

Name:		Form Class:	
Subject:	Senior Chemistry	Date:	See Below
Teacher:		Time Allowed:	5 Weeks
Semester:	1	Year:	2007

Assessment No	2	Assessment Technique	EEI
Topic/s:	Determine the potability of water from a range of sources and what steps are required to purify it.		
Common Curriculum Elements:	Field C – Applying techniques and procedures Field D – Analyse Assessing and concluding		
Instructions & Conditions:			
You must:			
<ul style="list-style-type: none"> • Maintain a journal that catalogues the investigative process followed over the duration of the EEI. • Establish the investigation by conducting a preliminary literature search to establish a research focus for the EEI and develop a hypothesis that relates to the research focus. • Develop an investigative process for the EEI. • Conduct and manage the investigation to ensure efficient collection of data in a safe environment. • Analyse and discuss data to identify patterns and trends. This should extend to developing models to explain collected data in terms of the underlying concepts and ideas. • Evaluate of investigative processes used and consider the validity of the hypothesis in relation to the collected data. 			
Your teacher will provide:			
<ul style="list-style-type: none"> • Timely guidance and advice to get (and keep) your EEI moving. • Suggested World Wide Web (WWW) links (not exhaustive) to useful sites pertaining to your topic. • Class time to work on the EEI • Criteria to guide your performance 			

	Due Date		Teacher signature	Date
	Ms Graham	Mr Jones		
EEI assigned		10/5		
Submission of student-selected topic research plan & risk assessment form		22/5		
Checkpoint		29/5		
Draft of report submitted		5/6		
Final report and logbook submitted		12/6		

LEVEL OF ACHIEVEMENT

the best we can be

The Investigation:

Determine the potability of water from a range of sources and what steps are required to purify it.

Background information:

Humans rely on consuming clean, potable water. The water that is collected for human consumption can go through a series of purification processes before it is considered “safe” and suitable for human consumption. What are these processes? What are the standards that we consider “suitable” for drinking water?

Decide and research at least one water purification method :

- Flocculation,
- Softening,
- Disinfecting,
- Balancing pH,
- Desalinisation

How to undertake an EEI

Phase of EEI	Step to Complete. You should:	Date Due	Complete
Phase One: Decide on a research topic	1. Consider one (or more) of the following water purification methods; <ul style="list-style-type: none"> □ Flocculation, □ Softening □ Disinfecting □ Balancing pH □ Desalinisation 		
Phase Two: Understanding/planning/ developing a strategy	2. Research your method 3. Clarify: <ul style="list-style-type: none"> a. The chemical principles b. Measurement techniques 4. Plan your approach 5. Decide what initial trials you will undertake, how many trials etc. 6. Complete a Research Proposal sheet for your teacher to review and give approval. 7. Complete the Risk Assessment sheet for your teacher to review and give approval. 8. Locate any equipment necessary.		
Phase Three: Performing	9. Perform the investigation. 10. Record all observations, measurements, problems, changes in approach and modifications to your initial plans and procedure in your journal.		
Phase Four: Report Writing	11. Write your individual report - collate all you've done into a report of your investigation. The report will be a more detailed version of a standard laboratory report. It must not contain plagiarised material – this also includes copying large sections of the report from other members in your group.		

Hints for journal writing:

- You will need a logbook/diary to record in one place your thoughts and notes about everything from selection of a topic through to completion of your investigation. It is a no-frills, on-the-spot recording of the essentials of your work. It need only be intelligible to you but it may be used to verify the authenticity of your work.

- You will need to submit your journal along with your final report. Your journal and your draft is your way of providing evidence that *you engaged in the research process* and that the report is *your own word*

Hints for report writing:

The format of the report required for this task is outlined below. A more detailed breakdown, including examples may be accessed from the following address: <http://unilearning.uow.edu.au/report/2b.html>. Note that there are slight differences in the suggested structures. These are reflective of the intended audience.

Set your report out in the following format:

1. **Title page** (in standard format)
2. **Abstract**
 - a. A paragraph, that if read by itself, summarises the project in the least possible words. It should include the aim, principles/techniques employed and a very brief statement of your results and conclusions. Hint: write the abstract last.
3. **Introduction:**
 - a. State the researchable question
 - b. State the hypothesis to be tested
 - c. Give an orientation of the reader to biology principles, overall design, and the reasons for performing particular steps in the method
 - d. Discuss and analyse any research. This will be used to tell a story that generates interest in the reader for the field of your research and link to the practical investigation to follow.
 - e. Describe your planning and thinking, both in preparing for, and during the investigation. (Include any original plan and how and why it, or techniques, were modified)
 - f. Report on the results of any preliminary "pilot" trials you did before starting the main investigation.
4. **Materials:** *The materials used and how the investigation was conducted.*
5. **Method:**

A description of what *you* did in the final practical tasks. You may do this in the traditional form (A replicable, stepwise description in 3rd person, past tense).
6. **Results** (in forms that are appropriate to your data, eg. prose, tables, graphs, statistical analysis etc)
7. **Discussion** (of procedures, data etc as appropriate).

You will need to show evidence of critical thinking in interpreting your data.
Answer the six questions in order to craft a good conclusion.

 - a) What was the purpose of the experiment?
 - b) What were the major findings?
 - c) Did this support your original hypothesis (or answer your research question)?
 - d) How do your findings compare with other people's findings or with information in your textbook?
 - e) What are the possible experimental errors, how did they effect the experiment and how can the experiment be improved?
 - f) What explanation can you think of for these findings?
 - g) How could this experiment be improved or extended?

8. Conclusion

A response to your original problem and/or hypothesis.

9. Bibliography

Your research should involve a variety of reputable sources. Any references you make to published material must be acknowledged. The purpose of the annotation is to inform the reader of the relevance, accuracy, and quality of the sources cited. Use the following headings to build your bibliography. For example:

Lim, K., Horton, M. and O'Haver, T. (2004). Making use of IT. *Teaching Science*. Spring 50(3), 38-43 . (This article actually provides guidance for referring to a variety of sources including web based material)

**Phase Two:
EEI Initial Proposal.**

Name:

Researchable question and proposed hypothesis:

Identified chemical concepts involved:

Overview of the project (What do you intend to do and how will this be achieved?)

Equipment Required:

Timeline:

EI Risk Assessment:

Name:

POSSIBLE HAZARDS

Spillage		Explosion		Moving Parts		Heat/Cold	
Combustion		Corrosion		Electrocution		Infection	
Toxicity		Sharp Objects		Radiation		Other	

Details of Other

HAVE YOU VIEWED MSDS FORMS FOR HAZARDOUS CHEMICALS USED IN THE PRACTICAL ?
Please Circle: YES/NO

HAZARDOUS CHEMICALS LIST			

HAZARDOUS CHEMICALS DISPOSAL METHOD:

RISK MINIMIZATION STRATEGIES

UNDERSTANDING	Shows an understanding of the experiment and the possible hazards	
PREPARATION	class size is appropriate for the experiment class has the appropriate experience for this type of experiment class groups are appropriately spaced for the experiment number of groups are desirable	teacher has previous experience with similar types of experiments hazards have been assessed prior demonstration of skills necessary emergency procedures have been considered
ORGANIZATION	area is appropriate for the experiment movement of people has been taken into account appropriate spillage control methods are on hand	materials have been considered in the activity
SAFE SUPERVISION	hair tied back synthetic parkers/garments removed jewellery removed if appropriate	complete covered in footwear any student wearing contact lenses needs to wear goggles in chemistry experiments protective clothing necessary
EXPERIMENTAL PRACTICES	minimization of skin contact through appropriate practices amounts of chemicals are appropriate need for good ventilation need for use of the fume cupboard students are aware of the toxic nature of the chemicals	students have been reminded about: - lighting and use of the Bunsen Burner - heating in test tubes - heating large vats of liquid - handling hot apparatus/liquid - carrying glassware - handling reagent bottles - inserting glass into rubber stopper
PERSONAL PROTECTION		use of lab coat necessary goggles necessary

RISK ASSESSMENT

RISK LEVEL	LOW RISK
after considering: 1. the students 2. your expertise 3. the experiment, <u>Circle any hazards and determine the Risk Level</u>	NO heat, pressure or vacuums, mains voltage, corrosive, volatile, flammable or toxic chemicals, handling of dangerous biological materials or specimens
MEDIUM RISK	HIGH RISK
INVOLVES heat, mains voltage, mildly corrosive, volatile, flammable or toxic chemicals, handling of biological specimens, low speed mechanical and/or moving objects and devices, or growing cultures under controlled conditions	INVOLVES extreme heat or cold, cryogenic gases, high pressures or low vacuums, high voltage, highly reactive, corrosive, volatile, toxic or flammable chemicals, radioactive substances, high speed mechanical and/or moving objects, or unknown biological hazards

High Risk practicals MUST be approved by HOD. HOD Signature:

Signature:

Date

Name:	A	B	C	D	E
Aspects of the task	Have you:	Have You:	Have you:	Have you:	Have You:
Investigation plan and risk assessment Developed a safe plan for EEI UT 1	<input type="checkbox"/> designed and refined investigations, manages research task effectively and identified and applied risk management procedures	<input type="checkbox"/> designed investigations, managed research task and identified and applied safety procedures	<input type="checkbox"/> managed a plan to conduct research tasks and applied safety procedures	<input type="checkbox"/> followed a given plan to conduct aspects of a research task and followed safe procedures	<input type="checkbox"/> attempted to follow given procedures and safety instructions
Abstract: Summarised the EEI in an abstract UT 3	<input type="checkbox"/> used clear and concise vocab and scientific terminology to clarify ideas and communicate information	<input type="checkbox"/> used clear and concise vocab and scientific terminology to communicate ideas and information	<input type="checkbox"/> used clear and concise vocab and scientific terminology to communicate information	<input type="checkbox"/> communicated information using scientific information	<input type="checkbox"/> communicated information
Introduction: Hypothesis formation and linked to research I1	<input type="checkbox"/> generated valid researchable question and formulated a testable hypothesis linked with research	<input type="checkbox"/> generated valid researchable question and formulated a testable hypothesis	<input type="checkbox"/> generated a researchable question	<input type="checkbox"/> collected and collated information about the investigation	<input type="checkbox"/> attempted to state information about the investigation
Introduction: Identifying the chemistry involved in this EEI with links to research to the topic A1	<input type="checkbox"/> critically analysed the chemistry in a range of situations and evaluated the validity of propositions	<input type="checkbox"/> explained the chemistry in this investigation and evaluated the propositions.	<input type="checkbox"/> Identified the chemistry in this situation and made statements on chemical propositions	<input type="checkbox"/> Identified some chemistry in this situation	<input type="checkbox"/> Responded to identified chemistry
Method: Selects and explains the equipment used UT 2	<input type="checkbox"/> selected and justified the equipment used for the intent of the investigation	<input type="checkbox"/> selected and explained the equipment used in the investigation	<input type="checkbox"/> selected and listed equipment for the investigation	<input type="checkbox"/> used given equipment	<input type="checkbox"/> attempted to use given equipment
Results: Recording and displaying data UT 2	<input type="checkbox"/> Applied, with discrimination, equipment and technology to gather record and manipulate valid data and information	<input type="checkbox"/> applied equipment and technology to gather record and manipulate valid data and information	<input type="checkbox"/> used equipment technology to gather, record data and information	<input type="checkbox"/> used equipment and technology to display some data	<input type="checkbox"/> attempted to use equipment and technology to display some data
Results: Working with data in a chemistry context A2	<input type="checkbox"/> applied algorithms and integrated concepts and theories to find creative solutions	<input type="checkbox"/> applied algorithms and linked concepts and theories to find solutions	<input type="checkbox"/> applied algorithms to problem solving situations to predict outcomes	<input type="checkbox"/> applied algorithms to problem solving situations	<input type="checkbox"/> attempted to apply algorithms to problem solving situations
Discussion: Analysed data and linking I3	<input type="checkbox"/> Systematically analysed primary and secondary information showing links to underlying concepts	<input type="checkbox"/> Analysed primary and secondary information recognising the concepts involved	<input type="checkbox"/> Analysed primary and secondary data	<input type="checkbox"/> Made statements about the investigation	<input type="checkbox"/> Attempted to make statements about the investigation
Discussion: Identifying links to EEI data and research findings I2	<input type="checkbox"/> synthesised and explained relationships between trends in data and information collected	<input type="checkbox"/> Explained trends in data and information collected	<input type="checkbox"/> explained obvious trends/patterns in data and information	<input type="checkbox"/> stated obvious trends/patterns in data	<input type="checkbox"/> recorded some data
Discussion Evaluates the investigation I5	<input type="checkbox"/> critically evaluated the investigation and proposes justified refinements	<input type="checkbox"/> evaluated the investigation and reflected on the adequacy of the data collected	<input type="checkbox"/> discussed the investigation	<input type="checkbox"/> made statements about the investigation	<input type="checkbox"/> attempts to make statements about the investigation
Conclusion: Made justified conclusions I5 and A3	<input type="checkbox"/> justified and critically evaluated conclusions with reasoned and supported decisions	<input type="checkbox"/> generated and evaluated conclusion with reasoned feasible decisions	<input type="checkbox"/> generated feasible conclusion and solutions	<input type="checkbox"/> made a statement about the investigation	<input type="checkbox"/> attempted to make a statement about the investigation

Teacher Comments:

Date:

Signature: