PROBLEM-BASED LEARNING FACILITATOR TRAINING

LEARNING OBJECTIVES
1- Be able to describe the philosophy behind problem-based learning.
2- Be able to describe how problem based learning is implemented in the medical curriculum at the UND SMH.
3- Be able to describe the facilitator’s role in problem-based learning including student assessment and evaluation.

SUPPLIED SUPPLEMENTAL READINGS:
5) Feedback. Options in Health Science Education. University of New Mexico School of Medicine Teacher Development Task Force. 1995.

LECTURE OUTLINE
I) Overview of student centered, problem-based learning (PBL)
   A) Teaching-learning methods can be divided into two general categories
   B) Basics of the PBL approach
   C) PBL is based on adult learning
   D) The PBL process
   E) The role of the facilitator in PBL
II) Problem based learning in the medical curriculum at UND
    A) Overview of the PCL process
    B) Specifics of the PCL process
    C) Implementation of the PCL process at the beginning of each block
III) The facilitator’s role in PCL
    A) Specifically
    B) Generally
    C) Facilitating discussion
    D) What not to do
    E) Learning objective construction
IV) Student assessment by the PCL facilitator
    Guidelines for evaluating and instructing students on the PCL small group process
I) Overview of student centered, problem-based learning (PBL)
(from A PBL primer for students and faculty By Robert E. Waterman, Ph.D. and Stewart P. Mennin, Ph.D.)

A) Teaching-learning methods can be divided into two general categories:
   1) based on the person responsible for deciding what students learn
      teacher-centered or student-centered
   2) based on how knowledge is organized
      subject-based or problem-based

   -traditional education is teacher-centered, subject-based
   -PBL education is problem-based and student-centered

B) Basics of the PBL approach
   -students take responsibility for decisions and consequences
   -learn to find information
   -success is a direct function of the questions asked
   -learning springs from desire to know something

   Classic PBL - discussion amongst small groups of students/self-study is the primary mode of learning
   Integrated PBL - combination of case discussions with traditional approaches (lectures, labs, etc)

C) PBL is based on adult learning
   -use what has been learned, as you learn it
   -use knowledge to solve problems
   -learn at your own pace
   -setting own objectives increases motivation
   -provide constant feedback
   -learn by doing, not by hearing or seeing

   -in other types of learning, the problem is at the end (exam), in PBL it is at the beginning (the case)
     -identify what you need to solve the problem (not a problem to illustrate why you have to know info)

D) The PBL process
   -students work cooperatively in small groups
   -assisted (facilitated) by a faculty member who may not be expert in the issues raised by the “problem”
   -use progressive disclosure or discovery through a case to identify learning needs

   Identify:
   1) what students know
   2) what students do not know
   3) what students need to know

   -students should be able to:
     -identify what they do not know
     -ask a question to refine that lack of knowledge
     -be able to find the answer to that question through a variety of resources (lifelong learning)
students teach each other: communication, generating and answering questions
- develop evidence-based reasoning
- continual evaluation/reflection via peer and facilitator feedback
- learn how to research material/find information: how to tackle a problem and appropriate resources (self-directed learning skills)

- there is an increased motivation for learning when it is self-directed
- students learn to understand (required to teach) rather than recall facts
- learning is integrated, rather than discipline-based (models real-life situations)
- becomes cumulative learning: may revisit the same issue over the course of 2 years

- the case unfolds as:
  1) a discussion of all the pertinent information (cues) contained in the case
  2) discussion of what that pertinent information means (recall knowledge or identify needs)
  3) incorporate new and old knowledge to understand case

Cues⇒Hypotheses⇒Mechanisms⇒Information possessed or required⇒explain Hypothesis & Mechanism

E) The role of the facilitator in PBL
  1) Facilitators should be comfortable with PBL theory
  2) Facilitators should be familiar with our curriculum
  3) Facilitators should understand their role in enhancing the PBL process
  4) Facilitators should understand their role in evaluating (formative and summative) group members

Bottom Line:
**STRENGTHS OF PBL**
- Develop an effective reasoning process.
- Develop effective self-directed learning skills.
- Increase motivation for further learning.
- Develop interpersonal and communication skills.
- Connect new information to previous knowledge.

II) Problem based learning in the medical curriculum at UND

- the global approach is called PBL, but at UND SOMHS our cases all involve patients
- we therefore often call this approach PCL (patient-centered learning)

A) Overview of the PCL process
  - small groups of 7-8 students and one facilitator
  - conduct 8, one week cases per Block (four Blocks per year)

  For each case:
  - meet on Monday, Wednesday and Friday morning (except during holidays) for 2 hours each
  - case wrap-up for one hour after Friday session: meet live patient and physician
B) Specifics of the PCL process

1) **Overview**

- CUE ⇒ PROBLEM ⇒ HYPOTHESIS ⇒ LEARNING OBJECTIVE
- each group must select Scribe & Group leader & Reader
- case disseminated one page at a time
- receive information--glean cues/clues (write onto board)
- finish one page before going on to the next
- hypothesize causes--revise frequently--NOT the important part
- from clues get learning objectives (L.O.s)---concise & basic or clinical science
- CRISP (basic/clinical science) ISSUES (areas of ignorance)---aim is not hypothesis or diagnosis
- aim=basic & clinical science and information discovery and research
- 10 min reports by each student on Wed & Friday
- end of week evaluation--evaluate each other—strengths/weaknesses/improve
- evaluate by facilitator 1) mid-block; 2) final (using SPIRAL form or narrative)

2) **Weekly Design**

- CUE ⇒ PROBLEM ⇒ HYPOTHESIS ⇒ LEARNING OBJECTIVES

**Monday**

1-get started, first piece (page) of case---identify CUES (history, physical exam)
2-write down the CUES (+ & -) and propose causes (HYPOTHESIS)
3-develop basic/clinical science learning objectives
4-revise hypothesis after patient history—identify needed tests
5-prioritize & develop learning objectives—give report on Wed.—ORAL & HANDOUT
6-need CRISP learning objectives at the end of Monday & Wednesday
7-can have: more than 1 L.O./person & more than 1 person/L.O. (not optimal)

**Wednesday**

1-summarize the case
2-group leader determines presentation order (best done before class time)
3-10 minutes per report--**not** longer (ORAL & HANDOUT)
4-then more case pages--revise hypothesis
5-students develop new learning objectives
6-faculty developed learning objectives are distributed at end of Wednesday’s session
7-students develop their L.O.s and present on Friday

**Friday**

1-group leader supplies breakfast Friday only (no cooking in rooms, non-disruptive foods)
2-summarize case
3-L.O. presentations (covering faculty and student objectives)
4-finish all the case pages
5-evaluations---group, Facilitator/member & member/member---**VERY IMPORTANT**
6-case wrap-up in lecture theatre (appropriate dress & behaviour) at 11am
C) Implementation of the PCL process at the beginning of each block

-except for Block I, students should be familiar with these guidelines/procedures

1) INTRODUCTION OF GROUP MEMBERS AND FACILITATOR (15 minutes)
   Goal is to produce a comfortable, relaxed environment
   a. Ask for simple information that might help “break the ice” – where they’re from, college, major in college, interests outside of school, etc.
   b. Be enthusiastic for the PBL procedure and the block

2) CREATE SOME GROUND RULES (at least the following, some groups may want to add others):
   a. RESPECT each other
   b. ABSENT/LATE—not an option; must notify if unavoidable (Student Affairs)
   c. TIME--Start and stop on time!
   d. PROFESSIONALISM - want all opinions - all questions valid
      -professional behaviour expected (no cursing, inappropriate jokes, feet on the table, etc)
   e. Must be prepared and participate
   f. No information from second years. Dismissal hearing for both parties.
   g. Minimal use of references during PCL – Outside resources (medical dictionary, PCL computer for quick lookup)---only if it does not stifle group discussion.
   h. No cell phones and no laptops in continuous use
   i. Rotate group leaders each week – leaders meet with block director on Friday
   j. Mandatory CASE WRAP-UP ATTENDANCE & professionalism (dress code, no newspapers, laptops, cell phones, hand-held devices)
   k. Break and food/drink policies to be decided by the group in consultation with facilitator

3) DESCRIBE/REVIEW THE PCL PROCESS (WHAT I TELL STUDENTS)
   a. STUDENT CENTERED LEARNING – You are responsible for your own learning
   b. STATE ROLE OF FACILITATOR: Facilitator is only a GUIDE, not a content expert! Will help:
      i. With roles in PCL (QB, scribe)
      ii. Learn the PCL process—board organization, ID issues, clues from case (facilitator guide)
      iii. Stay On Task
      iv. Evaluate performance (give out SPIRAL form) - evaluative & instructive
      v. Foster professional intergroup relationships
      vi. Provide frequent feedback (verbal or e-mail) - Support and suggest changes
      -provide students with a contact (phone and email) so that they may notify you if they are to be late or absent (they must also notify Office of Student Affairs)
   c. How each case is expected to unfold (chief complaint, history of present illness, family history, review of systems, physical exam, etc.)
   d. Describe what happens on Monday? Begin case, progressive unfolding, development of LOs
   e. Describe what happens on Wednesday? Presentation of LOs, Finish Case, Faculty LOs
4) **START CASE AND CONSTRUCT LEARNING OBJECTIVES**
   a. Read page 1 of the case
   b. Review the information (cues and clarification)
      i. **Help** with roles as students begin to work on the case (QB, scribe)
      ii. **Help** with organizing board work
      iii. **Help** with definitions: chief complaint, signs, symptoms, cues, etc.
   c. Begin addressing questions from in the case. Assist in development of habits of mind—questions to be asked in every case (i.e. chief complaint, revise hypotheses, focus physical exam, etc.)
   d. Develop hypotheses (must be justified)
   e. Based on hypotheses, suggest tests/exams/additional information to narrow differential diagnoses
   f. Develop any learning objectives for that page

5) **PRACTICAL PCL TIPS THAT I GIVE OUT TO THE STUDENTS**

   **Ground Rules**
   - Respect each other. Act toward each other, and the patient, with the utmost professionalism
   - Attendance in PCL is mandatory: if you must be absent notify Office of Student Affairs
   - 2 hrs=Tight schedule – Therefore, we must start/stop on time (do not make your group wait)
   - All opinions are valued and expected (no interruptions and only one conversation at a time)
   - A medical vocabulary is key: when reading/presenting, attempt to pronounce all words
   - Second year students cannot be used as a resource for L.O.s or case information.
   - Minimal use of references during PCL
   - Mandatory case wrap-up attendance: professional dress & conduct expected (no newspapers, cell phones, laptops, etc.)

   **PCL Evaluations**
   - Look at the SPIRAL form; you will be evaluated according to those guidelines
   - Self-evaluation prepared and presented to facilitator at mid-block
   - 10-15 minute meeting with facilitator at mid-block and end-of-block
   - Evaluation by facilitator presented to you at mid-block and at end-of-block
   - Peer and group evaluations are critical to effective group function – perform weekly

   **Lecture and Block Evaluations**
   - You will be expected to fill out evaluations of individual lecturers and for each block.
   - Filling out evaluations is a component of professionalism – You were admitted to a profession because of your citizenship and behavior. Your participation is confidently expected.
   - Your opinion counts! It will be carefully considered and, if feasible, acted upon.
   - Do not make negative comments about PEOPLE. Comment on BEHAVIORS that would make faculty or the block more effective.
   - When you make a criticism, propose a remedy or make suggestions for improvement.
III) The facilitator’s role in PCL

A FACILITATOR:
- must understand the theory of PBL and how it is applied in small group discussion at UND SMHS
- is not a content expert, but should be knowledgeable about the case
- enables students to learn on their own
- should be facile in summative and formative evaluation

-the role of the facilitator will change as the group evolves
-1-3 weeks of socializing/conflict⇒high productivity for 3 weeks⇒end of block stress for 2 weeks
-role of facilitator will also be different in more experienced groups

A) Specifically:
- help the student with their roles
- help the student learn PCL method (see ground rules above)
  - board organization
  - defining/identifying chief complaint, signs, symptoms, clues, issues
- help students stay on task
- help students address the faculty-generated questions that appear throughout the case
  - (i.e. chief complaint, revise hypotheses, focus physical exam, etc.)
- help students develop hypotheses (they must be justified)
- help students identify tests/exams/additional information to narrow differential diagnoses
- help students develop learning objectives (guide towards topics and model style)—see below
- EVALUATE (narrative or SPIRAL form)—summative and formative
  - I make daily notes on each student
  - I contact each student weekly and give positive and formative feedback
  - I convert my notes, weekly feedback and responses to mid/end block evaluative narratives
- ensure professional conduct/interpersonal civility (& correct if necessary)
- establish a safe learning environment for all
- provide conflict resolution

B) Generally:
- empower students to assume ownership of the group and their learning
  - e.g. develop their own boundaries for depth and breadth for their learning objectives
- model expectations and behaviour
- demonstrate the value of feedback by providing it (and the time to do so in the group)
- help students be a part of the group

-the role of the facilitator will change as the group evolves through a Block

1-3 WEEKS OF SOCIALIZING/CONFLICT⇒HIGH PRODUCTIVITY FOR 3 WEEKS⇒END OF BLOCK STRESS FOR 2 WEEKS
- the role of the facilitator will change between Blocks (from Block I to Block VIII)
- early in year 1: most emphasis may be on teaching behaviours and how to be a self-directed learner
  - how to be successful at the PCL process
- by year 2: little facilitation required; evaluate and provide feedback on depth and breadth of L.O.s
-the close interpersonal relationship between student & facilitator in a small group is much different than in the lecture hall or lab setting
-requires a different skill set and approach

1) **ATTITUDE**
   a) positive
   b) interested
   c) enthusiastic
   d) humble
   e) respectful
   f) accessible
   g) idealistic

2) **MEDICAL KNOWLEDGE**
   a) prepares by understanding case and block content
   b) understands block and case objectives
   c) understands role of basic science in clinical applications
   d) values psychosocial, patient care, and/or ethical aspects of block material
   e) knows limitations

3) **PROFESSIONALISM**
   a) professionalism is learned by modeling
   b) faculty should demonstrate commitment to the pursuit of knowledge and academic excellence
   c) faculty should demonstrate a positive attitude and behavior toward all colleagues, including students, and institutional expectations
   d) faculty should demonstrate respectful behavior when addressing all curricular or extracurricular activities
   e) faculty should provide timely feedback on appropriate and inappropriate behaviors demonstrated by the group or an individual
   f) faculty should adhere to the UND SMHS PBL Program policies and guidelines

4) **PATIENT AWARENESS**
   a) the group should never lose sight of the patient at the center of the case
   b) discussion should always have a link to the patient
   c) consider patient as person, not illness
   d) patient care and consideration must be emphasized
   e) discuss how the patient’s attitude, action, appearance and adherence impact a physician’s response and vice versa
   f) always consider the impact of the disease and therapy on the patient’s life
C) Facilitating discussion
-a facilitator consistently must work to facilitate discussion
  1) get it started (what is issue?)
  2) keep it moving & on track
  3) bring it to a close (ask someone to summarize where the group is)
-may need to teach this (1 person speaks at a time, have everyone involved, etc)
-in early blocks, I ask questions to model how they should be approaching issues
-this also assists students in identifying what they do not know

D) What not to do:
-facilitators should avoid becoming the “content resource”
  -if students turn to facilitator as content expert, turn questions into questions
    (Does anyone else know the answer? Should this be a learning objective?)
  -silence may facilitate group interaction and discussion after you ask a question
-DO NOT give out faculty learning objectives prior to Wednesday

COMMON DIFFICULT SCENARIOS AND SOME CORRECTIVE MEASURES
  1) Unprepared -speak with student or group
  2) Under-prepared -identify problem and address whole group or speak with individual
  3) Under-participation -encourage individuals to participate (required for satisfactory eval.)
    -ask whole group to take turns adding comments
  4) Excessive participation -monopolizing or overly critical/dominating behaviours
  5) Disruptions -sidebar conversations, personality conflicts
  6) Distractions -tardiness, excessive attention to reference material, unprofessional comments

E) Learning objective construction
-students often require some assistances in generating learning objectives
  -a facilitator should not dictate content, but rather influence subject areas by providing ideas
  -a facilitator should provide as much assistance as necessary concerning the style of L.O.s

GLOBAL PRINCIPLES FOR CONSTRUCTING LEARNING OBJECTIVES
  1) Learning objectives should be written as a statement that describes what a student will be able to perform or accomplish at the end of the instructional activity.
  2) Learning objectives should contain an action verb that provides directions as to what is expected and leads to a measureable outcome (e.g. verbs such as “understand, know, familiarize, comprehend” are less measureable than “describe, diagram, illustrate, explain, design, theorize, etc” and should be avoided).
  3) Students (and faculty) should aspire to writing learning objectives that cover a range of complexity. The action verbs should reflect the expected level of accomplishment (see attached list of verbs that might be used to reflect different levels of performance).
  4) Ideally, learning objectives should include the conditions under which the activity is performed and criteria of acceptable performance. However these may be implied by the instructional venue. In the case of learning objectives for PCL, the implied conditions would be the short (10 minute) oral presentation with handouts.
  5) Learning objectives for PCL should be focused and specific.
### Verbs that might be used to reflect emphasis on different levels of performance

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<td>Knowledge</td>
<td>Recall, identify, recognize, acquire, distinguish, state, define, name, list, label, reproduce, order</td>
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<td>Comprehension</td>
<td>Translate, extrapolate, convert, interpret, abstract, transform, select, indicate, illustrate, represent, formulate, explain, classify, comprehend</td>
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<td>Application</td>
<td>Apply, sequence, carry out, solve, prepare, operate, generalize, plan, repair, explain, predict, demonstrate, instruct, compute, use, perform, implement, employ, solve</td>
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<tr>
<td>Analysis</td>
<td>Analyze, estimate, compare, observe, detect, classify, discover, discriminate, explore, distinguish, catalog, investigate, breakdown, order, determine, differentiate, dissect, contrast, examine, interpret</td>
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<tr>
<td>Synthesis</td>
<td>Write, plan, integrate, formulate, propose, specify, produce, organize, theorize, design, build, systematize, combine, summarize, restate, argue, discuss, derive, relate, generalize, conclude, produce</td>
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<td>Evaluation</td>
<td>Evaluate, verify, assess, test, judge, rank, measure, appraise, select, check, judge, justify, evaluate, determine, support, defend, criticize, weigh, assess</td>
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<td>Affective domain</td>
<td>Agree, avoid, support, participate, cooperate, praise, help, offer, join</td>
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#### 12 Tips for successful group facilitation [Azer (2005) Medical Teacher 27(8) 676-681]

1) set ground rules in first meeting  
2) discuss the different roles within the group  
3) encourage trust and teamwork  
4) do not dominate group, facilitate discussion  
5) be a role model  
6) encourage students to pursue understanding and acknowledge limitations  
7) foster healthy discussion and understanding (rather than memorization), and critical thinking  
8) direct discussion and L.O. development through open-ended questions  
9) promote a healthy group dynamic  
10) approach group conflict with a developmental attitude (rather than punitive)  
11) provide feedback that encourages and helps (formative) the group  
12) clearly state the role of the facilitator
IV) **Student assessment by the PCL facilitator**

-the SPIRAL form will be used in Blocks I and II along with a narrative for all blocks
-the SPIRAL form will provide benchmarks and a guide to abilities the students should demonstrate
-the SPIRAL form is not a “grading scale” (PCL evaluation is pass/fail)
-students should fit somewhere along a continuum of competencies for each component
  -I often think that in Block I, most students could be “Novice” for all components
  -by Block VIII, we would like all students to achieve “Mastery” in all components
  -in reality, students have different levels of competencies, in different components, at different times

-although there is one final grade for PCL small group facilitation for each Block, you evaluate twice

  1) mid-block (during week 4); a 15-30 minute individual discussion with each student
    -performance review and formative feedback
    -at mid-block you will provide them with:
      1) the narrative evaluation
      2) SPIRAL form (Blocks I & II only)

  2) end-block (during week 8); a 15-30 minute individual discussion with each student
    -performance review and formative feedback
    -at end-block you will provide them with:
      1) the narrative evaluation
      2) SPIRAL form (Blocks I & II only)
      3) provide them with their grade

-evaluations are submitted on-line in addition to being provided to students
-students are to be evaluated according to the SPIRAL form and the guidelines below:

**GUIDELINES FOR EVALUATING AND INSTRUCTING STUDENTS ON THE PCL SMALL GROUP PROCESS:**

A) **Writing learning objectives**

  1) LOs should be written as a statement that describes what they will be able to accomplish/perform.

     -examples of well developed objectives

     _Describe the anatomical arrangement and relationships of the lower limb bones with specific reference given to characteristic features observable on radiographic (x-ray) imaging._

     _Explain the mechanisms by which the antibiotics used in this case exert their antimicrobial effects. On that basis, justify the antimicrobial therapies chosen and employed in this case._

     -examples of poorly developed objectives

     *leg bones—anatomy*

     *chem panel*

     *clotting cascade*

     *PKU*
2) LOs should contain an action verb that leads to a measurable outcome.
   \( \Phi \): describe, diagram, illustrate, explain, design, theorize
   \( \Psi \): understand, know, familiarize, comprehend

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3) LOs, as a group, should cover a range of complexity.
   - different verbs reflect different levels of accomplishment & complexity

4) LOs should be focused and specific. (not leg anatomy)

5) LOs must take into consideration: 10 minute oral presentation with a handout.

6) LOs should always have two aspects:
   a) acquisition of basic biomedical or clinical knowledge
   b) relevance to the case under discussion

   - always consider that there has to be some measurable outcome (assessment)
   - we can assess “Describe……”, we cannot assess “Familiarize…..”
B) **Researching learning objectives**
   The goal is to use credible resources with a scientific basis.

1) **PREFERRED (AND SUFFICIENT) RESOURCES:**
   Recommended textbooks
   - *to purchase* as listed below:
     - Textbook of Biochemistry with Clinical Correlations, 7th ed., Devlin, 2010
     - Neuroscience, 5th ed. Purves, et. al., 2010
     - Neuroanatomy Through Clinical Cases. Blumenfeld, 2nd ed., 2010
     - Doc.com (year 1 students)
     - Biomedical Ethics. Mappes and DeGrazia, 7th ed., 2011
     - Rubin's Pathology, Clinicopathologic Foundations of Medicine, 6th ed., 2011
     - Robbins and Cotran Pathologic Basis of Disease, 8th ed. 2009
   - many texts also available, for reference, in the library
   Recommended websites (MDConsult, Access Medicine)
   Web-based articles with the following characteristics:
     - Identifiable author(s)
     - References (including primary literature and authoritative textbooks)
     - Current (most recent update identified)
   Primary literature (PubMed search)

2) **ACCEPTABLE (BUT INSUFFICIENT) RESOURCES**
   Lecture notes
   Board review books
   Online articles that do not meet “acceptable resource” criteria
     - Identifiable organizations (CDC, Mayo Clinic, American Cancer Society)
     - Should be info targeted at physicians or scientists rather than general public
3) **Discouraged resources (can be used as a starting point, but not as a reference in L.O.):**

- Wikipedia
- Any article or book of questionable authority
- Pocket manuals
- Web-based articles with the following characteristics:
  - Pharmaceutical companies
  - Patient information websites

C) **Finding appropriate resources**

- Students have received training and information on this topic from the library staff

D) **Learning objective presentations**

1) **Understand boundaries of L.O.**

   - The group has written a focused & specific L.O.
   - The student must stay focused on exact L.O.
   - Only have 10 minutes for presentation

2) **Organization:**

   - Students are encouraged to “tell what you’re going to tell them, tell them, tell them what you told them”
   1) “Tell what you’re going to tell them”
      - Introduction: brief with enough background to provide context
   2) “Tell them”
      - Body of information: the details: from general to specific
   3) “Tell them what you told them”
      - Summary: make sure to tie the L.O. information into the case

   - Determine and include context of information (how it relates to case)
   - Choose informative figures—If figures do not add something, do not add
   - Consider length and depth of L.O.—deliver in 10-12 minutes

   - Choice of medium:
     - PowerPoint
     - Whiteboard
     - Models
     - Easel
     - Videos
     - Audio

   - Students should ensure PowerPoints work before the presentation

3) **Deciding on amount of detail is always difficult**

   - Students should always err on the side of more detail (but staying within 10-12 minutes)
   - Students may make L.O. presentation available to other students within own PCL group (S drive)
E) Delivery of learning objectives
1) Stand to give presentation
2) Presentation modality appropriate to content (e.g. some content may be best suited to models)
3) Easy to read/logical progression
4) Some evidence that the student “owns” the information
   Uses their own words
   Does not just read or regurgitate information
   Pronounces all the information
5) Teaching, not just passing information
   Engaged, enthusiastic
6) Anticipate questions
7) Discusses all the figures in the L.O.
   Orients audience to figure before proceeding

F) Learning objective handouts
1) Makes copies for all students in group plus one for facilitator
2) Prepares/copies handouts well in advance (NOT immediately before PCL!)
3) Includes on first page:
   Student name and date of L.O.
   Complete Title of Learning Objective
   Case name
4) Text of L.O. in a readable font--12 point (10 point at minimum)
5) Length – whatever is necessary, but one page (front and back) is the goal
6) Content – whatever is relevant for students to understand and learn the information
7) Figures and visuals that contribute to understanding (legible with citations)
8) References (http://www.nlm.nih.gov/bsd/uniform_requirements.html)
   -use standardized style as dictated by NIH National Library of Medicine
   1. Standard journal article
   2. Books with personal author(s)
      2002.
   3. Books with editor(s), compiler(s) as author
      Gilstrap LC 3rd, Cunningham FG, VanDorsten JP, editors. Operative obstetrics. 2nd ed. New York:
   4. Journal article on the Internet
      Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J
      Nurs. 2002 Jun [cited 2009 July 16];102(6):[about 1 p.]. Available from:
      http://www.nursingworld.org/AJN/2002/june/Wawatch.htmArticle
   5. Part of a homepage/Web site
      23; cited 2009 July 16]. AMA Office of Group Practice Liaison; [about 2 screens]. Available from:
      http://www.ama-assn.org/ama/pub/category/1736.html
   -many other examples provided at the cited website
SPIRAL identifies fourteen components of learning and performance behaviors in medical education. Each component is divided into competencies that have identified core knowledge and associated observable indicators. The observable indicators are broken down into four levels of competence that are defined as:

**Level 1 – Marginal**
Not able to meet minimum expectations of the learning situation

**Level 2 -- Novice**
Entry/beginning level
Seeking required training and knowledge

**Level 3 -- Practicing**
Practicing skills gained from knowledge
Seeking additional knowledge

**Level 4 -- Skilled**
Consistently connecting knowledge and skills in daily practice
Seeking additional knowledge and refining skills

**Level 5 -- Mastery**
Ability to model knowledge and behaviors and to facilitate growth in others
Sequenced Progress Inventory & Reflective Assessment of Learning (SPIRAL)

Acquisition and Integration of Knowledge

<table>
<thead>
<tr>
<th>Marginal</th>
<th>Novice</th>
<th>Practicing</th>
<th>Skilled</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Defining and solving problems</td>
<td>Demonstrates a limited range of knowledge.</td>
<td>Explains relationships in general terms</td>
<td>Draws appropriate conclusions and explains why</td>
<td>Accurately identifies problems and predicted outcomes</td>
</tr>
<tr>
<td></td>
<td>Provides an occasional hypothesis without supporting evidence.</td>
<td>Provides frequent hypotheses with minimal supportive evidence.</td>
<td>Consistently identifies newly discovered patterns and subtle differences in interpretation</td>
<td>Makes appropriate decisions and interpretations</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Explains significance of problems supported with a deep understanding of basic science and clinical mechanisms</td>
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<td></td>
<td>Shows an ability to teach the above skills to others</td>
</tr>
<tr>
<td>2. Demonstrating and applying knowledge base</td>
<td>Recalls information presented in lecture, laboratory and PCL</td>
<td>Demonstrates a firm grasp of information and accurate application to patient</td>
<td>Begins to integrate new information with existing knowledge</td>
<td>Immediately and insightfully places new information in proper context with existing knowledge</td>
</tr>
<tr>
<td></td>
<td>Poses appropriate questions that require application of knowledge base</td>
<td>Is able to interpret facts to compare and contrast with knowledge base</td>
<td>Applies new knowledge from several areas in a novel approach</td>
<td>Shows an ability to discriminate between hypotheses and is able to prioritize hypotheses</td>
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<td></td>
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<td></td>
<td>Is able to identify hidden meanings</td>
<td>Shows an ability to break down concepts into components</td>
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<td></td>
<td>Shows an ability to justify statements based on a deep understanding of information</td>
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<tr>
<td></td>
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<td></td>
<td>Skillfully challenges group to justify statements using an evidence-based (clinical research) foundation</td>
</tr>
<tr>
<td>3. Generating hypotheses</td>
<td>Suggests hypotheses though rationale is unclear</td>
<td>Supports hypotheses with a variety of information at times, including evidence-based research data</td>
<td>Generates hypotheses that are clearly stated and supported with examples</td>
<td>Generates hypotheses that are based on a multitude of information resources</td>
</tr>
<tr>
<td></td>
<td>Rarely considers alternative hypotheses</td>
<td>Begins to suggest and consider alternative hypotheses</td>
<td>Demonstrates application of their information research to support position in a clear and concise manner</td>
<td>Generates hypotheses that are supported by all available evidence</td>
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<tr>
<td></td>
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<td></td>
<td>Has a profound understanding of clinical presentation and underlying pathophysiological mechanism</td>
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<td>Consistently generates exhaustive list of hypotheses on the differential diagnosis</td>
</tr>
</tbody>
</table>
### 4. Generating learning issues

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Infrequently suggests learning issues</td>
<td>Understands own learning needs</td>
<td>Uses effective approach to generate concise learning issues</td>
<td>Shows a consistent understanding of own learning needs and that required by others</td>
<td></td>
</tr>
<tr>
<td>Generates learning issues that are general and broad</td>
<td>Is able to examine topic to own satisfaction (personal level of detail)</td>
<td>Makes solid connections with previous (existing) knowledge</td>
<td>Can approach a topic from multiple angles</td>
<td></td>
</tr>
<tr>
<td>Cannot yet identify multiple questions within broad issues</td>
<td>Uses effective approach to generate concise learning issues</td>
<td>Shows a consistent understanding of own learning needs and that required by others</td>
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</tr>
</tbody>
</table>

### Narrative on Acquisition and Integration of Knowledge:

**Peer Teaching and Communication Skills**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Uses one information source</td>
<td>Uses multiple information sources for each learning issue but relies heavily on web sites and textbooks</td>
<td>Uses multiple information sources for each learning issue including use of primary literature</td>
<td>Uses information that has been gathered from all existing relevant sources</td>
<td></td>
</tr>
<tr>
<td>Uses easiest source for information (e.g. web sites, required textbooks, lecture handouts) or consistently uses the same source for information</td>
<td>Addresses learning issue but reports are accompanied by abundant extraneous information</td>
<td>Generates reports that are succinct and accurate and reflect original learning objective</td>
<td>Compiles reports that are succinct and flow from a brief general overview to the very specific and most recent information</td>
<td></td>
</tr>
<tr>
<td>Indirectly addresses learning issue (e.g. reports are too broad, off topic or superficial)</td>
<td></td>
<td>Uses information that has been gathered from all existing relevant sources</td>
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</tr>
</tbody>
</table>

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<th>Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is frequently distracted or not paying attention to speaker</td>
<td>Appears to be listening but is not watching or acknowledging speaker or presentation</td>
<td>Displays occasional indicators of concentrated attention to presentation (e.g. nodding, note taking)</td>
<td>Is actively engaged in presentation (e.g. nodding, taking notes, eye contact with speaker or slide)</td>
<td></td>
</tr>
<tr>
<td>Rarely asks questions</td>
<td>Asks questions to help them understand the presented material</td>
<td>Asks questions that demonstrate an understanding of the material presented</td>
<td>Asks questions that require integration of existing knowledge with the material presented</td>
<td></td>
</tr>
<tr>
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<td>Practicing</td>
<td>Skilled</td>
<td>Mastery</td>
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<tr>
<td><strong>7. Presentation skills</strong></td>
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</tr>
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<td>Mastery</td>
</tr>
<tr>
<td></td>
<td>Reads notes or slides and is obviously nervous; does not stand to present information</td>
<td>Uses a comfortable and relaxed presentation style that is clear, but may be too informal</td>
<td>Uses a clear presentation style that needs very slight polishing</td>
<td>Employs a professional presentation style and pace</td>
</tr>
<tr>
<td></td>
<td>Uses medical terminology sparingly or incorrectly; jokingly dismisses errors</td>
<td>Often employs medical terminology correctly, but occasionally uses jargon</td>
<td>Does not employ jargon but occasionally is unclear on certain scientific or medical definitions</td>
<td>Is comfortable with all medical terminology and its correct usage</td>
</tr>
<tr>
<td><strong>8. Teaching methodology</strong></td>
<td>Generates handouts that are poorly organized and frequently too long or too short; no references</td>
<td>Prepares organized handouts but textual format (e.g. point-form versus paragraph format, lack of illustrations) may need work; handouts only occasionally too long or too short; lack of essential information requires frequent post hoc supplementation (e.g. “I will get you that information later”)</td>
<td>Prepares well organized handouts of appropriate length but the critical information may be difficult to extract from the document</td>
<td>Always prepares handouts of appropriate length and content and the essential information is easy to identify; thorough references in appropriate citation style</td>
</tr>
<tr>
<td></td>
<td>Consistently does not employ audiovisual aids of any sort</td>
<td>Utilizes one presentation medium (overheads, drawing on board or easel, PowerPoint; web-based videos or audio clips; quizzes)</td>
<td>Utilizes a variety of presentation media but may not select optimal media for the content of each objective (e.g. large, clear overhead images for an anatomy objective; animated PowerPoint for immunological interactions)</td>
<td>Utilizes a variety of presentation media and always selects proper presentation media to supplement communication of objective content</td>
</tr>
<tr>
<td><strong>9. Responding to questions</strong></td>
<td>Response is vague or contains elements of factual error</td>
<td>Response is well phrased and demonstrates some knowledge of the subject area</td>
<td>Integrates related information into answer</td>
<td>Utilizes examples and facts to better answer the question</td>
</tr>
<tr>
<td></td>
<td>Does not directly address question asked or appears defensive</td>
<td>Makes factual uncertainty very clear before attempting to answer to the best of their ability</td>
<td>Displays a knowledge of the subject area beyond the information in their report</td>
<td>Will clarify points by approaching the same information from a number of different avenues</td>
</tr>
</tbody>
</table>

**Narrative on Peer Teaching and Communication Skills:**
## Professionalism

<table>
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<tr>
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<tbody>
<tr>
<td>10. Being a responsible team member</td>
<td>Fulfills duties minimally</td>
<td>Carries out group responsibilities</td>
<td>Carries our responsibilities well</td>
<td>Exceeds expectations in fulfilling group responsibilities</td>
</tr>
<tr>
<td></td>
<td>Attends on time</td>
<td>Engages in group leadership and evaluation</td>
<td>Active group leader</td>
<td>Active but not overpowering leader</td>
</tr>
<tr>
<td></td>
<td>Rarely provides feedback on group effectiveness</td>
<td>Doesn’t “make waves” in group</td>
<td>Keeps group working well; engaged in group evaluation</td>
<td></td>
</tr>
</tbody>
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<tbody>
<tr>
<td>11. Evaluating self accurately</td>
<td>Is largely dependent on feedback from others</td>
<td>Has some awareness of strengths and weaknesses</td>
<td>Assesses strengths and limitations realistically</td>
<td>Shows deep awareness of strengths and limitations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Can identify important elements of own learning needs</td>
<td>Able to define personal learning needs and develop plan for improvement</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>12. Responding appropriately to feedback</td>
<td>Shows limited interest in responding to feedback</td>
<td>Can hear feedback, usually responds appropriately</td>
<td>Accepts feedback well, almost always responds appropriately</td>
<td>Actively solicits feedback, responds appropriately at all times</td>
</tr>
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<tr>
<td>13. Treating others with respect</td>
<td>Is limited to own attitudes, often put off by differing opinions</td>
<td>Is somewhat able to empathize with other views and acknowledge their plausibility</td>
<td>Is respectful of others; open to different views and can discuss differences non-judgmentally</td>
<td>Is always respectful of others; seeks out differing views and uses them to test own views</td>
</tr>
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</thead>
<tbody>
<tr>
<td>14. Striving for excellence</td>
<td>Does minimum necessary to get by</td>
<td>Does more than minimum necessary</td>
<td>Continually works to improve performance</td>
<td>Consistently strives for excellence in all activities</td>
</tr>
</tbody>
</table>

**Comments about Professionalism:**
End-of-Block Grade: _______Satisfactory _______Unsatisfactory