

ED-5-A Appendix: Active Learning Examples

Active learning: The process by which a medical student 1) independently, or collaboratively with his or her peers, identifies his or her learning objectives and seeks the information necessary to meet the objectives and/or 2) contributes to the learning of a group with information that he or she prepares and discusses. In active learning, the learner has a role in the learning outcomes achieved by the individual learner and his or her peers.

It is expected that the methods of instruction and assessment used in courses and clerkships will provide medical students with opportunities to develop lifelong learning skills. These skills include self-assessment on learning needs; the independent identification, analysis, and synthesis of relevant information; and the appraisal of the credibility of information sources. Medical students should receive explicit experiences in using these skills, and they should be assessed and receive feedback on their performance.

Provide examples that illustrate the opportunities that exist in years one and two of the curriculum for students to do each of the following:

- A. Assess their learning needs, individually or in groups*
- B. Identify, analyze, and synthesize information relevant to their learning needs*
- C. Assess the credibility of information sources*
- D. Share the information with their peers and supervisors*
- E. Receive feedback on their information retrieval and synthesis skills*

Year One						
Course	Session Title	Session Objective	Active Learning Component	Instructional Method	Assessment Method	Resource Type
Molecular Basis of Medicine -Bev Delidow AY 12-13	Hemoglobinopathies	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Independent Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Gout	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Lysosomal Storage Diseases	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Clinical Cancer Research	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Obesity	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Diabetes	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation

Molecular Basis of Medicine -Bev Delidow AY 12-13	Cardiovascular Disease	Demonstrate integration of information from basic and clinical science by formulating a question addressing a gap in current knowledge	A,B	Case-Based Instruction/ Learning	Narrative Assessment Reflective Questions	Clinical Correlation
Molecular Basis of Medicine -Bev Delidow AY 12-13	Bad Blood (documentary film)	Describe the coagulation pathway and the causes of hemophilia Describe the history of treatments for hemophilia List risks engendered by development of therapeutics derived from human blood Describe the ethical choices made by all involved parties; define acceptable risk	B, D, E	Large Group Discussion	Narrative assessment: Answer the question, "What is acceptable risk?" Provide examples from the film to support answer	Film/video
Molecular Basis of Medicine -Bev Delidow AY 12-13	Stem Cell Homework	Assess the validity and applicability of emerging stem cell therapies in a clinical example Evaluate and cite appropriate literature	A, B, C, D, E	Problem-Based Learning (PBL)	Narrative assessment Students work in groups and are required to provide literature sources for their answers	Searchable database
Molecular Basis of Medicine -Bev Delidow AY 12-13	Genetics Homework	Apply principles of genetics to sample problems	A, B, E	Independent Learning	Exam - Institutionally Developed, Written/ Computer-based	Printed Materials (or Digital Equivalent)
Molecular Basis of Medicine -Bev Delidow	Revisiting Warburg -Part One	Using review article as a guide, develop a series of questions to guide your understanding of the	A, B, D	Small Group Discussion; Large group discussion	Group presentation Narrative assessment	Printed Materials (or Digital Equivalent)

AY 12-13		principles of tumor development and metabolism. Apply principles of tumor development and metabolism to develop a concept map				
Molecular Basis of Medicine -Bev Delidow AY 12-13	Revisiting Warburg-Part Two	Compare and contrast original questions and concept map to current knowledge of tumor development and metabolism	A, B, D	Small Group Discussion; Large group discussion	Group presentation Participation	Printed Materials (or Digital Equivalent)
Molecular Basis of Medicine -John Wilkinson AY 12-13	First heart and liver transplant operation to overcome familial hypercholesterolemia	Apply “patient oriented concerns or ethics” including cost of treatment to a clinical case.	B, D, E	Journal Club Case-Based Instruction/Learning Discussion, Small Group [≤ 12]	Exam - Institutionally Developed, Oral	Printed Materials (or Digital Equivalent)
Molecular Basis of Medicine -John Wilkinson AY 12-13	Mitochondrial disorder, MELAS (Mitochondrial Encephalomyopathy, Lactic Acidosis, Stroke-like episodes).	Apply clinical information including symptoms and results of a diagnostic testing to determine a medical disorder in a group discussion format	B, D, E	Journal Club Case-Based Instruction/Learning Discussion, Small Group [≤ 12]	Exam - Institutionally Developed, Oral	Printed Materials (or Digital Equivalent)
Molecular Basis of Medicine -John Wilkinson AY 12-13	Oxidative Phosphorylation	Interpret experimental data and predict how these data change under experimental conditions.	B, D, E	Small group discussion Stimulated Recall	Exam - Institutionally Developed, Oral	Printed Materials (or Digital Equivalent)
Molecular Basis of Medicine -Elaine	Nutrition Small Group Exercise	Students will define the personal, social and economic challenges for eliciting dietary change	A, B, C, D, E	Problem based learning Self-directed	Oral presentation Peer assessment	Digital materials Virtual patient

Hardman AY 12-13		Students will give examples of dietary changes as an integral part of clinical therapy		learning Small group discussion		Search electronic database
Molecular Basis of Medicine -Elaine Hardman AY 12-13	Nutrition Independent study – Nutrition Modules	Students will describe the scientific basis of the nutritional elements that can be used clinically to modify cardiovascular disease, diabetes and obesity.	A, B	Tutorial Self-directed learning	Computer based exam	Digital materials
Microscopic Anatomy and Ultrastructure - Laura Richardson AY 13-14	Blood and Lymphatic Vessels	Describe the structure of the blood and lymphatic vessels. Compare the structural features of arteries, veins and lymphatic vessels. Describe and compare the different types of capillaries. Describe how the structure of the vessels serves their function. Review cardiac muscle and Purkinje fiber structure in the context of the overall structure of the heart. Complete Application Exercise	A, B, C, D, E	TBL	IRAT/GRAT Self and Peer Evaluation	Educational Technology (iPad or Laptop) Searchable Database (various)
Microscopic Anatomy and Ultrastructure -Laura Richardson	Lymphoid Tissues	Identify the primary and secondary lymphoid tissues. Identify the cell types of	A, B, C, D, E	TBL	Exam - Institutionally Developed, Written/ Computer-based	Educational Technology (iPad or Laptop) Searchable Database

AY 12-13		<p>the immune system.</p> <p>Correlate the anatomical locations of the cells of the immune system with their function.</p> <p>Correlate specific organelles and cellular processes with the function of specific cells of the immune system.</p> <p>Define terms commonly used to describe elements of the immune system.</p> <p>Complete Application Exercise</p>			(IRAT/GRAT Self and Peer Evaluation)	(various)
Microscopic Anatomy and Ultrastructure -Laura Richardson AY 12-13	Respiratory System	<p>Describe the organization of the nasal passages, epiglottis and larynx.</p> <p>Describe the structure of the conducting and respiratory airways.</p> <p>Compare the elements of the conducting and respiratory airways.</p> <p>Correlate the structure of the respiratory airways with their function and relationship to the pulmonary vasculature.</p> <p>Complete Application Exercise</p>	A, B, C, D, E	TBL	<p>Exam - Institutionally Developed, Written/ Computer-based</p> <p>(IRAT/GRAT Self and Peer Evaluation)</p>	<p>Educational Technology (iPad or Laptop) Searchable Database (various)</p>

Microscopic Anatomy and Ultrastructure -Laura Richardson AY 12-13	Renal System	<p>Describe the organization of the kidneys, ureters, urethra and bladder.</p> <p>Describe the filtration apparatus of the kidney.</p> <p>Describe the blood flow in the kidney and correlate the flow with its contribution to filtration and concentration of urine.</p> <p>Describe the juxtaglomerular apparatus.</p> <p>Describe the parts of the nephron that participate in control of blood pressure and electrolyte balance.</p> <p>Complete the Application Exercise</p>	A, B, C, D, E	TBL	<p>Exam - Institutionally Developed, Written/ Computer-based</p> <p>(IRAT/GRAT Self and Peer Evaluation)</p>	Educational Technology (iPad or Laptop) Searchable Database (various)
Gross Anatomy -Maria Serrat and participating anatomy faculty AY 12-13	Gross Anatomy Dissection Laboratories: Lower extremity, Upper extremity, Thorax, Abdomen Pelvis	<p>Under the guidance of the readers, students will complete dissection of the entire assigned body region and will demonstrate to their instructors all structures on the assigned checklist by the end of the laboratory session.</p> <p>Define structures and provide examples from the dissection as a</p>	A,D,E	Laboratory, Peer-Teaching, Team-Building, Discussion, Small Group	Participation, Narrative Assessment, Self-Assessment, Practical	Cadaver

		<p>feedback mechanism to level of comprehension of the topic (i.e., “what nerve innervates this structure)</p> <p>After completing each dissection, demonstrate the structures to students who were not present during the dissection (students participate in lab on a rotating basis)</p>				
Gross Anatomy – Maria Serrat AY 12-13	Independent Learning Module: Brachial Plexus Formation and Nerve Lesions	<p>After completing the module in groups or individually, students will be able to:</p> <p>Describe structural components and anatomical position of the brachial plexus</p> <p>List major nerve branches and spinal contributions to each</p> <p>Describe motor and sensory innervation of main nerve branches</p> <p>Describe major nerve lesions and clinical symptoms</p>	A, D	Independent Learning, Clinical Correlate, Team Building	Participation	Printed materials, clinical correlation, educational technology (also includes non-plastinated models)
Gross Anatomy – Maria Serrat AY 12-13	Independent Learning Module: Clinical Anatomy of the Inguinal Canal	<p>After completing the module in groups or individually, students will be able to:</p> <p>Describe the muscle and fascia components of the</p>	A, D	Independent Learning, Clinical Correlate, Team Building	Participation	Printed materials, clinical correlation, educational technology (also includes non-

		<p>inguinal canal</p> <p>Define the boundaries of the inguinal canal</p> <p>Describe how inguinal canal development relates to gonad development</p> <p>Describe how testes and spermatic cord layers are derived from the abdominal wall</p> <p>Distinguish different types of hernias that occur in the inguinal region</p>				plastinated models)
Neuroscience -Larry Grover AY 12-13 AY 13-14	Ion Channels and Channelopathies	<p>Integrate concepts of ion channels diseases (channelopathies) with physiological mechanisms of membrane excitability (horizontal integration).</p> <p>Integrate concepts of pharmacological treatment of paroxysmal disorders with physiological mechanisms of membrane excitability (vertical integration).</p>	A, D, E	<p>Case-Based Instruction/ Learning</p> <p>Discussion, Small Group [≤ 12]</p>	Exam - Institutionally Developed, Oral	Clinical Correlation
Neuroscience -Larry Grover AY 12-13 AY 13-14	Peripheral Nerve	Integrate concepts of peripheral nerve disease with nerve conduction testing and basic mechanisms of	A, D, E	<p>Case-Based Instruction/ Learning</p> <p>Discussion, Small</p>	Exam - Institutionally Developed, Oral	Clinical Correlation

		membrane excitability and action potential conduction		Group [≤ 12]		
Neuroscience -Larry Grover AY 12-13 AY 13-14	Pain	<p>Integrate concepts of pain management and neuropathic pain with physiological mechanisms of pain, neurotransmitters and receptors</p> <p>Integrate concepts of opiate and non-opiate analgesics with physiological mechanisms of pain and basic mechanisms of synaptic transmission</p>	A, D, E	<p>Case-Based Instruction/ Learning</p> <p>Discussion, Small Group [≤ 12]</p>	Exam - Institutionally Developed, Oral	Clinical Correlation
Neuroscience -Larry Grover AY 12-13 AY 13-14	EEG/Seizure	Integrate concepts of seizure disorders, EEG measurement of abnormal cortical activity, and anatomy of central visual pathways, headache, and pharmacological treatment of paroxysmal disorders (horizontal and vertical integration).	A, D, E	<p>Case-Based Instruction/ Learning</p> <p>Discussion, Small Group [≤ 12]</p>	Exam - Institutionally Developed, Oral	Clinical Correlation
Neuroscience -Larry Grover AY 12-13 AY 13-14	Learning and Memory	Integrate concepts of normal declarative memory function and the role of the limbic system, seizure disorders, traumatic brain injury, and CNS somatosensory and visual pathways (horizontal integration).	A, D, E	<p>Case-Based Instruction/ Learning</p> <p>Discussion, Small Group [≤ 12]</p>	Exam - Institutionally Developed, Oral	Clinical Correlation
Physiology -Piyali	Embolism	Apply clinical reasoning skills and problem	A, B, D	Case Study	Exam - Institutionally	Printed Materials (or Digital

Dasgupta AY 12-13 AY 13-14		solving to a clinical case			Developed, Written/ Computer- based	Equivalent)
Physiology -Piyali Dasgupta AY 12-13	COPD	Apply clinical reasoning skills and problem solving to a clinical case	A, B, C, D	Independent Learning	Exam - Institutionally Developed, Written/ Computer- based	Printed Materials (or Digital Equivalent)
Physiology -Piyali Dasgupta AY 12-13	COPD	Apply clinical reasoning skills and problem solving to a clinical case	A, B, D	Case Study	Exam - Institutionally Developed, Written/Computer- based	Printed Materials (or Digital Equivalent)
Physiology -Piyali Dasgupta AY 12-13	Carbon Monoxide Poising	Apply clinical reasoning skills and problem solving to a clinical case	A, B, D	Case Study	Exam - Institutionally Developed, Written/ Computer- based	Printed Materials (or Digital Equivalent)

Year Two						
System	Session Title	Session Objective	Active Learning Component	Instructional Method	Assessment Method	Resource Type
Pathology -Darshana Shah AY 12-13 AY 13-14	Cellular Response to Stress and Toxic Insults: Adaptation, Injury, and Death	Define and describe the pattern of cell necrosis. List and discuss causes of cell injury. Define and explain atrophy, hypertrophy, hyperplasia, metaplasia, and dysplasia.	A,B,C,D,E	Concept Mapping (Structured Handout)	Exam - Institutionally Developed, Written/ Computer-based	Printed Materials (or Digital Equivalent)
Medical Microbiology - Don Primerano	Microbial Physiology and Genetics	Apply basic concepts of microbial physiology and genetics to a	B, C, D, E	Case-Based Instruction/ Learning	Exam - Institutionally Developed, Oral	Printed Materials (or Digital Equivalent)

AY 12-13		clinically relevant problem		Discussion, Small Group [≤ 12]		
Medical Microbiology - Don Primerano AY 12-13	Pathogenesis	Apply clinical reasoning skills and to reinforce concepts of infectious agents and mechanisms of pathogenesis.	C, D, E	Case-Based Instruction/ Learning Discussion, Small Group [≤ 12]	Exam - Institutionally Developed, Written/ Computer-based Exam - Institutionally Developed, Oral	Printed Materials (or Digital Equivalent)
Medical Microbiology - Don Primerano AY 12-13	Antimicrobial susceptibility of bacteria.	Apply morphology and biochemical properties of microorganisms including bacteria, fungi and parasites and diagnostic procedure of a clinical laboratory to test for antimicrobial susceptibility of bacteria.	C, D, E	Laboratory	Exam - Institutionally Developed, Written/ Computer-based	Virtual/ Computerized Laboratory
Medical Microbiology -Maria G. Lopez-Marti AY 12-13	Sexually transmitted infections (STI) interactive case	Determine knowledge of STI (epidemiology, clinical manifestations, microbiology and treatment) and apply concepts to solve two clinical cases: congenital syphilis and pelvic inflammatory disease.	A,B, D, E	Discussion, Small Group [≤ 12] Case Based Presentation Independent learning, clinical correlation	Exam - Institutionally Developed, Written/ Computer-based	Clinical correlation
Medical Microbiology -Maria G. Lopez-Marti AY 12-13	Vector borne infections, jeopardy game	Apply concepts of bacterial vector-borne infections most commonly seen in the USA (epidemiology, clinical manifestations, microbiology, and treatment) to solve the questions posted by the game of jeopardy.	A,B, D, E	Games Jeopardy Independent learning, clinical correlate	Exam - Institutionally Developed, Written/ Computer-based	Clinical Correlation

Microscopic Anatomy and Ultrastructure - Laura Richardson AY 12-13	Immune System and Lymphoid Tissues	<p>Identify the primary and secondary lymphoid tissues.</p> <p>Identify the cell types of the immune system.</p> <p>Correlate the anatomical locations of the cells of the immune system with their function.</p> <p>Correlate specific organelles and cellular processes with the function of specific cells of the immune system.</p> <p>Define terms commonly used to describe elements of the immune system.</p>	B,C,D,E	Independent learning	Exam - Institutionally Developed, Written/ Computer-based	Printed Materials (or Digital Equivalent)
Pharmacokinetics - Monica Valentovic AY 12-13	Thyroid Agents Androgens	<p>Assess background knowledge of Androgens and Thyroid.</p> <p>Independently review preparatory material.</p> <p>Apply preparatory material to answer questions at the end of PowerPoint.</p> <p>Receive feedback regarding incorrect answers.</p>	A,B,C,D,E	Independent learning	Exam - Institutionally Developed, Written/ Computer-based	Printed Materials (or Digital Equivalent)
Pharmacology - Monica	Diabetes	Individually assess background knowledge	A,B,C,D,E	Independent learning	Exam - Institutionally	Printed Materials (or Digital

Valentovic AY 12-13		look up information and determine the reliability of the information, provide findings individually to the instructor and receive feedback.			Developed, Oral/ Computer-based	Equivalent)
Pharmacology -Richard Eggleton AY 12-13	Pharmacology Database Exercise	Apply database query to a unique Pharmacology question and formulate a response based on methodology used to address the question.	B, C, D, E	Self-Directed Learning	Exam - Institutionally Developed, Written/ Computer-based	Searchable Electronic Database
Pharmacology -Monica Valentovic AY 12-13	Pharmacokinetics	Outline an alternative clomiphene dosing strategy including dose and treatment intervals that has proven successful in similar cases, resulting in live births.	B, D, E	Discussion, Small Group [≤ 12] Peer-to-Peer Teaching	Participation	Printed Materials (or Digital Equivalent)
Pharmacology -Richard Eggleton AY 12-13	Corticosteroids	Describe the Physiological and Pharmacological elements of the HPA axis in endocrine disorders and effects of corticosteroid therapy and withdraw.	A, B	Independent Learning	Exam - Institutionally Developed, Written/ Computer-based	Printed Materials (or Digital Equivalent) Clinical Correlation
Pharmacology -Gary Rankin AY 12-13	Cancer	Describe the appropriate Pharmacological treatment options for a patient with cancer	A, B, C, D, E	Independent Learning Case Study	Exam - Institutionally Developed, Written/ Computer-based	Clinical Correlation
Pharmacology -Gary Rankin Travis Salisbury AY 12-13	Review of the PNS	Apply the principles of physiological and pharmacological modulation of the adrenergic and cholinergic systems	B, C, D, E	Independent Learning	Exam - Institutionally Developed, Written/ Computer-based	Virtual/ Computerized Laboratory

		using simulation, and small group case studies.				
Pharmacology - Gary Rankin Travis Salisbury AY 12-13	Autonomic Nervous System	Apply the principles of the Pharmacology of the autonomic system using a computer based laboratory exercise.	A, B, D, E	Independent Learning	Self-Assessment Exam - Institutionally Developed, Written/ Computer-based	Virtual/ Computerized Laboratory
Pharmacology - Gary Rankin Travis Salisbury AY 12-13	Autonomic Nervous System	Integrate the principles of nervous system autonomies into clinically relevant case studies and the block exam.	C, D, E	Small Group ≤12	Exam - Institutionally Developed, Written/ Computer-based	Clinical Correlation
Pharmacology -Richard Egleton AY 12-13	Neuroscience	Apply the appropriate Pharmacological treatment options for a patient with a Psychiatric complaint.	A, B, C, D, E	Independent Learning Case Study	Research or Project Assessment	Clinical Correlation
Pharmacology -Carl Gruetter AY 12-13	Treatment of Hypertension and Angina	Compare and contrast drugs to treat hypertension	A, C, D	Independent Learning Case Study	Exam - Institutionally Developed, Written/ Computer-based	Clinical Correlation
Pharmacology -Paulette Wehner AY 12-13	Cardiovascular and Hypertension	Integrate knowledge from the first year (ECG, cardiovascular Physiology), and the second year Pharmacology, with clinically relevant cases	C, D, E	Discussion, Small Group [≤12]	Exam - Institutionally Developed, Oral	Clinical Correlation