive to the conditions the student will face.

• Ensure Clear Directions
Developing an Assessment: Types of Items

• Selected-response items require a student to select a response from available alternatives (multiple-choice, true-false, & matching items).

• Constructed-response items require students to create or construct a response (fill-in-the-blank, short answer, essay items, performance assessments & portfolios).
Selected Response vs. Constructed Response

• Which type is better?

• There is no consistent advantage of one over other. One is not inherently superior to the other.

• Select the item type that provides the most direct measure of the intended learning outcome.
Should a classroom assessment instrument be very hard, very easy, or somewhere in between?

• When assessments are too easy, students may not study very much and therefore may not learn as much as we would like.

• When students become accustomed to passing assessments with minimal effort, they may be easily frustrated in later years when they encounter more challenging material and do have to work hard.
Should a classroom assessment instrument be very hard, very easy, or somewhere in between?

- When assessments are too easy, teachers and students alike may think students have mastered something they haven’t really mastered at all. In other words, the assessments are not a valid measure of students’ learning.

- When assessments are too difficult, students may become discouraged and believe they are incapable of mastering the subject matter being assessed.
Creating Your Own Assessments:

• Remember, it takes a lot practice to develop good assessment instruments and items!

• Ideally you should consider measuring outcomes in multiple ways (e.g., multiple choice, projects, homework, etc.)

• Don’t fall into the “either/or” thinking
A brief introduction to test construction

• Why would you use a true-false type item?
• What are the pros and cons to this type of item?
• What makes a good T/F item?
True false items

- **Benefits:**
  - Can quickly assess a bunch of objectives/efficient
  - Easy to score

- **Disadvantages:**
  - 50% of items correct by random chance
  - Limited amount of info gained
  - Emphasizes rote memorization without understanding
  - Low diagnostic capability
How to write GOOD T/F items

• Attempt to test something other than rote memorization

• Avoid specific determiners – words that give away the answer
  – E.g. always or never, impossible

• Make each statement UNEQUIVOCALLY true or false- no room for argument or interpretation

• NO double-barreled items---unless the item is intended to show a cause and effect relationship the item should contain only one idea
How to write GOOD T/F items

• If an opinion is used it should be attributed to someone
• One strategy is to create a list of true statements from the material and then convert approximately half of them to false statements
• True and False statements should be approximately the same length (true statements may tend to be longer--qualifiers)
• Avoid ambiguous terms or statements
Creating Matching Items

• Use homogenous material (e.g., famous tennis players)
• Include unequal number of responses and premises & responses may be used more than once
Matching Items

• Advantages
  – Compact form/measure a lot at one time.
  – Ease of construction (for the most part)

• Disadvantages
  – Restricted to factual information
  – Difficulty of finding homogenous material
A brief introduction to test construction

• Why would you use a multiple-choice type item?
• What are the pros and cons to this type of item?
• What makes a good multiple-choice item?
“Best Buy”

• Multiple Choice Item Format provides a “Best Buy” for
  – Content coverage
  – Administration
  – Scoring
  – Reliability
Item Writing Rules
Why Worry?

• An item containing a flaw that directs any examinee to the correct answer who otherwise would NOT know the answer is invalid

• If an item is answered correctly, but for the wrong reason, it is not measuring the outcome it was intended to measure

• Flawed items provide an advantage to test-wise students
Multiple Choice Items
Rules for Writing Stems

• The stem should present a single self-contained question, problem, or idea
• State the problem as simply and clearly as possible (avoid excess verbiage and window dressing)
• The stem should contain as much as the item’s content as possible
Writing **GOOD** multiple-choice questions:

- Attempt to test something other than rote memorization
- Avoid specific determiners—words that give away the answer (like a, an, his or her, etc.)

- e.g. EDP 560 is an:
  A. Semester of Laughs
  B. Terrific Time
  C. Terribly Good Time
  D. Absolute abomination
Writing **GOOD** multiple-choice questions:

- Be clear in the stem what you are looking for
- **Not:**
  - Christopher Columbus was: ....
Writing **GOOD** multiple-choice questions:

- Make sure that ONE answer is clearly the best
- Make correct answer a,b,c,d,e in equal amounts
Writing **GOOD** multiple-choice questions:

- Use *plausible* options as distracters

- The leader of the Allied forces in the Pacific during WWII was:
  - A. Hitler
  - B. Eisenhower
  - C. MacArthur
  - D. Mickey Mouse
Writing **GOOD** multiple-choice questions:

- Be careful using “all of the above” as an option– this is often a specific determiner
- Using “none of the above” may increase the level of knowing and difficulty
- Make sure the answer is clearly defensible
Writing **GOOD** multiple-choice questions:

- The question should not typically be answerable without studying the material
- Avoid giving the answer away in the question or in the remainder of the test
- Create items that measure knowledge at all levels
- Work on your **distracters**--they make all the difference!
Written Exams
Multiple Choice Format

Advantages
• Lower chance score
• Reliable
• Good sampling
• Can be computer scored
• Low administration cost
• Large candidate groups

Disadvantages
• Often requires recognition only
• Difficult to write
• Requires longer development time than other exams
Multiple choice items

- **Advantages:**
  - More versatile than T/F in assessing higher cognitive levels
  - Can quickly assess a bunch of objectives
  - Easy to score

- **Disadvantages:**
  - 25% of items correct by random chance (if 4)
  - Limited amount of info gained
  - Emphasizes rote memorization without understanding