

## Year 1 PBL in-course assessment – Student guide

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### 1. Aims of the PBL In-Course Assessment

An assessment should be aligned with what students need to learn. It is a truism that assessment drives learning<sup>1</sup>.

There are two main Aims of the PBL course. This is an extract from the Student Guide:

“The ‘Imperial style of PBL’ will enable you to **integrate your learning across the themes** of the whole curriculum and **develop your professional skills**. The skills acquired include team-working, analysing cases, gathering relevant information and critically appraising it, evaluating the use of data in evidence based practice and medical decision-making and **teaching** through questioning one another, doing presentations and giving feedback.”<sup>2</sup>

The PBL In-Course Assessment should help you achieve these aims.

### 2. Structure of the PBL In-Course Assessment

The PBL in-course assessment consists of 4 parts:

- 1 Attendance and punctuality record
- 2 Individual student assessment (1-1 feedback from PBL tutor)
- 3 Written reflection
- 4 Independent PBL exercise

Each of these elements needs to be passed satisfactorily to pass the PBL course in Year 1.

### 3. Details of the four elements of the In Course Assessment

#### Part 1 – Attendance and punctuality record

You are required to attend the PBL course in full or provide explanations via the standard College processes. Your tutor will report on your attendance record. They will mark as unsatisfactory any times you were absent or late without appropriate reason.

#### Part 2 – Individual student assessment (Extract from the Student Guide)

At the end of both the autumn and spring terms you will have a 1-1 assessment with your PBL tutor (see Appendix B3 in your course guide). The autumn term 1-1 assessment is formative – this means that it will give you an opportunity for feedback that will help you improve, but does not count towards the overall assessment. The spring 1-1 assessment is summative, which means that it does count towards the overall assessment. It allows you to

demonstrate that you have performed satisfactorily in all the elements. You need to show satisfactory progress in all aspects in the spring term to pass. If any aspects of your progress are considered unsatisfactory in the spring term you will need to agree a plan with your PBL tutor about how to address this in future. If there are any significant concerns your PBL tutor will discuss them with the PBL Course Leads and you will be invited to an interview to discuss them in greater depth.

### Part 3 – Written reflection

As an adult learning model, problem based learning, like most experiential learning methods, requires a level of *self-reflection*. Reflective practice is taught separately in other parts of the course and this log will link up with those so that you have the chance to practice reflective writing in different ways.

For this written reflection we would expect 500 words (+/- 10%) of reflection about the process of your learning in PBL. Sources of evidence to be used for this would include the 1:1 tutor feedback from term 1, feedback from peers during sessions, and the experience of presenting information and learning from others.

One way to do this may be to describe the strengths you have noticed about yourself and what challenges you about the PBL process. We then would expect there to be reference to subsequent plans for development. If, for some reason, you did not receive 1-1 feedback, you should still reflect on your progress, in particular why it did not happen and what you would have said.

You will submit this via Blackboard. It will also go through Turnitin.

The reflection will be reviewed by your PBL tutor once submitted and will be given a pass/fail mark, and double marked by a second tutor. We would expect the vast majority of students to pass if they have submitted a piece of work of the correct length with reflective content. Any submissions which the tutor is concerned about will be forwarded to the PBL course leads to review. The logs should, by their very nature, be personalised and based on your own personal experience.

You will receive a pass/refer grade and some feedback via Blackboard.

### Part 4 - Independent PBL exercise

The Independent PBL Exercise is designed to evaluate not only how, but how well, you can:

- Formulate relevant **learning objectives** in relation to a mini PBL case
- **Critically appraise** available resources in a systematic and sensible fashion under the given constraints
- **Summarise** that information in a short report

This independent PBL exercise was adapted from the Glasgow Medical Independent Learning Exercise (MILE) used at Glasgow University Medical School:

<http://www.scottishdoctor.org/resources/appendix10.pdf>

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## Structure

Your assessment should be word processed, using the following headings;

1. Learning objectives generated (maximum 4)
2. Written Report (500 words +/- 10%)
3. Utilisation of Sources (critical appraisal of up to 6 of the sources used, maximum 50 words explaining why you chose each one-total word count 300 +/- 10%)

### 1. Learning objectives generated

It is important that your research begins with a clear focus. Think carefully about your initial question(s) or issue(s) and specify these clearly. Remember, PBL is about understanding 'how' and 'why', and linking basic sciences with clinical practice; the way you phrase your questions will help you do both these things. We recommend **no more than 4 learning objectives**. However, 2 well written learning objectives could be appropriate. See section 5 for more information about writing learning objectives.

### 2. Report

The report is intended to be a synthesis of the research you carried out addressing your learning objectives.

**The written report section should be 500 words +/- 10% (state the number of words used).**

Any words in excess will not be considered as part of the report and therefore will not be read.

Evidence should be referenced in your report using numbered superscript. In writing your report you need to reference the information you give as though you were writing for a journal or scientific audience, i.e. you need to use the Vancouver system of referencing (see below).

The best reports will be those that integrate basic sciences, such as anatomy, physiology, MCD etc, with clinical sciences and evidence-based medicine.

### 3. Utilisation of Sources

- a. List **up to 6** of the resources which you used in this enquiry (you may have a reference list of more sources but in this section you need to appraise no more than 6). All sources should be appropriately referenced, as you were advised in the Library sessions. Note that while you can and should look at relevant lecture notes we do not expect you to include these in this list.
- b. Critically appraise the resources that you used, writing up to **50 words per reference** to explain why you chose each one.

### **How independent is independent?**

PBL is designed to be done as a group, to benefit from everyone's prior knowledge and thoughts. You may decide to start discussing this case, and generating possible learning objectives, as a group. However, you will be expected to research the topics and write the report independently. Your submitted report and utilisation of sources will be put through Turnitin, the plagiarism-detection software (see section 4).

## 4. Thinking about resources

### Critical appraisal of sources of information

Refer to your Year 1 Epidemiology in Practice Course- details on the Intranet. The Course is taught in the autumn term of Year 1. **All reports will be run through the plagiarism-detection software Turnitin so it is important to reference correctly.**

### Library Resources

Information about library services, including support for PBL, was in the induction pack which was distributed at the first library presentation.

To help you become familiar with finding reliable information, you will have two sessions on the Blackboard course OLIVIA (OnLine Virtual Information Assistant). You will work through units which will develop your skills in planning a search, finding different kinds of information, using the Internet, etc. This will be of use to you not just for the PBLs, but throughout your course and into your years of work as a medical professional.

Campus libraries provide a wide range of resources such as textbooks, journals, videos, and CD-ROMs. Imperial College staff and students have access to a wide range of networked electronic resources: the library catalogue which gives details of the holdings of all Imperial libraries; databases such as MEDLINE, Cochrane, EMBASE and Psycinfo; electronic journals which allow searching and downloading of full text articles; reference material such as the Medical Directory and the Encyclopedia of Life Sciences; electronic books such as the Oxford Textbook of Medicine; and internet tutorials and guides such as Internet Medic. Further details and access from the Library website <http://www.imperial.ac.uk/library> or via the teaching intranet.

### A few additional notes about resources:

#### *Internet*

The use of information from Web pages is acceptable provided that you give some detail as to the publisher of the page to give an idea of validity (i.e. a page by the British Diabetic Society would be acceptable but one written by an individual in their bedroom would not). Articles or abstracts from E-Journals are also acceptable sources.

#### *Relevant Experts*

You may use any relevant expert as a source. You should outline whom you have approached and the sort of information they provided.

#### *Selection*

You are encouraged to use a selection of all available resources. Please list all the resources you have used and provide sufficient detail to enable markers to refer to them, if required.

### Referencing system

You should use the Vancouver system of referencing (see your library training or the library website for full details:

<http://www3.imperial.ac.uk/library/subjectsandsupport/referencemanagement/harvard>

### **Extract from BSc Guide**

The links below will also provide you with examples of Vancouver reference style:

<http://student.bmj.com/student/static-pages.html?pagelid=2#ref>

[http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)

We recommend the use of a tool such as EndNote or Reference Manager for reference management and formatting.

## 5. Thinking about learning objectives

Learning objectives specify what you need to research to understand the clinical scenario, and in particular, what you need to know from basic sciences to understand the clinical situation. They are used in education to help frame what needs to be learnt.

When students generate learning objectives in the Independent PBL Exercise, they will be given more credit for including learning objectives that require them to demonstrate this higher-level thinking, or that help them to link basic sciences with clinical practice.

Consider the following case scenario:

Colin Duggan felt a very heavy, crushing pain in the centre of his chest which radiated to his left arm. The paramedic at his house carried out a 12-lead ECG which showed ST elevation in the inferior leads. He explains to the patient that he has had a myocardial infarction, or heart attack, and needs to go to hospital.

Now compare the learning objectives generated by two groups:

Group A:

1. Myocardial infarction – symptoms, causes, treatment etc
2. ECG – what it shows, how it's done

Group B:

1. What is a myocardial infarction? (Relate to pathology)
2. How does a myocardial infarction cause the specific symptoms felt? (Relate to anatomy)
3. How does an ECG help diagnose a heart attack? What are the different leads and how do they relate to the heart?

While Group A is likely to look up lists of information, Group B is likely to try to understand the problem, using both basic clinical sciences and some clinical textbooks to relate the anatomy and pathophysiology to the patient's symptoms.

Some additional notes about learning objectives:

You should be familiar with learning objectives from all your courses. In educational terms, they are used to frame what the student should learn, and what they should be able to do once they have done the learning.

Consider using the SMART acronym to make your objectives more useful:

Specific – rather than open-ended

Measurable – could you write an assessment for it?

Achievable – is it realistic to be able to study it?

Relevant – to the year of study

Timescaled – this usually means you can roughly say how long it would take

For example, instead of generating learning objectives such as:

- Anatomy of the heart

you should be more clear as to what needs to be done, eg:

- Draw a schematic diagram showing the 4 chambers of the heart, the heart valves and the major vessels
- Describe which territories of the heart are affected by blockages in the different coronary vessels

It is also important to think about the main verb used in the objective. There is a difference in learning between just recalling facts, and applying them in practice. There is a model for thinking about this, called Bloom's taxonomy<sup>3</sup>, where the lowest level deals with pure recall, whilst higher levels deal with synthesis, evaluation and application:

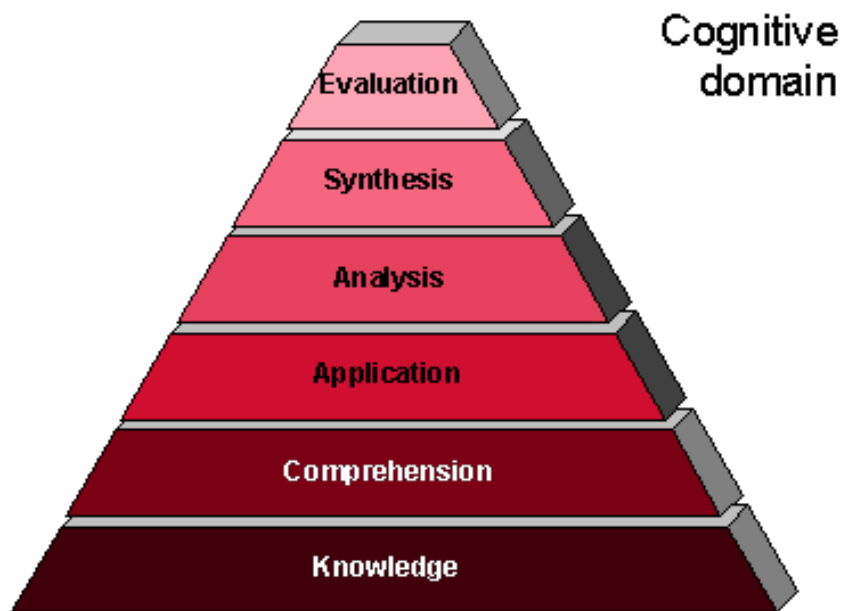


Diagram 1: Bloom's taxonomy (from <http://www.learningandteaching.info/learning/bloomtax.htm>, accessed 8<sup>th</sup> Dec 2011)

So, instead of generating a learning objective such as:

- Breaking bad news

Consider in more detail the verb used, and what you want to be able to do by the end. Compare the following:

- List the steps used to share difficult news about a diagnosis with a patient
- Analyse the communication skills required to share difficult news

They are both to do with communication skills, but they require very different levels of thinking by the student.

## 6. Pass marks

The College pass mark is 40%.

*You must score at least 1 mark for each section*

### Prize

There is a prize, donated by the Hall of Apothecaries, for the student with the best performance overall in the PBL in-course assessment (all 4 elements).

### Referred assessment

Students who are referred for the independent PBL exercise will be given a second opportunity to complete the exercise during the resit period in the summer, with a new case. They will be given generic feedback about the assessment to help guide them.

**A requirement to resit the PBL exam will automatically exclude you from merits and distinctions in the first year.**

## 7. Important Dates & Submission

There will be a talk about the assessment in the first term - **13<sup>th</sup> December 2011.**

There will be an example independent PBL exercise on Blackboard / intranet at the end of the first term.

1-1 feedback from PBL tutor at end of term 1 (this is formative but forms the basis of your written reflection)

A self –test case will be released on **10th January 2012.**

You should submit this via Blackboard by **5pm on Tuesday 24<sup>th</sup> January 2012.**

Written reflection to be submitted via Blackboard by **5pm on Monday 13<sup>th</sup> February.**

The assessment case will be released on **6<sup>th</sup> March 2012**

The case must be submitted via Blackboard by 5pm on **Tuesday 20<sup>th</sup> March 2012.**

Late submission will not be accepted and will count as a fail.

You are advised to retain your own electronic copy of your submission.



## 8. Mark Scheme

Consider the assessors' rating form carefully to ensure that you understand the criteria by which your assessment will be graded.

Element being assessed	Marks allocated / grade descriptors			
	Fail	Pass	Good	Excellent
1. Generation of specific learning objective(s)	<p><b>0</b></p> <p>Does not identify basic issues from the case.</p> <p>and/or</p> <p>Not written clearly.</p>	<p><b>1</b></p> <p>Identifies basic issue(s) from the case.</p> <p>and</p> <p>Clearly stated.</p>	<p><b>2</b></p> <p>Comprehensive and clear objectives about relevant, researchable issues.</p>	<p><b>3</b></p> <p>As <b>2</b> and more complex, with questions of greater breadth and depth, exploring relationship between basic science and clinical practice, or using higher levels of Bloom hierarchy</p>
2. Report - summary of information and conclusions drawn	<p><b>0</b></p> <p>Unrelated to learning objectives.</p> <p>and/or</p> <p>General lack of synthesis.</p> <p>and/or</p> <p>Absent or unjustifiable conclusions.</p>	<p><b>1 or 2</b></p> <p>Acceptable synthesis and important factor(s) emphasized and conclusions justified, related to learning objectives</p>	<p><b>3 or 4</b></p> <p>Clear synthesis of information obtained. Conclusions well justified and related to learning objectives</p>	<p><b>5 or 6</b></p> <p>As '<b>3 or 4</b>' and of excellent quality. Integrates basic sciences with clinical practice.</p>
3. References: "What you chose"	<p><b>0</b></p> <p>Inappropriate or irrelevant list of sources in relation to learning objectives</p>	<p><b>1</b></p> <p>Relevant sources.</p> <p>and</p> <p>Referenced appropriately.</p>	<p><b>2</b></p> <p>Comprehensive range of sources including up-to-date and/or seminal references</p> <p>and</p> <p>Consistent reference style.</p>	<p><b>3</b></p> <p>As <b>2</b> and resources used show familiarity with the most appropriate resources for the learning objectives</p>
4 Critical appraisal of references "How and why you chose it"	<p><b>0</b></p> <p>Mainly uncritical</p> <p>and/or</p> <p>unjustified</p>	<p><b>1</b></p> <p>Some critical appraisal of sources with comments on usefulness.</p>	<p><b>2</b></p> <p>Clear and comprehensive critical appraisal of information from chosen sources with justification of choice</p>	<p><b>3</b></p> <p>As <b>2</b> and of excellent quality</p>

**Maximum marks = 15**

## 9. Example case and sample answer

(From Glasgow mock MILE Question)

### Example case

Mr McRory comes into the surgery asking for advice on the effects of dyes on his health. He has recently joined a new firm that makes chemical dyes for the fashion industry and the firm is offering a screening programme. He has heard from friend that a newspaper reported that someone working with dyes died of a cancer and Mr McRory is concerned that this could happen to him.

### Sample answer

Note that this is **not** a perfect answer. We have provided an example answer that you can try to mark. You should try to mark this yourself, using the mark scheme provided, and then discuss your thoughts with a colleague.

### Learning objectives generated

1. What harmful effects may chemical dyes have on the body?
2. Describe the screening programme and its pros and cons
3. Explain the anatomical and physiological process of cancer related to exposure to chemical dyes

### Report

The physical state of chemical dyes, level of exposure, length and route of exposure determine how badly the body can be affected. Harmful effects of dye can be split into two categories:

1. Acute toxicity effects
2. Chronic toxicity effects<sup>1</sup>

Acute toxicity effects include skin irritation, contact dermatitis, eye irritation and respiratory tract irritation (which may lead to sensitisation).

Chronic toxicity effects include damaging effects on organ function and cancer. If dye enters the circulation it can be metabolised into either

- a) a less toxic substance excreted via urine/faeces OR
- b) a more toxic substance that may damage organs or act as potential carcinogens

In dye factories, a higher incidence of bladder cancer exists amongst men. Aromatic amines in the dye (e.g. aniline, 2-naphthylamine, benzidine) and azodyes are causative agents<sup>1,2</sup>. Most also require metabolic conversion to active carcinogens. ̂-naphthylamine requires conversion by hydroxylation in the liver. Because of conjugation<sup>3</sup> with glucuronic acid, however, there is no carcinogen effect until it is deconjugated in the urinary tract (which is why the cancer is most common in the bladder).

Statistics show occupational exposure to chemicals is responsible for one third of bladder cancers<sup>4</sup>. In conclusion, dyes can have many different harmful effects ranging from skin irritation due to short term exposure, to bladder cancer due to long term exposure.

For patients like this man, doctors carry out cytological tests to examine for tumour cells (which are early signs of malignancy)<sup>5</sup>. They also look for signs of haematuria (blood in urine). Macroscopic haematuria with no pain may mean a patient has urothelial cancer. There may also be protein casts present, due to damage to organs in the urinary tract. Therefore, in the case of a chemical dye worker, doctors are searching for signs of cancer, in particular, malignant cells.

The main purpose of screening programme is prevention<sup>6</sup>. It is aimed to detect early changes (e.g. the presence of malignant cells) so that effective treatment may be given and precautions taken. The overall aim is to reduce the incidence of cancer in the screened population (i.e. in this case, the workers of this chemical factory).

Another reason for this company having this regular screening programme is to avoid risks of paying large amounts in compensation to workers who may develop cancer. In the 1950's (without these programmes) it was found that those who contracted the disease received compensation without litigation. However, because of the development of these screening programmes, workers today who want compensation must go through court.

Therefore, it is important to carry out screening programmes to detect malignancy at a still treatable stage, thus reducing the incidence of cancer and to protect the companies from the demands of compensation. (450 words)

### Utilisation of sources

1. General and Systemic Pathology 2nd Edition; Churchill Livingston; 1996; pp 264-268
  - Excellent source providing a good amount of detail on how Aromatic Amines cause bladder cancer but 15 years old. (20)
2. "Health and Safety Standards of Dyes"; ETAD ( Ecological and Toxological Association of Dyes) <http://www.nacdef.com/publicat/ETAD/dye/Intro.htm>
  - Provided very helpful information on all the different effects (short and long term) dyes can have on the body. (20)
3. Medical Dictionary; Oxford; 2010
  - This source was helpful in explaining some difficult terms I came across in other books (e.g. conjugation). (18)
4. Banburry Report: Quantification of occupational cancer; 1981
  - Shows trends in the U.S. between occupational hazards and cancer which again reinforced the idea that cancer is related to exposure to chemical dyes. (25)
5. ABC of Urology; BMJ Publications; pp26-28
  - Gave a good, comprehensive explanation of what Doctors look for in a urine sample, particularly in patients with bladder cancer. (21)
6. Expert - Dr T. I. F. Macleod; Cytologist
  - Very helpful in outlining what Doctors look for when giving a urine sample of a worker in a dye factory and also provided useful information on the purpose of screening programmes. (32)

## 11. References

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<sup>1</sup> Shumway JM & Harden RM. AMEE Guide No. 25: The assessment of learning outcomes for the competent and reflective physician. *Medical Teacher* 2003; 25(6): 569-584

<sup>2</sup> Currie J & Muir EH. Year 1 PBL Student Guide. Imperial College; 2011

<sup>3</sup> BLOOM B S (ed.) *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain* New York: McKay; 1956