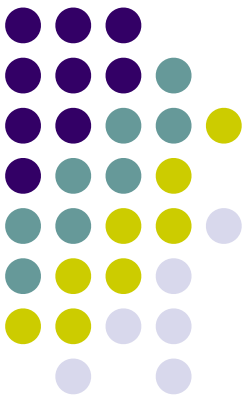


# **Assessment in Outcome-Based Undergraduate Pediatrics: Matching Evaluation Tools to Learning Outcomes**

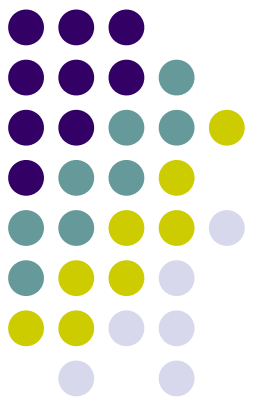
Ma. Cecilia D. Alinea, MD, MHPEd, FPPS  
Clinical Associate Professor  
Department of Pediatrics, UP-PGH

# Road Map



- Competency-based to Outcome-based education in medicine
- Principles of assessment in OBE
- Three circle model (educational outcomes)
- Written exam: Extended Matching Items (EMI), Key Features Exam
- Performance Exam: OSLER
- Record of Performance: Portfolio

# Competency to Outcome Based Education in Medicine



## TRADITIONAL

Knowledge acquisition- based

Emphasis:  
PASSING MARK

International CBME  
Collaborators 2009

## COMPETENCY- BASED

Outcomes- based

Emphasis:  
COMPETENCIES

International CBME  
Collaborators 2009

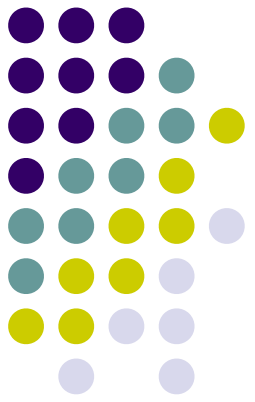
## OUTCOME- BASED

Performance- based

Emphasis:  
PRODUCT  
(what kind of doctor  
will be produced)

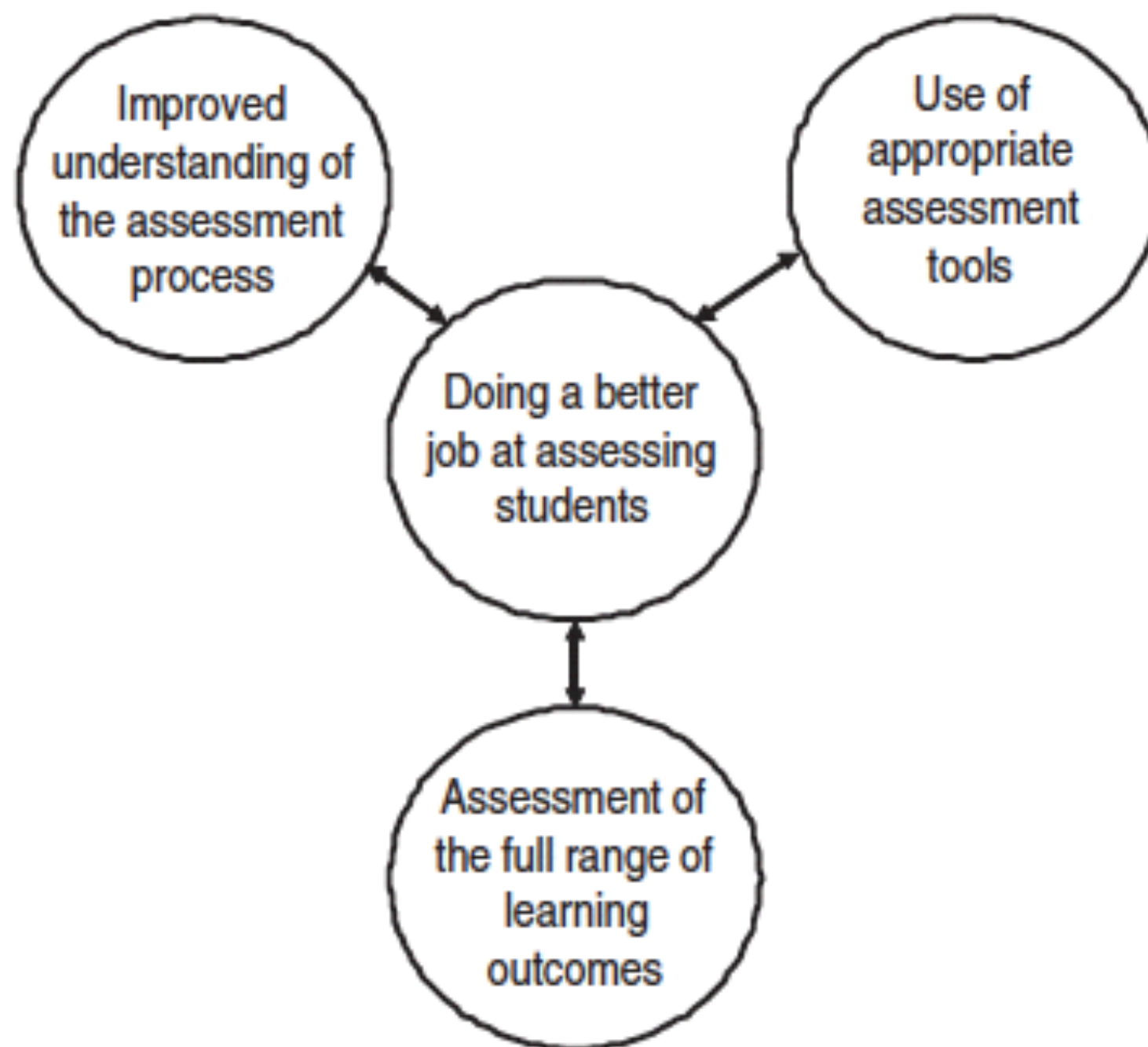
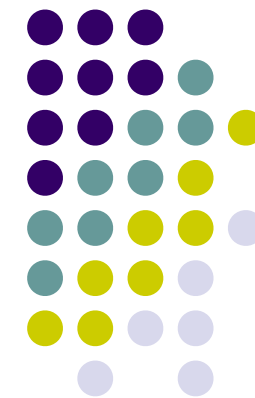
Harden R, et al. Medical  
Teacher, 21 (1).

# Instructional Design

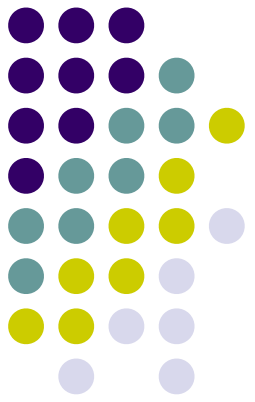


LEARNING OUTCOMES	OBJECTIVES	CONTENT	T-L STRATEGIES	EVALUATION	
<p>Clinical skills                      Practical procedures                      Investigating a px                      Patient management                      Health promotion &amp; disease prevention                      Communication skills                      Information handling                      Understanding of basic, clinical and social sciences                      Appropriate attitudes, ethical and legal responsibility                      Decision making, clinical reasoning                      Role of the doctor                      Personal development</p>	Cognitive	Concepts Topics	Lectures SGL strategies	Written (MCQ) OSCE	
	Psy	<div style="background-color: #e67e22; color: white; padding: 20px; border-radius: 15px; font-size: 2em; font-weight: bold; letter-spacing: 0.5em;">                         CONGRUENCE                     </div>			
	Affective	Values Attributes	Role play Bedside rounds	Multi Source Feedback Logbook Portfolio	

# Assessment in OBE



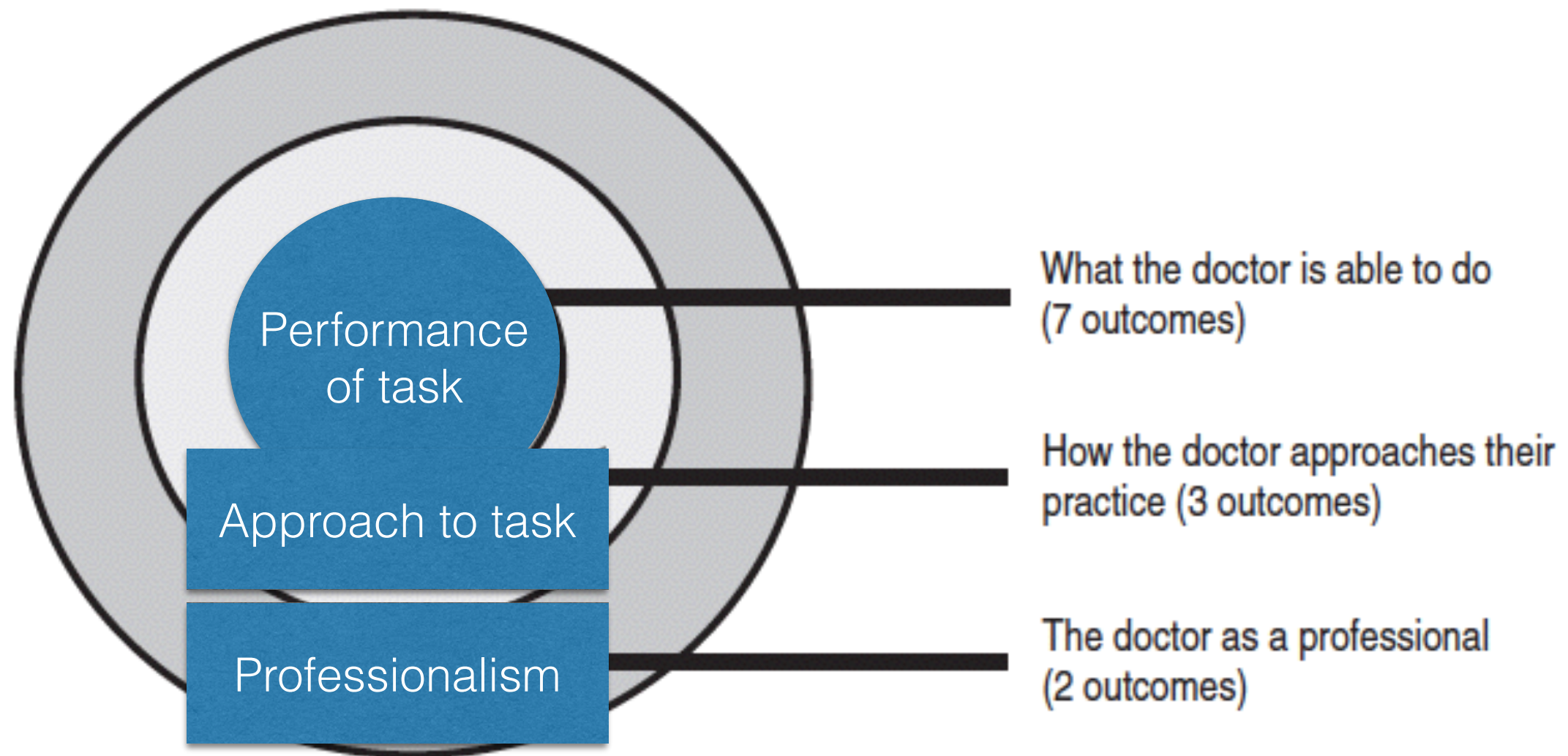
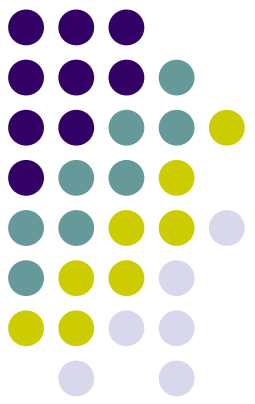
# 12 OBE Learning Outcomes



- 1. Clinical skills**
- 2. Practical procedures**
- 3. Investigating a px**
- 4. Patient management**
- 5. Health promotion & disease prevention**
- 6. Communication skills**
- 7. Information handling**
- 8. Understanding of basic, clinical and social sciences**
- 9. Appropriate attitudes, ethical and legal responsibility**
- 10. Decision making, clinical reasoning**
- 11. Role of the doctor**
- 12. Personal development**



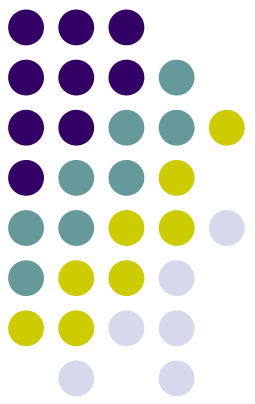
# Outcome Based Education



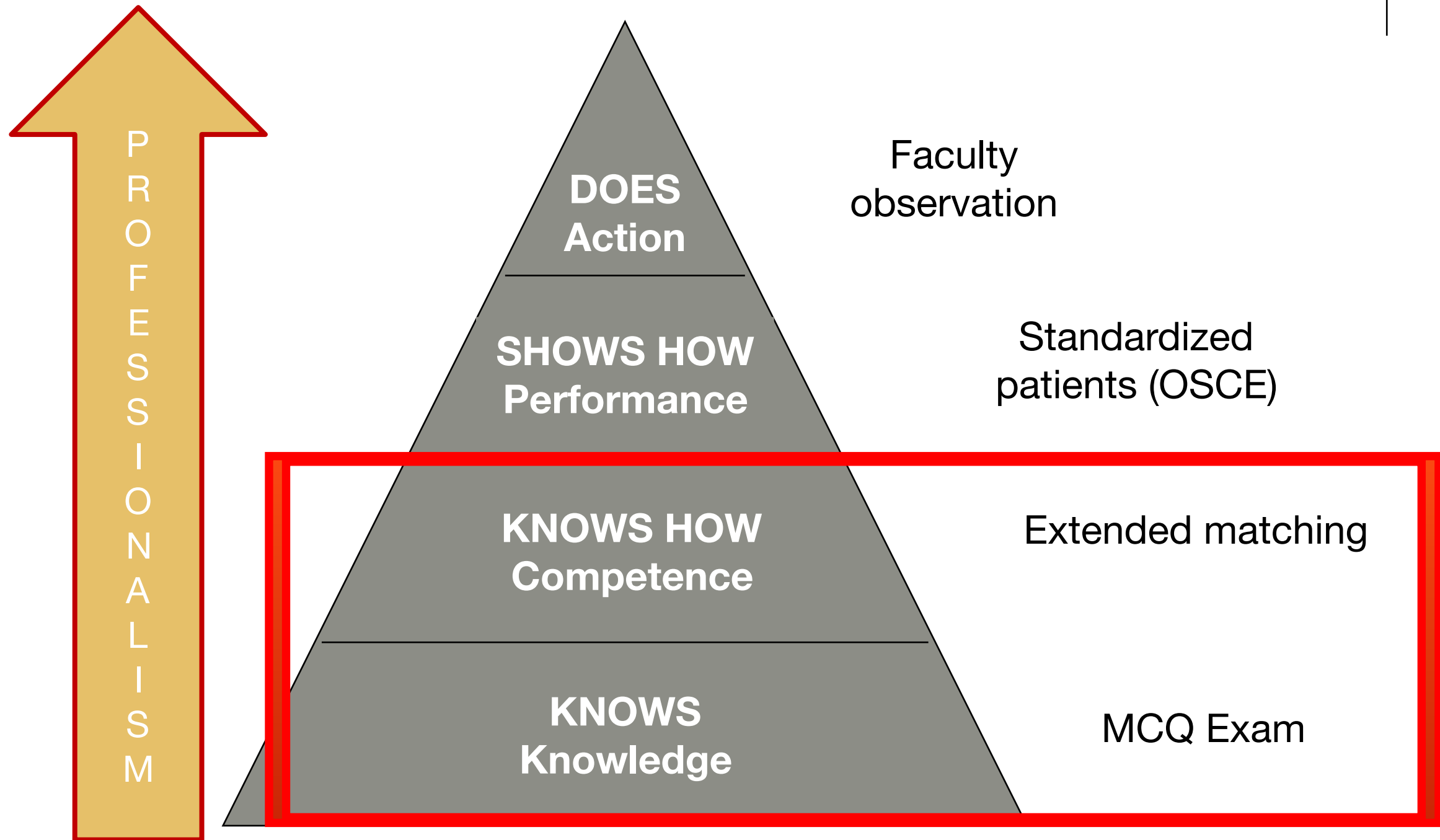
**Three Circle Model representing educational outcomes**

Assessment Category	Representative Instruments
Written Assessments	Essay Short Answer Questions Completion Questions Multiple Choice Questions (MCQs) <b>Extended Matching Items (EMIs)</b> <b>Modified Essay Questions (MEQs)</b> <b>Patient Management Problems (PMPs)</b> Progress Test Dissertation Report
Clinical/Practical Assessments	Long Cases Practical Examination Spot Examination <b>Objective Structured Clinical Examination (OSCE)</b> <b>Objective Structured Practical Examination (OSPE)</b> <b>Objective Structured Long Examination Record (OSLER)</b> <b>Group Objective Structured Clinical Examination (GOSCE)</b>
Observation	Tutor's report Checklists Rating scales Patient report
Portfolio and Other Records of Performance	<b>Logbooks</b> <b>Portfolios</b> <b>Procedural Logs</b>
Peer and Self-Assessment	Peer report Self-report



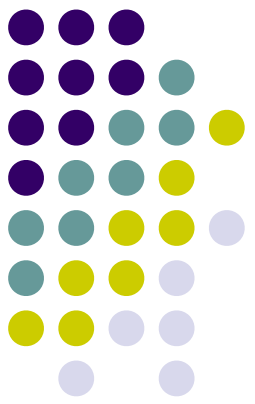


# Miller's Pyramid (1990)



Case and Swanson (1993)

# Extended Matching Items



- Description

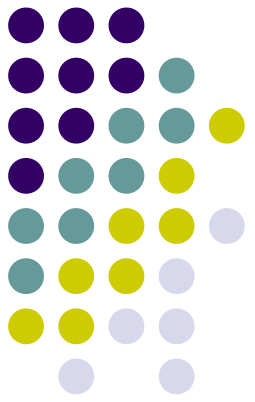
- consist of theme description, a series of options (up to 26), a lead-in and a series of short cases or vignettes

- Indications

- assessment of decision making or problem solving skills
- cover large knowledge base/hour of testing time
- large number of students are to be tested

Case and Swanson (1993)

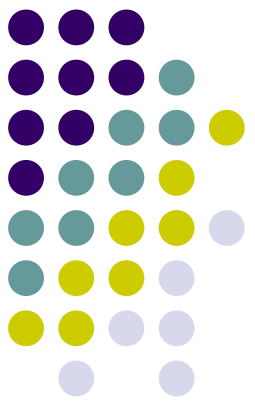
# Extended Matching Items



- Tips for item construction
  - determine theme
  - options should be short
  - lead-in should be clear and well-defined

Case and Swanson (1993)

# Extended Matching Items



Theme: Diagnosis (Respiratory Tract)

Options:

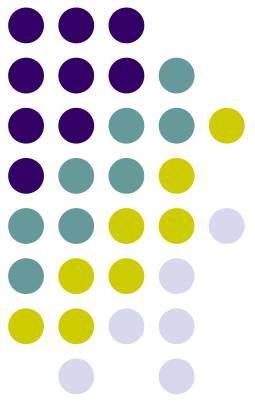
- |                 |                          |                    |
|-----------------|--------------------------|--------------------|
| a. Asthma       | d. Laryngotracheomalacia | g. Cystic fibrosis |
| b. Pneumonia    | e. Epiglottitis          | h. Diphtheria      |
| c. Tuberculosis | f. Bronchiolitis         | i. Pharyngitis     |

Lead-in:

For each of the ff cases select the most likely diagnosis

## Case and Swanson (1993)

# Extended Matching Items



### Vignettes:

1. A 4 year old boy presents in the ER with cyanosis. He has a 1 week history of cough and fever, associated with poor appetite. On PE, RR= 85/min, with intercostal and subcostal retractions, rales on all lung fields. On x-ray you note infiltrates in the lung parenchyma.

2. 

a. Asthma	d. Laryngotracheomalacia	g. Cystic fibrosis
b. Pneumonia	e. Epiglottitis	h. Diphtheria
c. Tuberculosis	f. Bronchiolitis	i. Pharyngitis

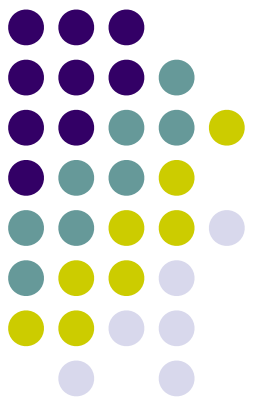
3. 

a. Asthma	d. Laryngotracheomalacia	g. Cystic fibrosis
b. Pneumonia	e. Epiglottitis	h. Diphtheria
c. Tuberculosis	f. Bronchiolitis	i. Pharyngitis



Bordage (1997)

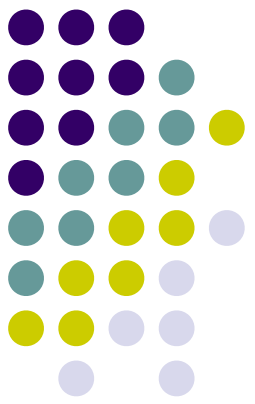
# Key Features Exam



- Description
  - short, clearly described case or problem with a limited number of questions aimed at making essential decisions
- Indications
  - assessment of problem solving & decision making skills
  - single case can assess for broad sampling of KSA
  - “appears closer to real life but still has the virtue of objectivity” (Norman 1995)

Bordage (1997)

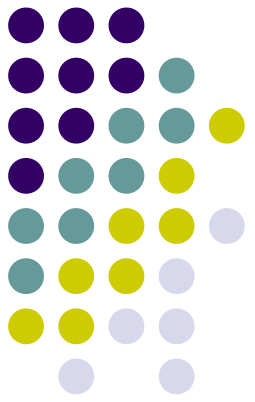
# Key Features Exam



- Tips for item construction
  - make sure all the important information is presented in the case
  - make sure the question is directly linked to the case
  - the question must ask for essential decisions

**Bordage (1997)**

# **Key Features Exam**



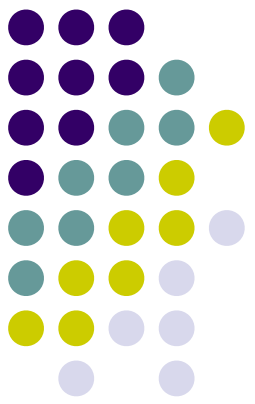
A 5 year old girl was brought to you for high grade fever of 5 days duration. The mother noted she had poor appetite and activity and would complain of abdominal pain. She noted that her stools were “blackish” in color. On PE, BP was 80/50, HR 128, RR 35, with note of flushed skin. No overt bleeding noted. Abdominal exam showed generalized tenderness on palpation.

List down 3 differential diagnoses for this case:

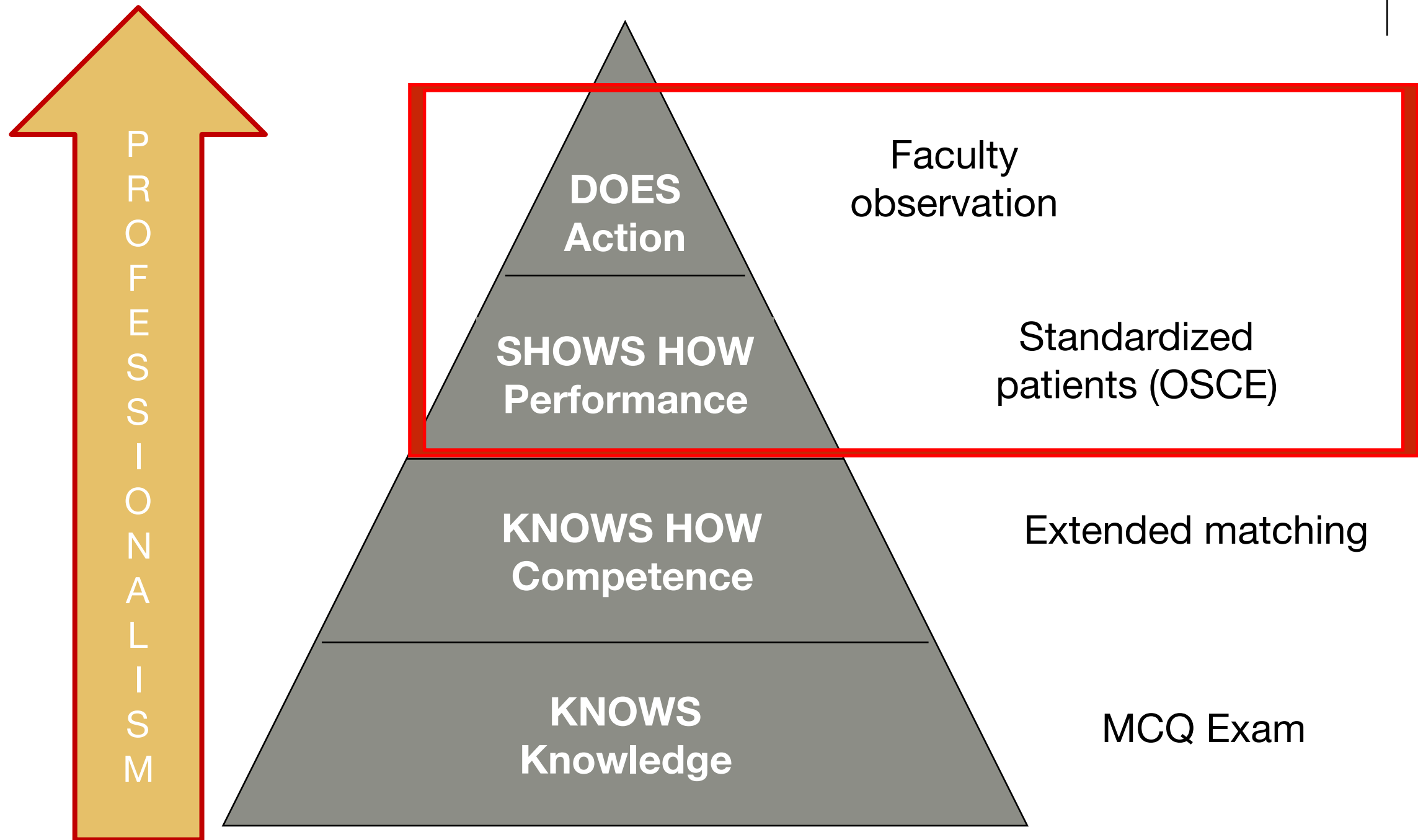
1. Dengue Fever/ Hemorrhagic Fever
2. Typhoid Fever
3. Systemic Viral Illness

What are the first 3 management steps that should be performed?

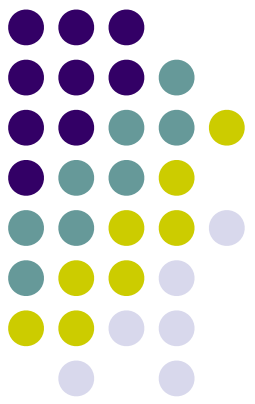
1. Insert IV fluids for hydration
2. Monitor bleeding parameters through platelet count monitoring
3. Insert an NGT



# Miller's Pyramid (1990)



# Objective Structured Long Examination Record (OSLER)



- Trainee interaction with patient
- 20-30 minute assessment of a learner's performance with a patient in the following areas:
  1. **history taking**- pace & clarity of presentation, communication skills, systematic approach, establishment of case facts
  2. **physical examination**- systematic approach, exam technique, establishment of correct physical findings
  3. ability to determine **appropriate investigations** for patient
  4. examinee's views on the **management** of the patient
  5. **clinical acumen** and overall ability to identify and present a **satisfactory approach to tackling the patient's problems**



# OBJECTIVE STRUCTURED LONG EXAMINATION RECORD (O S L E R )

DATE: .....

CANDIDATE'S : NAME	EXAMINATION NO.
-----------------------	-----------------

Examiners are required to GRADE each of the ten items below and assign an overall GRADE and MARK concerning the candidate PRIOR to discussion with their co-examiner as follows:

**EXAMINER:**

.....

**CO-EXAMINER:**

.....

	<b><u>GRADES</u></b>	<b><u>MARKS</u></b>	
P+	= VERY GOOD/EXCELLENT	(60-80+)	See over page for specific mark details.
P	= PASS/BORDERLINE PASS	(50-55)	
P-	= BELOW PASS	(35-45)	

**PRESENTATION OF HISTORY**

PACE/CLARITY →

COMMUNICATION PROCESS:  
( history e.g. CVS, investigation e.g. endoscopy,  
management e.g. patient education) →

SYSTEMATIC PRESENTATION →

CORRECT FACTS ESTABLISHED →

GRADE

AGREED GRADE

## PHYSICAL EXAMINATION

SYSTEMATIC





TECHNIQUE

(Including attitude to patient)





CORRECT FINDINGS ESTABLISHED



--

--

APPROPRIATE INVESTIGATIONS  
IN A LOGICAL SEQUENCE

(Communication Process option)



--

--

APPROPRIATE MANAGEMENT

(Communication Process option).



--

--

CLINICAL ACUMEN

(Problem identification/Problem solving Ability).



ADDITIONAL COMMENTS:-

Please Tick (✓) For CASE DIFFICULTY

	Individual Examiner	Agreed Case Difficulty	INDIVIDUAL EXAMINER		PAIR OF EXAMINERS	
Standard	<input type="checkbox"/>	<input type="checkbox"/>	OVERALL GRADE	MARK	AGREED GRADE	AGREED MARK
Difficult	<input type="checkbox"/>	<input type="checkbox"/>				
Very Difficult	<input type="checkbox"/>	<input type="checkbox"/>				

**EXTENDED CRITERION REFERENCED GRADING SCHEME**

**EXTENDED MARKING SCHEME**

**P+**

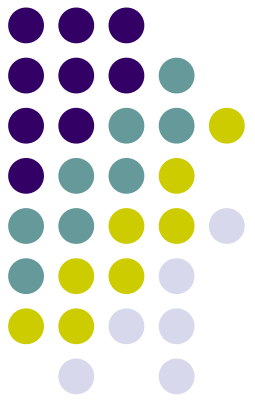
- 80 Outstandingly clear and factually correct presentation of the patient's history, **Outstanding** organisation of the case and management plan. Outstanding communication skills and clinical acumen. First class honours.
- 75 Excellent overall case presentation, communication skills, examination technique and physical signs of the case. The **Excellent overall** candidate demonstrates all the attributes in some but not all major areas. First class honours.
- 70 Excellent in most respects of overall case presentation, communication skills, examination technique and physical signs of the case. The **Excellent in most respects** candidate demonstrates the ability to investigate and appropriately manage the patient with a very well developed clinical acumen. First class honours.
- 65 Very good overall presentation covering all major aspects; few omissions, good **Very good overall** communication skills. Candidate in terms of communication skills. First class honours, division 1.
- 60 Very good in most respects of presentation and communication but not in all aspects. **Very good in most respects** candidate demonstrates a well developed clinical acumen, division 2.





<h1>P</h1>	<p>55 <b>Good sound overall</b> presentation and communication of the case without displaying <b>Good sound overall</b> the candidate displays an overall adequate technique. The patient's problems are identified and a reasonable management outline suggested.</p> <p>50 <b>Adequate</b> presentation of the case and communication ability. Nothing to suggest more than just reaching an acceptable standard in physical examination <b>Adequate</b> problems and their management. Clinical <b>Adequate</b> standard. Safe borderline candidate who just reaches a pass standard.</p>
<h1>P-</h1>	<p>45 <b>Poor</b> performance in terms of case presentation, communication with the patient and <b>Poor</b> adequate attempt at a clear identification of <b>Poor</b> candidate may display some adequate attributes but does not reach an acceptable pass standard overall.</p> <ul style="list-style-type: none"><li>• <b>THE MARK 40 IS NOT USED IN CLINICALS</b></li></ul> <p>35 <b>Veto mark (So poor)</b> Veto mark. The candidate's performance in terms of case presentation, clinical and communication <b>Veto mark (So poor)</b> and required is not even remotely <b>Veto mark (So poor)</b> candidate requires a further period of training.</p>

# Portfolio Assessment

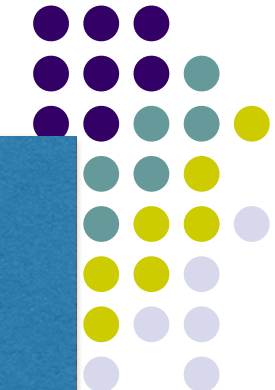


- “Collection of student work that exhibits the student’s efforts, progress and achievements in one or more areas” (Martin-Kniep 2000)
- Cumulative
- Purpose of assessment will determine:
  - content (i.e. best work, typical work, most diverse work, work on a theme, work on project as it evolves over time) (Stecher 1998)
  - process of creating it
  - interpretation of the evidence

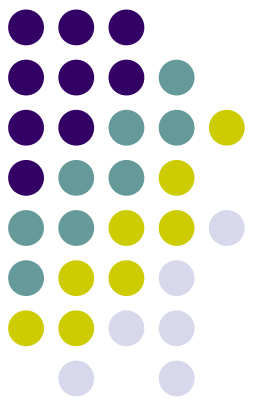


# Portfolio Co

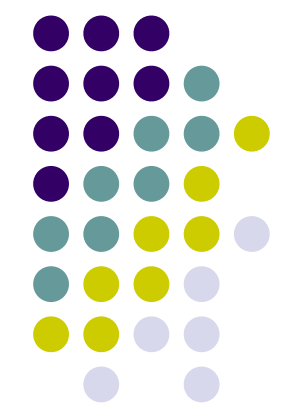
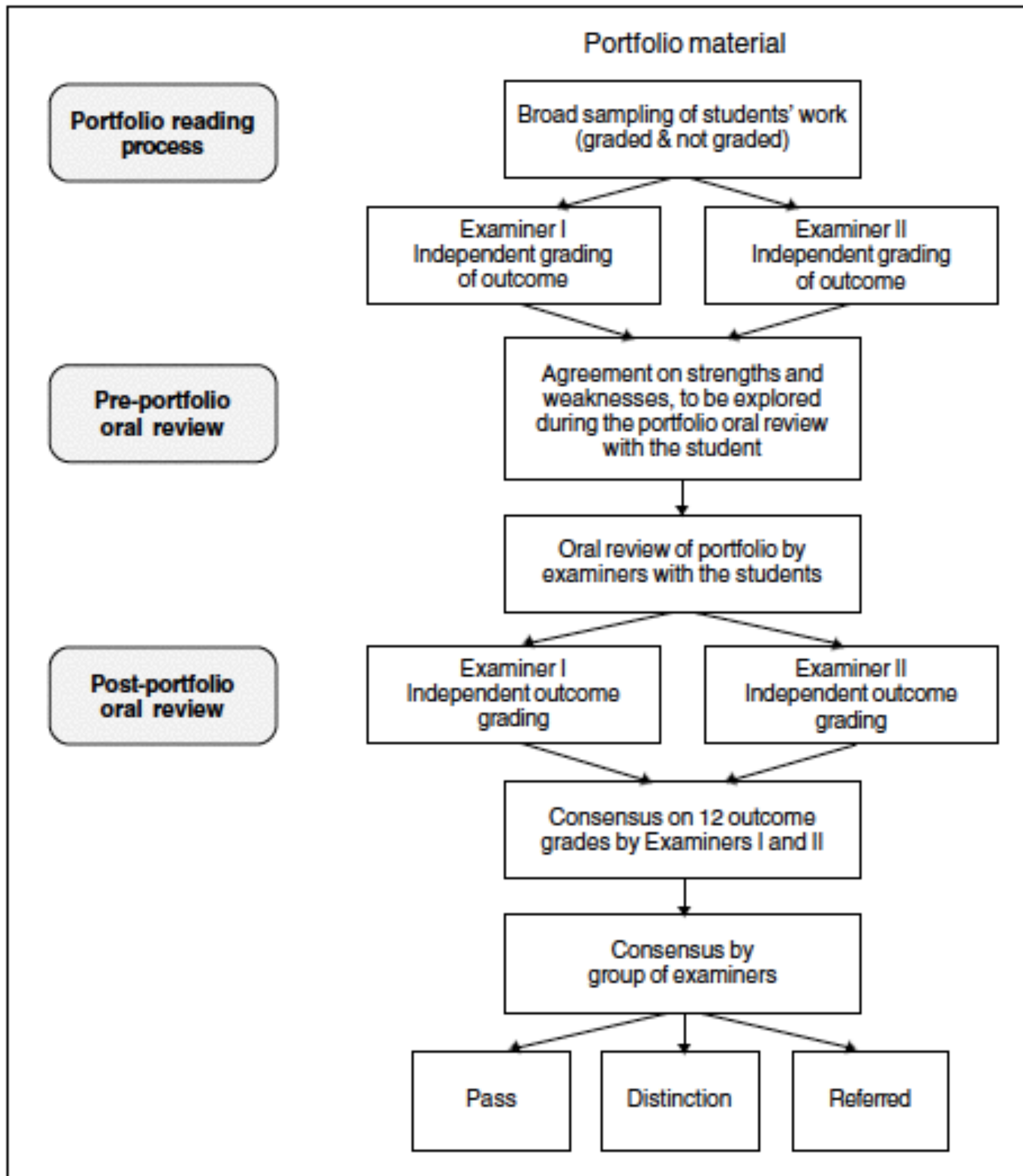
- Student's work over  
of learning and pro  
professional outco
- Includes work refle
  - maintenance of c
  - keeping up wot d
  - fitness for practic
  - adherence to pro



**Best essays**  
**Written reports/ research projects**  
**Samples of evaluation of performance**  
**Video tapes of interactions with patients or peers**  
**Record of practical procedures (logbook)**  
**Annotated patient records**  
**Letters of recommendation**  
**CV's**  
**Written reflection on the evidence and on professional growth**



Student work	Year	Number	Pre-marked*
<p>Student's personal summary of progress towards each outcome.</p>	5	12	No
<p><i>Patient presentations</i>: short summaries of patients seen by the student, selected from the 100 core clinical problems on which teaching and learning is based on this phase of the curriculum.</p>	4	10	Sometimes marked
<p><i>Case discussions</i>: reports of approximately 1500 words, each analysing a patient's history and findings in terms of one of the curriculum themes.</p>	5	7	Yes
<p><i>Year 4 assignment</i>: a project report with a grade awarded by the project supervisor together with feedback for the students.</p>	4	1	Yes
<p><i>Record of achievement</i>: a record of procedures that the student was expected to have completed or observed during the phase.</p>	4&5	1	Signed by Faculty
<p><i>GP special study module assessment form</i>: a report on the student by their general practice supervisor with a grade awarded.</p>	5	1	Yes
<p><i>Clinical special study module assessment form</i>: theme special study module assessment form: a report on student performance during the module with a grade awarded for relevant outcomes.</p>	5	2	Yes
<p><i>PRHO apprenticeship in medicine assessment form</i>: a learning contract between the student and his/her educational supervisor with grades awarded for each learning outcome.</p>	5	1	Yes

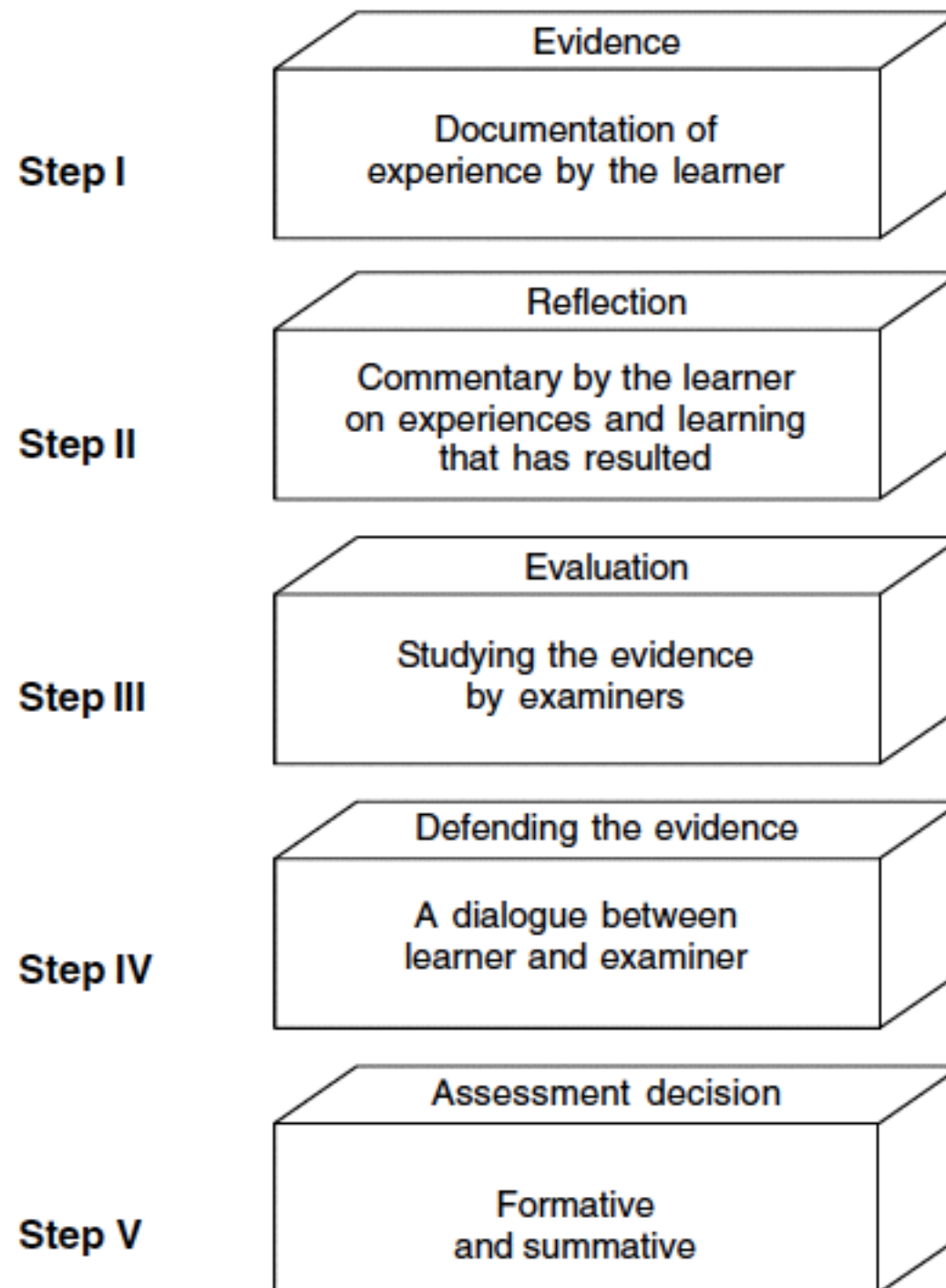
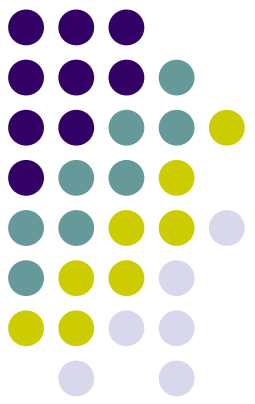


Friedman  
Ben David M,  
et al. AMEE  
Guide 24.  
Med Teacher  
Vol 23, No.6,  
2001

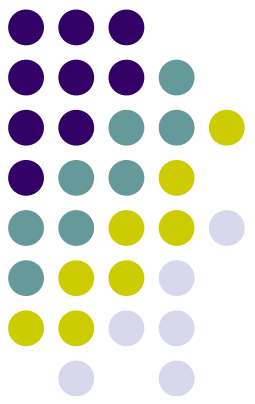
**Figure 1:** The portfolio examination process: the examiners' perspective



# Portfolio Assessment



# Triangulation in Assessment



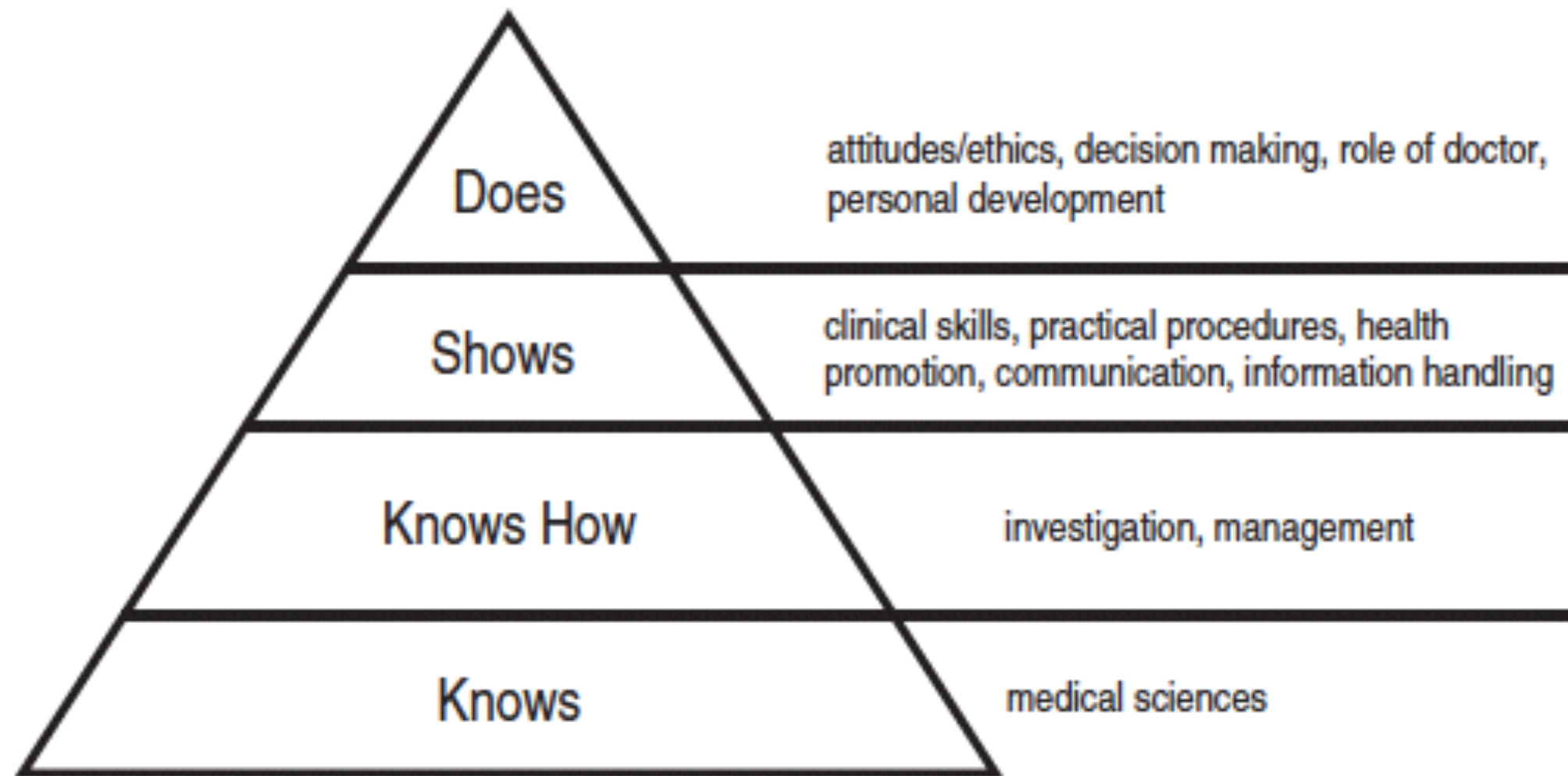
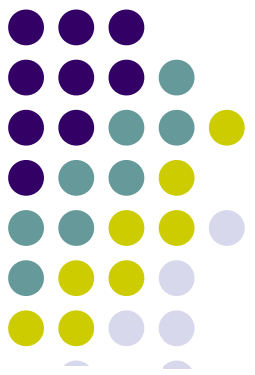
Outcomes	EMI <sup>1</sup>	CRQ <sup>2</sup>	OSCE	Portfolio
1 Clinical skills	xxx	xxx	xxx	xx
2 Practical procedures	xx	xx	xxx	xx
3 Investigating a patient	xx	xx	xxx	xx
4 Patient management	xxx	xxx	xxx	xx
5 Health promotion and disease prevention	xx	xx	xxx	xx
6 Communication skills	x	x	xxx	xxx
7 Information handling	xx	xx	x	xxx
8 Understanding of basic, clinical and social sciences	xxx	xxx	x	xxx
9 Appropriate attitudes ethical and legal responsibility	xx	xx	xx	xxx
10 Decision making, clinical reasoning	xxx	xxx	xxx	xxx
11 Role of the doctor	x	x	xx	xxx
12 Personal development	x	x	xx	xxx

<sup>1</sup> EMI (Extended Matching Items), <sup>2</sup> CRQ (Constructed Response Questions)

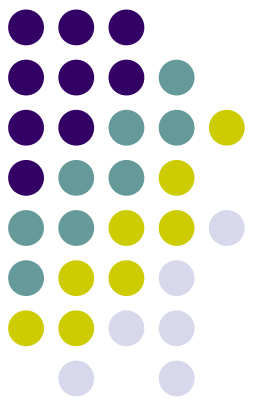
x – considered for use, xx – appropriate and is currently used, xxx – most appropriate assessment method

**Table 6:** Final examination grid in Dundee outcome-based curriculum



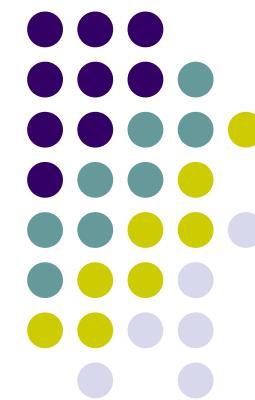


. The 12 learning outcomes matched for assessment purposes against the most appropriate level of the Miller Pyramid.



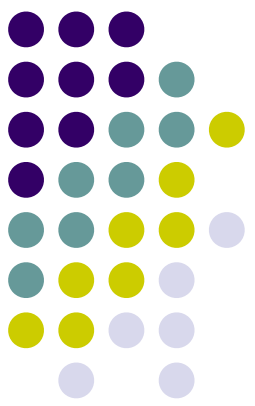
**Table 4.** Recommended assessment methods for the 12 learning outcomes of a competent and reflective physician.

<b>Learning outcome</b>	<b>Assessment methods</b>
<i>What the doctor is able to do</i>	
<b>5 Health Promotion and Disease Prevention</b>	<b>OSCE Portfolios Observation Written Assessment</b>
<b>6 Communication</b>	<b>OSCE Observation Peer/self assessment Portfolio</b>
<b>7 Information Management Skills</b>	<b>Portfolio OSCE Observation Written examination</b>



**Table 4.** Recommended assessment methods for the 12 learning outcomes of a competent and reflective physician.

Learning outcome	Assessment methods
<i>How doctors approach their practice</i>	
8 Principles of Social, Basic and Clinical Sciences	Written examination Portfolios Observation OSCE
9 Attitudes, Ethics and Legal Responsibilities	Observation Portfolio Peer/self assessment OSCE Written examination
10 Decision Making, Clinical Reasoning and Judgement	Portfolio Observation Written examination OSCE Peer/self assessment



**Table 4.** Recommended assessment methods for the 12 learning outcomes of a competent and reflective physician.

Learning outcome	Assessment methods
<i>Doctors as professionals</i>	
11 Role as a Professional	Observation Peer/self assessment Portfolio OSCE Written examination
12 Personal Development	Portfolio Observation Peer/self assessment OSCE Written examination



<b>CHED MD Program Outcomes</b>	<b>Operational Definition of Program Outcomes</b>
1. Demonstrate clinical competence	Competently manage clinical conditions of all patients in various settings
2. Communicate effectively	Convey information, in written and oral formats, across all types of audiences, venues and media in a manner that can be easily understood
3. Lead and manage health care teams	Initiate planning, organizing, implementation and evaluation of programs and health facilities. Provide clear direction, inspiration and motivation to the healthcare team/community
4. Engage in research activities	Utilize current research evidence in decision making as practitioner, educator or researcher. Participate in research activities.
5. Collaborate within interprofessional teams	Effectively work in teams in managing patients, institutions, projects and similar situations

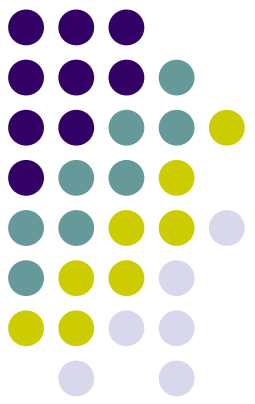
<b>CHED MD Program Outcomes</b>	<b>Operational Definition of Program Outcomes</b>
6. Utilize systems-based approach to healthcare	Utilize systems-based approach in actual delivery of care Network with relevant partners in solving general health problems
7. Engage in continuing personal and professional development	Update oneself through a variety of avenues for personal and professional growth to ensure quality healthcare and patient safety
8. Adhere to ethical, professional, and legal standards	Adhere to national and international codes of conduct and legal standards that govern the profession
9. Demonstrate nationalism, internationalism and dedication to service	Demonstrate love for one's national heritage, respect for other cultures and commitment to service
10. Practice the principles of social accountability	Adhere to the principles of relevance, equity, quality and cost effectiveness in the delivery of healthcare to patients, families and communities

# PPS proposed program outcomes

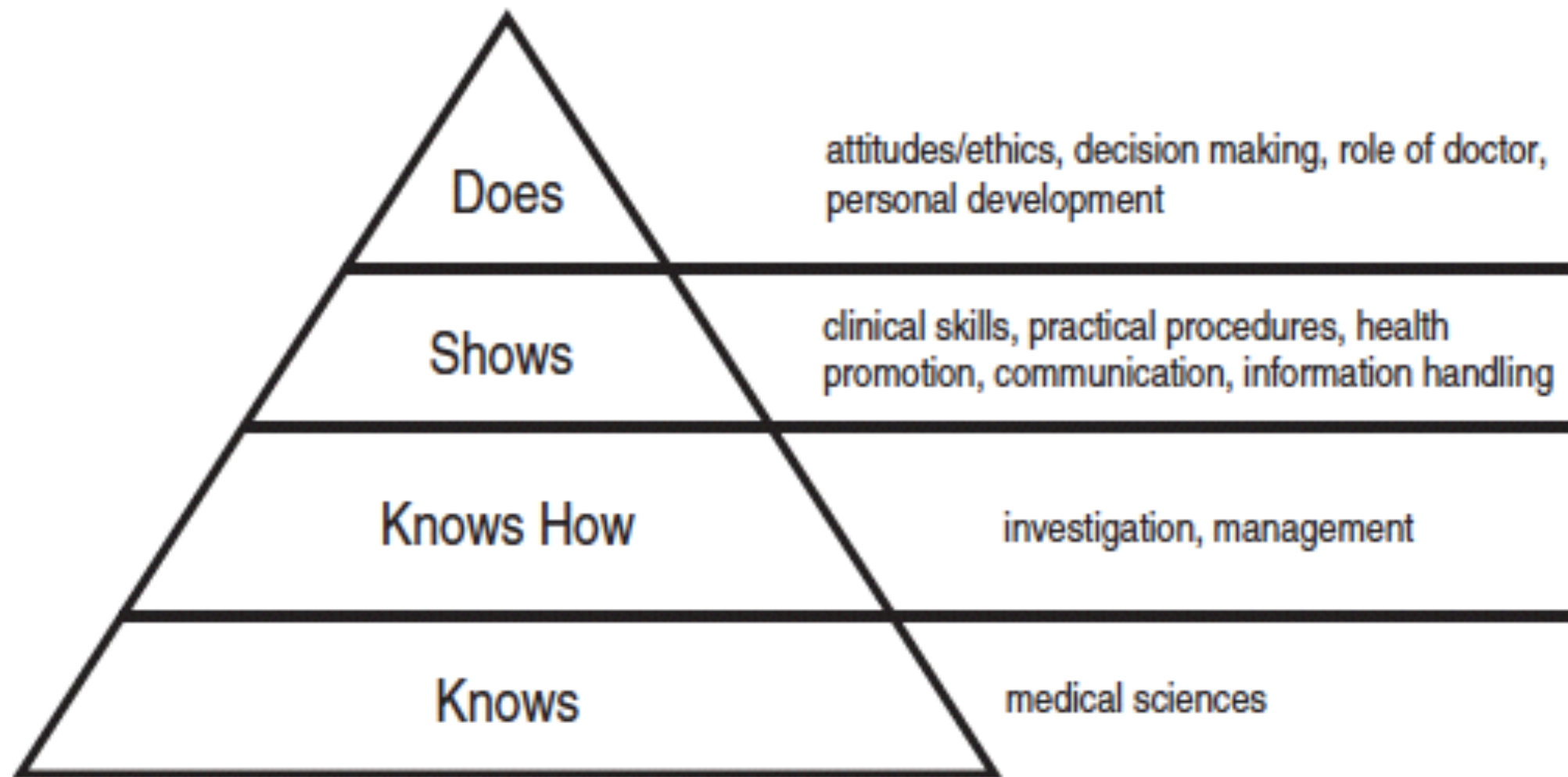
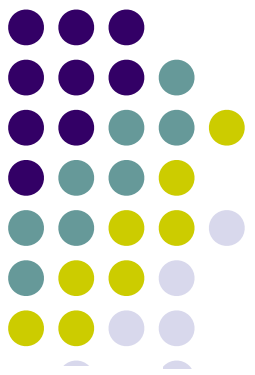
CHED Learning Outcomes	PPS Outcomes for graduates of pediatric residency training
1. Demonstrate clinical competence	1. Clinical competence
2. Communicate effectively	2. Communication and interpersonal skills
3. Lead and manage health care teams	3. Leadership and management skills
4. Engage in research activities	4. Evidence-based practice (Practice - based learning)
5. Collaborate within inter-professional teams	5. Inter-professionalism
6. Utilize systems-based approach to healthcare	6. System - based practice
7. Engage in continuing personal and professional development	7. Continuing professional development
8. Adhere to ethical, professional and legal standards	8. Professionalism
9. Demonstrate nationalism, internationalism and dedication to service	9. Nationalism and internationalism
10. Practice the principles of social accountability	10. Social accountability
	11. Community - oriented practice



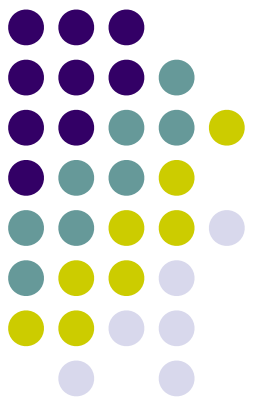
# Summary



- Outcome-based undergraduate pediatric assessment is based on the learning outcomes set for the students/ future doctors
- Three-circle model:
  - performance of task (what the doctor is able to do)
  - approach to task (how doctors approach their practice)
  - professionalism (doctors as professionals)
- Assessments may be written, practical/ clinical, or done via observation, providing proof of performance or self/ peer evaluation
- Triangulation of assessment tools improve validity and reliability



. The 12 learning outcomes matched for assessment purposes against the most appropriate level of the Miller Pyramid.



“In times of change,  
learners inherit the earth  
while the learned find themselves  
beautifully equipped to deal  
with a world that no longer exists.”

Eric Hoffer  
(1898- 1983)