Therapeutics of Clinical Nursing 1B

Health Numeracy and Research Skills Development (RSD)

Name ....
## Student number ....

The following package is the first in a series of assessments based on <u>Level 1</u> of the

Research Skills Framework developed by John Willison and Kerry O'Reagan of The

University of Adelaide.

- **<u>Please work through the RSD in the sequence numbered below</u>.**

- On successful completion of Level 1 of the RSD, you will advance to Level 2

  next year in Semester 1.

Pages contained herein:

1.   Title page

2.   The RSD framework

3.   The first numeracy diagnostic test

4.   Nursing numeracy audit – Facets C and D

5.   Nursing numeracy – Facet B

6.   Nursing Numeracy – Facet E – Part 1 and 2

7.   Nursing Numeracy – Facet F

8.   Nursing numeracy – Marking guide

Research Skill Development Framework
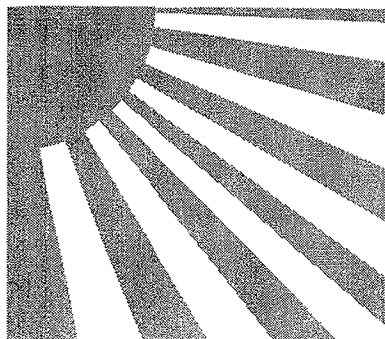
LEVEL OF STUDENT AUTONOMY ←

FACET OF INQUIRY

	Level I *Students research at the level of a **closed inquiry*** and require a **high degree of structure/guidance***	**Level II** *Students research at the level of a **closed inquiry*** and require **some structure/guidance***
A. Students **embark** on inquiry and so **determine a need** for knowledge/understanding	Respond to questions/tasks arising explicitly from a closed inquiry.	Respond to questions/tasks required by and implicit in a closed inquiry.
B. Students **find/generate** needed information/ data using appropriate methodology	Collect and record required information/data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data using a prescribed methodology from prescribed source/s in which the information/data is not clearly evident.
C. Students **critically evaluate** information/ data and the process to find/generate this information/data	Evaluate information/data and the inquiry process using simple prescribed criteria.	Evaluate information/data and the inquiry process using prescribed criteria.
D. Students **organise** information collected/ generated	Organise information/data using a simple prescribed structure and process.	Organise information/data using a recommended structure and process.
E. Students **synthesise**, **analyse** and **apply** new knowledge	Synthesise and analyse information/data to reproduce existing knowledge in prescribed formats. Ask questions of clarification/ curiosity.	Synthesise and analyse information/data to reorganise existing knowledge in standard formats. Ask relevant, researchable questions.
F. Students **communicate** knowledge and the processes used to generate it, with an awareness of ethical, social and cultural issues	Use mainly lay language and prescribed genre to demonstrate required knowledge and understanding for lecturer/teacher as the audience.	Use some discipline-specific language and prescribed genre to demonstrate self-selected knowledge and understanding from a stated perspective and for a specified audience.

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LEVEL OF STUDENT AUTONOMY ⟶

Level III	Level IV	Level V
Students research **independently** at the level of a **closed inquiry***	Students research at the level of an **open inquiry*** within **structured guidelines**	Students research at the level of an **open inquiry*** within **self-determined guidelines**
Respond to questions/tasks generated from a closed inquiry.	Generate questions/aims/ hypotheses framed within structured guidelines.	Generate questions/aims/ hypotheses based on experience, expertise and literature.
Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record self-determined information/data from self-selected sources, choosing an appropriate methodology based on structured guidelines.	Collect and record self-determined information/data from self-selected sources, choosing or devising an appropriate methodology with self-structured guidelines.
Evaluate information/data and the inquiry process using criteria related to the aims of the inquiry.	Evaluate information/data and the inquiry process comprehensively using self-determined criteria developed within structured guidelines.	Evaluate information/data and the inquiry process rigorously using self-generated criteria based on experience, expertise and the literature.
Organise information/data using recommended structures and self-determined processes.	Organise information/data using structures and processes suggested by provided guidelines.	Organise information/data using self-determined structures and processes.
Synthesise and analyse information/data to construct emergent knowledge. Ask rigorous, researchable questions based on new understandings.	Synthesise, analyse and apply information/data to fill recognised knowledge gaps.	Synthesise, analyse and apply information/data to fill self-identified gaps or extend knowledge.
Use mostly discipline-specific language and appropriate genre to demonstrate knowledge and understanding within a field from a scholarly perspective and for a specified audience.	Use the language of the discipline and appropriate genre to address knowledge and understanding gaps from several perspectives for a self-selected audience.	Use the language of the discipline, choosing appropriate genre to extend knowledge and understanding, from diverse perspectives for a range of audiences.

Mathematics Diagnostic Audit – RSD Level 1 – Facets C and D

From the descriptions of operations provided below please evaluate your Diagnostic to identify which types of mathematics are present. Please note there may be more than one type of operation involved in a problem. Place an X in the corresponding box.

Question	Student analysis								Please rank the questions from most difficult (10) to least difficult (1)	Study use only
	A	**S**	**M**	**D**	**C**	**S / F**	**Conv**	**Calc**		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

A Addition - the process of uniting two or more numbers into one sum, represented by the symbol +.

S Subtraction - the operation or process of finding the difference between two numbers or quantities, denoted by a minus sign (-).

M Multiplication -a mathematical operation, symbolized by $a \times b$, $a \cdot b$, $a * b$, or ab, and signifying, when a and b are positive integers, that a is to be added to itself as many times as there are units in b; the addition of a number to itself as often as is indicated by another number, as in 2×3 or 5×10.

D Division the operation inverse to multiplication; the finding of a quantity, the quotient, that when multiplied by a given quantity, the divisor, gives another given quantity, the dividend; the process of ascertaining how many times one number or quantity is contained in another.

C Converting metric units - a change in the form or units of an expression

S / F Sums involving fractions – manipulation of fractions which are A number that compares part of an object or a set with the whole, especially the quotient of two whole numbers written in the form $^a/_b$.

Conv Converting fraction to percentages - To convert a fraction to a percentage, divide the numerator by the denominator. Then move the decimal point two places to the right (which is the same as multiplying by 100) and add a percent sign.

Calc Calculations involving medications – Calculation the procedure of calculating; determining something by mathematical or logical methods

Definitions from http://dictionary.reference.com and http://mathforum.org/dr.math/faq/faq.fractions.html

Nursing Numeracy - Level 1
RSD Facet B

As a result of the numeracy audit you should have an ordered sequence of numeracy skills identifying your strengths and weaknesses. Using the audit as a base, find resources under the following headings that may be useful for developing your numeracy skills.

Textbooks

Websites

University services

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Nursing Numeracy - Level 1
RSD Facet E – Part 1

You have now combined (synthesized) your research regarding various resources available to assist your numeracy development and you have completed a numeracy audit of your diagnostic test. Your next task is to identify from the clinical examples below, the numerical operation required to complete the question. You should also include your working in the calculation box.

Question	Numerical Operations required	Calculation / Answer
e.g. a patient is ordered 7.5 g of erythromycin, orally. The drug stock is 250mg/ml. what volume is required to administer the dose?	Conversion Division Formula / calculation	
1. Chlorpromazine syrup stock is 25mg/5ml. How many mg of chlorpromazine are there in 30 mls.		
2. A patient is receiving an IV solution @ 125 ml/hr. How much fluid will they receive over 12 hours?		
3. A patient is to have 750 ml of fluid via an IVT over 10 hours. The IV set delivers 20 drops per ml. At what rate should the IVT drip to deliver this volume?		
4. A bag of blood is 300 mls. This is to be infused over 2 hours. for an IVT delivering 20 drops / ml calculate the drip rate in drops/ min		

Nursing Numeracy - Level 1
RSD Facet E – Part 2

Your next task is to identify from the clinical setting actual examples of medications provided for patients. As before, you are required to identify what numerical operations could be involved in the delivery of the drug. You should also include your working in the calculation box. Do not select examples where there are no numeracy skills involved.

Clinical example	Numerical Operations required	Calculation / Answer

Nursing Numeracy - Level 1
RSD Facet F

Complete the following questions as a result of your reading of the following article

Elliot, M. Joyce, J. 2005 *Mapping drug calculation skills in an undergraduate nursing curriculum*, Nurse Education in Practice, Vol 5 pp225-229

1. What are consequences of incorrect drug calculations?

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_____
_____
_____
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2. Is there an implied assumption that a high entrance score will imply a high level of mathematical ability?

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3. What is your ethical perspective on the concept that it is idealistic to expect every drug calculation to be completely accurate?

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4. What argument do the authors make for the place of calculators in drug calculations tests?

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5.   In what way do you believe that drug calculation tests conducted in the classroom will be different from the clinical setting?

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6.   Consider the section within the paper "Calculation skills in the profession". Compare the results of each of the studies of Gillham and Chu (1995), Blais and Bath (1992), Santamaria (1997), Blinder and Bayne (1991), Ashby (1997) and Gladstone (1995). Place these results in either a table or represent them in a graphical fashion. Provide a short explanation of why you have chosen to represent them this way.

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Marking guide – Health Numeracy RSD

Golbeck etal (2005) aspects of Basic Numeracy (no manipulation or calculation) and Computational Numeracy (simple manipulation in a health context)	Marking criteria – Students are required to provide evidence of how they have addressed the indicators for Level 1. Examples are included below.
❑ Completes diagnostic test early in semester 1	❑ Diagnostic test – week 2 ❑ Summative test – week 9
❑ Identify texts relevant to drug calculations ❑ Identifies websites assisting with basic mathematics 4	❑ Accurate bibliographic details of appropriate texts ❑ Appropriate websites identified and working URL's provided
❑ Students analyse the diagnostic using a set of descriptions supplied by tutor. 2	❑ Clear analysis and identification of the diagnostic and the numerical operations involved

❑ Students complete numeracy skills audit
 	
   o Addition
   o Subtraction
   o Multiplication
   o Division
   o Units of measure
   o Conversion
   o Calculator use   3
	❑ Students will correctly identify their strengths and weaknesses for each numeracy skill identified within the audit.

❑ Students introduced to the typical format for drug orders 5	❑ Students will provide 5 examples from the clinical setting of medications that require a calculation prior to being given. ❑ The numeracy aspect of each calculation will be clearly identified
❑ Students describe their understanding of the use of numeracy in nursing practice through critique of a journal article (supplied by tutor) 6	❑ Answers to journal article questionnaire should be clear and concise and have some consideration of ethical, social and cultural issues.