Documenting evidence

This is a sample of one teacher's evidence and has been provided to support your mentoring role.

It is important to note that evidence may vary significantly from this particular sample due to the context of each school and the practice of individual teachers.

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Evidence of Professional Practice for Full Registration

1. Establishing content and context for student learning.

Students and school context.

The school is a co-educational specialist government school which focuses on developing the capacity of students and staff in the areas of science, math and emerging technologies. The school is made up 3 year levels, year 10, year 11 and year 12 with roughly 190 to 200 students at each year level. The 600 students and 75 school staff operate in a three story building which has been designed from the ground up to be ecologically sustainable and at the forefront of pedagogical practice. Through the use of open plan learning spaces, team teaching, dual device technologies, Google Apps for Education and embedded collaboration with the University the school shares the site with, students are offered a range of unique and challenging curriculums at all year levels; including University extension curriculums at Year 12.

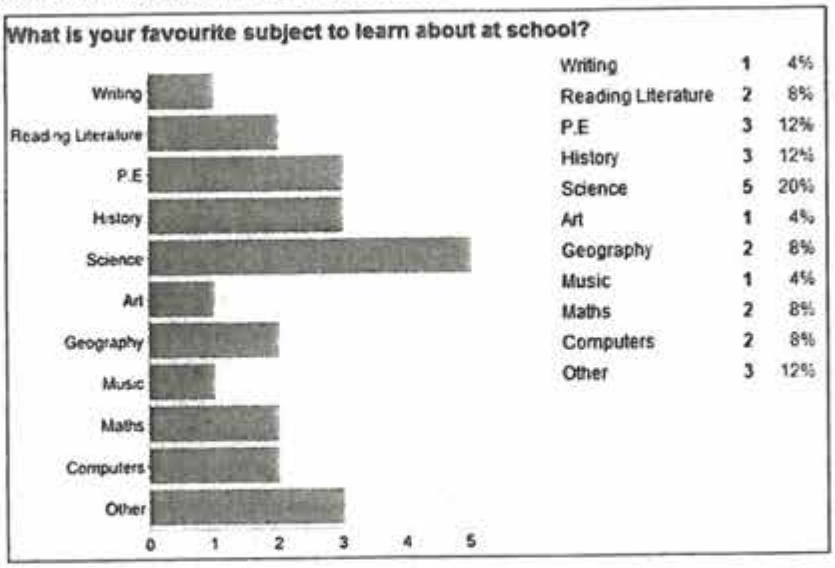
Within the school there is a diverse range of learning levels, however, all students are required to sit an entrance exam and attend an interview before they are given a place at either year 10 or year 11. As a result of these measures the vast majority of the students which attend the school are of high learning ability, have a passion for science and exhibit a mature perspective in the ownership of their own learning. Despite this there are still variations in student learning levels at all year levels and a small group of students who are on the Autism Spectrum or who have mild forms of developmental disabilities. Teaching support staff work with many of these students and teachers to develop and employ strategies to assist student learning.

The class group I have selected for my inquiry is my Year 11 Unit 1 and 2 Environmental Science class. I have selected this class of students to complete my inquiry for several reasons. Firstly the class is made up of 13 students who are all unique in their personality and diverse in their learning abilities. The student group is small enough to focus my individual attention upon all students yet large enough that carrying out a variety of different learning tasks, activities and measuring learning outcomes will not be impeded by too great or small a number of students.

Context of student learning – range of learning levels.

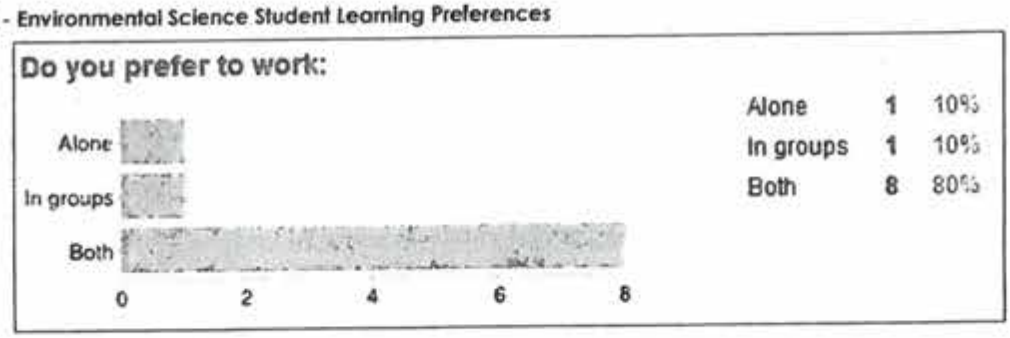
Students in this class have a range of learning levels. A consequence of each student entering the school at year 10 or year 11 is that they have all attended a diverse range of schools previously and therefore have all been exposed to and taught aspects of the curriculum to different degrees and in different ways. The impact of this is demonstrated by the range in learning levels within the classroom and the range of individual experience in these curriculums exhibited by the students. Within the class there are 3 students who are of low learning level (Group A) and 5 students who are of high learning level (Group B) as demonstrated by their semester 1 school assessed course work and exam results. The students in Group A, which exhibit low learning ability, struggled to demonstrate their ability to meet the learning and skill outcomes of Unit 1 environmental science whereas the students in Group B, who exhibit high learning levels, demonstrated an in-depth understanding of the knowledge and skills required to meet the Unit 1 environmental science outcomes. The remaining 5 students are of middle learning level, (Group C) and demonstrated a general understanding of some of the required skills and knowledge to meet the Unit 1 outcomes as well as an in-depth understanding of other aspects of the knowledge and skills in Unit 1.

Figure 1 - Environmental Science Student Subject Preferences



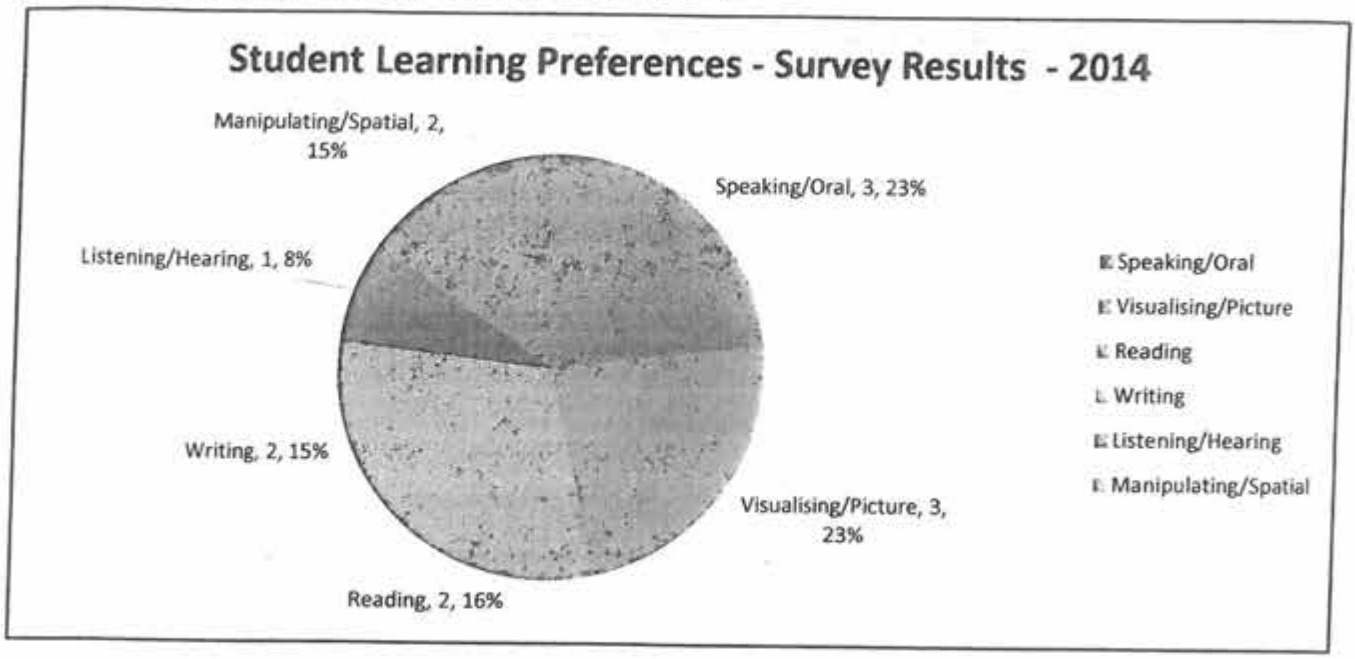
The students in the class have a range of interests such as video games (Minecraft, League of Legends and Hearthstone), environmental issues (Earthwatch Institute), engineering, medicine, politics, media production, sport (Ultimate frisbee and athletics) and science. They enjoy a variety of subjects as shown by Figure 1 and all appear to enjoy attending school. From my interactions and experiences with my students in semester 1 it is clear that many of the students in my class are active learners who are consistently engaged in their learning. In the class there is one student who is very passive and does not engage with many learning tasks.

Figure 2 - Environmental Science Student Learning Preferences



The students demonstrate a range of learning styles, as highlighted by Figure 2 and 3. The variety of learning styles in this classroom highlights the need for differentiation of student learning tasks as well as the importance of student choice. Failure to differentiate student learning may result in a disconnect between the students, the curriculum and their learning which may lead to students not being given the opportunity to succeed and consequently; not be able to achieve the learning outcomes required of them by the curriculum.

Figure 3 - Environmental Science Student Learning Preferences



The Unit 1 and 2 environmental science class is timetabled to have 6, 75 minute, periods a cycle and this allows me adequate time to work with the students as a class and individually at their point of need. Having 3 periods each week means that units of work can be easily and effectively structured in terms of a sequence of learning with measureable outcomes of learning and skill development. In each lesson I ensure I use a combination of student and teacher focused tasks and activities to accommodate those students who require extra support or extension which in turn allows me to closely monitor individual learning progress.

In my lessons I use a variety of learning tools such as Google Sites, Google+ and traditional pen and paper activities to engage my students and where possible give students a choice in how they complete set tasks. John Dewey's Democracy and Education (1916) highlights the importance of student choice and creating a democratic classroom. His research showed that through giving students ownership of their own learning, and involving them in all aspects of their learning, that students were more likely to engage in constructing meaningful connections between content, skills and application of these concepts in a real world sense. By promoting a democratic classroom I am able to give students the opportunity to make these connections and engage in learning that is reflective of their own learning styles.

I encourage students to get up and move around the room to discuss their ideas with their peers and use practical activities to both allow students to consolidate their conceptual knowledge and apply this knowledge in authentic real-world situations. As a learning community we frequently have class discussions evaluating, exploring or commenting on a variety of environmental issues or concepts pertaining to the curriculum. Throughout these discussions I advocate equal respect between students and encourage all students to share their insights, no matter how big or small, through praise and probing questions. Where a student may struggle to make a comment or contribute an idea to the discussion I encourage the student to continue thinking and listening to their peers before they are given another chance to contribute. This strategy allows all students in my class to experience success, not just when they achieve a significant result in an assessment task, but in everyday tasks which build their

confidence and conceptual understanding. Furthermore, I also encourage students to strive to do their personal best in the class, instead of trying to be the best, so as to build self-efficacy and avoid comparing themselves to other students as a measure of their learning success.

Through my initial interactions and conversations with these students, in Semester 1, I have developed a positive and quality learning relationship with them and am confident that I can rely on their honest feedback, which is essential for the success of this inquiry.

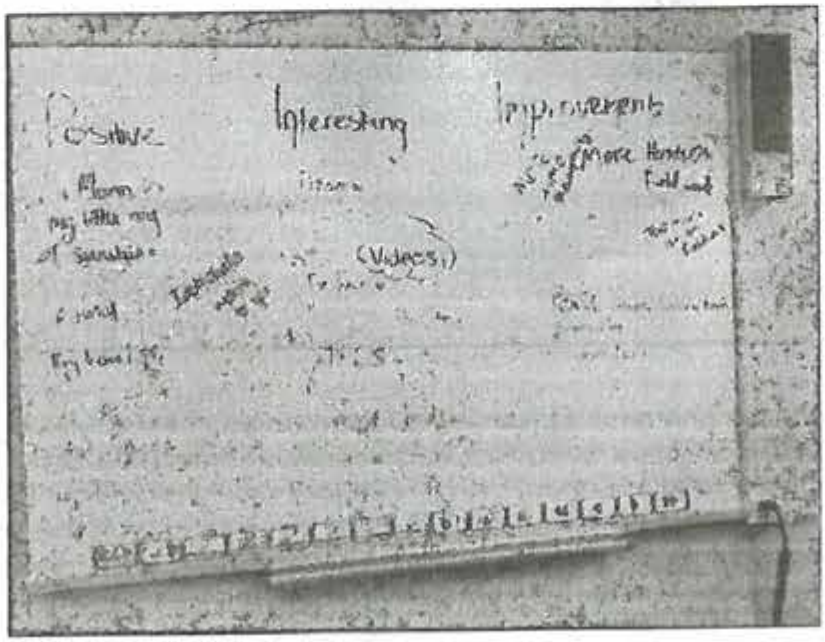


Image 1 – Student Feedback from Unit 1, Semester 1 - 2014

The feedback from the students, as shown in Image 1, demonstrated that whilst I had formed a positive relationship with my students, many of them felt that their learning needed to be challenged further through asking more questions, completing more hands on activities and by taking greater ownership of their learning. In response to this feedback I developed my inquiry question to investigate my capacity to create learner centred activities and classes, as well as provide students with the opportunity to take ownership of their own learning.

Context of student learning – factors affecting learning and prior learning based on evidence.

For the purpose of my inquiry I have selected to target three groups of students within my class. Specifically I will be mostly working with and targeting Group A students, who require the most support. Additionally I will be working to improve the learning outcomes of all my students, including those in Groups B and C.

Group A students demonstrate a willingness to participate in most class activities but occasionally do not show high levels of engagement with the class or tasks set. Of the students in Group A student AA is an EAL student who is a passive member of the class. He is quiet during discussions and does not ask for help or clarification in any of his work, despite his obvious need for further assistance as shown by his results from Semester 1. I ensure I spend 10 minutes with student AA most lessons to explain and break down class activities into more manageable tasks for his understanding, however, student AA does not complete any set work in class and rarely submits homework on time or completed. I often find student AA translating his work from Chinese to English or playing computer

games when not being closely supervised. Student AA can verbally articulate a response to conceptual questions about the topic being studied and can draw on some of the knowledge learnt in class and apply it to different situations, however, he cannot write expressively or with clarity about these ideas. Student AA struggles to stay on task and does not remain focused on his work, he has great potential in environmental science but his work does not reflect this potential.

Student AB is an enthusiastic yet highly distracted student in environmental science. She is always willing to contribute to class discussions and strives to do her best in all aspects of her work. Despite student AB's engagement with most class activities she struggles to complete all her set work and frequently overly engages with small aspects of activities and task which leads to off task behavior. Student AB is able to express her ideas well in both written and verbal mediums but demonstrates a lack of conceptual understanding in her responses and does not practice skills developed in class as shown by her results and class work from Semester 1. Student AB lives several hours from the school and during the week boards at a boarding house where some materials and resources are difficult to obtain compared to when she is at her own home. Student AB needs to focus on her work at all times and not get distracted by smaller inconsequential details that detract from her work. Whilst I encourage student curiosity, student AB frequently engages in her investigations at the expense of her class work.

Student AC is an easily distracted student who, whilst clearly enjoys the subject of environmental science, does not fully engage in his work in class. Student AC's work is consistently handed in late and often does not demonstrate the depth of his understanding or progress in environmental science. As student AC's mentor teacher I have had several conversations and meetings with him and his parents to address this issue which is prevalent across of his studies. Through our conversations we have identified online gaming and technology as barriers to his learning and study at home and as such have developed strategies to resolve these learning behaviours. However, it is apparent from his performance in class assessments that student AC is not utilizing these strategies at home or putting in the additional effort required to complete tasks to a satisfactory level. His responses in class and on assessment tasks do not demonstrate an established conceptual understanding of how concepts are connected or linked to each other and instead show his ability to think about these concepts in isolation from each other, but not as a whole.

Group B students all demonstrate a high level of engagement with all of their studies and actively participate in all class discussions and activities. Students in Group B readily raise their hand to answer questions in class and consistently ask for clarification of unit concepts and knowledge when they do not understand. Students BA and BB thoroughly enjoy group work and frequently pair up to complete set tasks unless I organise the groups myself. Student BA does fewer science based subjects at school compared to her peers but is a talented and enthusiastic media production student as demonstrated by her high quality films, posters and presentations in environmental science. Student BA's responses are well thought out and considered, they show a detailed understanding of the connections between the environment and human disturbances.

Student BB is the highest performing student in the class and always demonstrates profound depth of knowledge in her responses and expresses her answers to questions with clarity and precision. She readily offers her help to her fellow students and volunteers for challenging extension work.

Student BC is highly proficient in responding to questions which ask him to apply his conceptual knowledge in new ways and in different forms. He has a hearing difficulty

which requires the use of hearing aids and an FM transmitter during class but consistently asks for clarification if he does not hear something, I ensure when speaking to the class that I stand in a position where he can see my face and I make frequent eye contact with him to ensure he is able to hear instructions and information. This is especially important for when we attend fieldtrips or excursions where there is a lot of ambient background noise and it is sometimes difficult for BC to hear. His written work and presentation of ideas are considered and show a considered understanding of how concepts are related and connected throughout the various topics in environmental science.

Student BD is an earnest and high achieving student who works hard to achieve her best. Student BD is a very happy and diligent student and always makes contributions to our Google+ community by posting a variety of articles, videos and images that relate to our current unit of work. In Semester 1 student BD struggled with some conceptual understanding at times, especially when it came to soil and process mechanics, but used her class time effectively to complete revision tasks to address these deficiencies and sought further clarification from me to develop her understanding of the different cycles that occur throughout the earth.

Content for the program of learning –

The content for Unit 2 Area of Study 1, environmental science, is mandated by the VCE Study Design for environmental science which is developed and managed by the Victorian Curriculum and Assessment Authority. This Area of Study focuses on environmental indicators which are physical, chemical, biological or socioeconomic measures that best represent the key elements of a complex ecosystem or environmental issue. Environmental indicators for an ecosystem are investigated and the data interpreted in this area of study. On completion of this unit students should be able to explain the nature of environmental indicators for pollution and ecological health of ecosystems.

This area of study will operate within a 6 week program and will provide the content used in my Action Plan to investigate my inquiry question. This Action Plan will encompass the following knowledge and skills:

Key knowledge

- The types of environmental indicators for pollution and ecological health of ecosystems;
- The concept of ecological niche of organisms and its application for establishing environmental indicators, including thresholds, range of tolerance and limiting factors of species;
- Appropriate physical, chemical, biological environmental indicators for an ecosystem or environmental issue; for example, turbidity in streams, pH, light intensity, biological oxygen demand in streams; salinity level in soils or water; presence/absence of pollution intolerant species in streams; presence/absence of introduced species; public urban green space per capita.

Key skills

These skills include the ability to

- Identify and classify the types of environmental indicators;
- Examine the capacity to use organisms for establishing environmental indicators;
- Use a variety of practical techniques to collect environmental indicator data in the field;
- Suggest and justify appropriate environmental data for an ecosystem.

Learning outcomes for the program of learning

Group A – At the end of the 6 week program I would like to see Group A take greater ownership of their learning, demonstrate greater learner confidence and engagement with all aspects of the class;

- AA; at the end of the 6 week program I would like to see student AA take ownership of his learning, engage with all classroom activities and be able to demonstrate his understanding of the area of study knowledge and skills in both written and verbal forms.
    - **Specific outcome:** Achieve above 50% on unit fieldwork task and practical report.
- AB; at the end of the 6 week program I would like to see student AB continue to demonstrate the high level of engagement she has with the class and focus on the big picture learning outcomes and knowledge of the area of study, rather than inconsequential specific details associated with class tasks and lessons.
    - **Specific outcome:** Achieve at or above 70% on unit fieldwork task, and practical report, and demonstrate her understanding of the connections between concepts through her verbal and written responses.
- AC; at the end of the 6 week program I would like to see student AC complete work on time and to a high standard. I would like to see his responses become more expressive and include evidence to support his claims. It would also be pleasing to see him take the opportunities given to him to engage in further communication with his teacher to further develop his understanding of knowledge and concepts associated with the area of study.
    - **Specific outcome**: Achieve at or above 70% on unit fieldwork task, and practical report, and demonstrate her understanding of the connections between concepts through her verbal and written responses.

Group B – At the end of the 6 week program I would like to see Group B take greater ownership of their learning and be able to direct their own learning at their own pace.

Developing student learning outcomes.
What will be done for:

Students who need developing beyond the learning outcomes	- Differentiate the curriculum as shown individual lesson plans and unit outline. **Highlighted in Action Plan.** - Work in mixed ability groups to act as peer mentors and group leaders. - Get students to reflect on their learning within lessons and assessments to identify strengths and weaknesses. - Encourage students to upload and share with the class videos, articles or images to the Google+ community that are related to the area of study. - Help students to set personal learning goals and expectations. - Break out tutorial or focus groups to address specific student concerns or misunderstandings of concepts. - Reflect on and adapt learning outcomes for these students.
Students who need support to meet the learning outcomes	- Differentiate the curriculum as shown in individual lesson plans and unit outline. **Highlighted in Action Plan.** - Work with students of mixed learning ability in groups to challenge and assist learner confidence development. - Work with the teacher on a one to one tutorial basis or focus group to address areas of weakness of misunderstanding. - Provide specific task instructions and break down tasks into manageable individual tasks. - Teach at the point of need - Celebrate success and encourage students to perform at their best not be the best in the class - Encourage students to share their work with their peers and work together to achieve learning outcomes.

2. The Question for inquiry and professional learning
Identifying your question for inquiry.

Inquiry: "How can I improve the learning outcomes of students with high and low learning levels through engaging them in taking ownership of their learning?"

Through this inquiry question I will be able to focus on developing my pedagogy and teacher practice which specifically caters for the diversity of learners within a classroom. This relates to the improved learning of my students through the development of strategies which support students at the point of need in the classroom as well as extending those students who demonstrate high learning abilities. This is an essential part of quality education and as such an important aspect of my pedagogical development.

Differentiation of learning tasks, assessment and skill development is required to ensure that all students within the classroom have the same opportunity to learn and succeed. Furthermore student choice and the development of a democratic classroom are key components in creating a positive and supportive learning environment for students which in turn provides students with opportunities to succeed. I have focused my inquiry question on low and high level ability learners, rather than middle ability learners, so as to further develop my capacity to support and engage those students who are either not challenged enough by the curriculum or struggle with various curriculum content and skills. It is my aim that by specifically focusing on students of high and low learning ability I will also consequently improve the learning outcomes of students who are of middle learning levels. Through my inquiry I will attempt to give the group of students I have selected increased ownership of their learning and hence greater engagement with the curriculum. Through increasing each student's ownership of their learning I believe students will be able to demonstrate significantly more established and consolidated understandings of the unit concepts and skills of Unit 2 environmental science. For this inquiry I have selected the Unit 2, Area of Study 1, environmental science curriculum as the content, skills and outcomes as the curriculum lends itself to the development of teaching strategies and tasks which will enable me to address this inquiry question. Throughout my inquiry I will engage in professional conversations with my mentor and team teaching partners, explore a variety of teaching strategies and observe expert teachers in an attempt to answer this question and improve my practice.

Your professional learning.

To complete my question of inquiry I have identified several aspects of my practice and pedagogy that I need to learn more about. A key component of my inquiry is being able to give students increased ownership of their learning to enable them to demonstrate their learning and skill development at their own pace. To do this I need to observe senior teaching staff create these opportunities in their classes and attempt to replicate the activities and tasks in my classroom.

Another area in which I need further development in is the planning and running of fieldwork tasks in a meaningful and authentic scenario. An important aspect of student feedback from semester 1 indicated that students wanted to participate in more hands on activities and by creating learning opportunities in the field for my students I will be able to address this feedback. In order to construct these learning opportunities I need to further develop my ability to connect fieldwork tasks to the study design's mandated skills and knowledge as well as connect this learning to my students' lives and experiences. Through attendance of the Geography Teachers Association of Victoria's annual conference and Fieldwork Professional development day I intend to develop these skills in readiness of completing this action plan. I believe that through consistent

and further professional development in this area of my practice I can become proficient in planning and running quality fieldwork tasks.

Additionally I need to further develop my understanding of student learning styles and how they influence student learning in a classroom setting. I need to also develop my understanding of how to effectively differentiate learning for my students, in terms of these learning styles and student learning ability, to more effectively engage my students and improve their learning outcomes. Through conversations with my Mentor and team teaching partners, as well as observations of leading teachers I aim to develop these skills and understanding.

These areas of practice pertain directly to my inquiry question and will be developed through continued engagement with professional practice at my school, at educational events, and conversations with my mentor and team teaching partners.

Observing the practice of others.

Date: Tuesday 9th of September, 2014
Teacher: BAY/HRN
What was observed?

The focus of this observation was to further build upon my understanding of running and planning interactive fieldwork for my students and how to support students of low learning ability and extend students of high learning ability whilst on fieldwork. To develop this understanding I attended the Year 10 Geosciences fieldwork to the Melbourne Museum and a tour of the CBD to explore the different geological features found throughout Melbourne. Students spent the morning at the Melbourne Museum using the exhibits to answer questions about evolution and geological concepts which they were learning in class. They were given time to explore the exhibits we had access to and discussed their responses to the questions with their teachers. In the afternoon students worked with a Monash University tutor to examine several sites of geological interest in the CBD, identifying different rock types and the processes that formed them. I observed students and teachers engaged in discussion of the answers to the questions and how through continued questions students could be made to answer their own questions. It was interesting to see how quickly the students got tired during the excursion and how BAY/HRN managed their time at each part of the excursion. BAY and HRN ensured students spent a commensurate time at each location and had enough time to respond to the questions and discuss the information with their peers. During the fieldwork I did not observe any intentional intervention for students who struggle to meet the learning outcomes nor did I observe students who achieve above the learning outcomes being challenged further by their teachers. Instead it was clear that the interactive and hands on nature of the fieldtrip had engaged learners of all abilities and the distinction between learning levels was less pronounced.

What did you learn?

Throughout the fieldwork I learnt that it is difficult to construct extension work for students of high learning ability on fieldwork but that there are many opportunities to implement support strategies for students who struggle to meet the learning outcomes. Instead extension activities can be presented to students back in the classroom where they can apply their knowledge developed on the fieldwork in a new situation. It was clear that many students enjoyed the hands on component of the fieldwork to the Melbourne Museum and Melbourne CBD. Both teachers were able to expand on the information provided by the exhibits or answer student questions with clarity. BAY/HRN were particularly effective at moving students from one part of the fieldwork to the other but I also noted that many students were tired by the lunch break and did not engage well with the afternoon session where they walked around the CBD. Both sessions demonstrated a balance between student-focused learning and teacher instruction and allowed students to engage in self-directed learning through their navigation of the Museum exhibits. This balance is something I need to work on in terms of giving students the input or instruction they need of the lesson concepts and then engaging them in tasks which allow them to construct and demonstrate their knowledge. Too often I spend the majority of the lesson talking about lesson information and do not give students enough time to adequately demonstrate or take ownership of their learning.

How does this help you address your question for inquiry?

My question for inquiry asks how I can engage and support students at both ends of the learning ability spectrum. That is; how can I support students who struggle to meet the learning outcomes and extend students who achieve beyond the learning outcomes? The fieldwork I observed reinforced the importance of giving students ownership of their learning to allow them to construct and demonstrate their understanding of concepts and

knowledge. I also learnt the inherent value of continued questioning to allow students to form and solve their own answers to their own questions. I also discovered that fieldwork does not necessarily facilitate the teacher to support students at the different ends of the learning spectrum but rather attempts to engage all learners in meaningful and contextualized learning which has the potential to assist students construct and demonstrate their knowledge.

Observing the practice of others.

Date: Wednesday 17th of September, 2014
Teacher: REI
What was observed?

The focus of this observation was on the gamification of essential subject concepts and skills to engage students in self-directed learning. REI presented the skills and knowledge of spatial concepts in an interactive and highly engaging manner which did not rely on students' prior knowledge to complete the task. REI spent 10 minutes of the class showing the students the location of the resources they could use to complete the task and explaining how they were to complete the activities within the task. Students were to complete a set of activities exploring the knowledge and skills associated with spatial concepts in geography unit 1 and 2. REI gave the students access to explanations about the different types of spatial concepts and spoke to the worksheet on the interactive whiteboard to explain the activities. REI modeled how students were to complete the questions using her own, or my, responses to the first question. Students were then given the opportunity to complete the task at their own pace, starting with which ever question they wanted to. When students were engaged with the skill task REI was able to support students at the point of need, answering their specific questions related to the activity. REI attempted to engage all students in the class by altering the task into a competition; those students who completed the task and got the most answers correct would win a prize. The competitive aspect was embraced by the students and clearly drove them to complete the task efficiently and comprehensively.

What was learnt?

Through observing REI I learnt the importance of modelling responses to questions or tasks to give students a point of reference for them to complete their work. REI was effective in demonstrating to students how to answer the questions in the task and directed their attention to the spatial concepts resource which they could use to support their own learning, rather than having to wait for the teacher to answer their question. REI reinforced the idea of continued questioning to get students to answer their own questions as a powerful learning tool. REI's explanation of the task encompassed both verbal and visual instruction which is important in assisting students with different learning styles or preferences. I need to improve my ability to engage students in self-directed learning and avoid spending too much time providing students with the answers they can find for themselves. REI demonstrated an effective strategy to get students into a task without having to provide massive amounts of explicit teaching and this clearly engaged the students in their learning better than if they had of completed the task as homework or after 20 minutes of instruction.

How does this help address your question for inquiry?

REI's lesson highlighted some effective strategies to deliver key skills and concepts to her students without having to spend vast amounts of lesson time explicitly teaching these skills. Instead REI demonstrated how through the use of providing students with the resources they required to complete the task she could engage the students in self-directed learning and provide support or intervention to students who required further assistance to answer the questions than the resources provided them. It was helpful to see how REI moved around the classroom and assisted students with their work whilst monitoring the progress of other students at the same time.

3. Applying knowledge to practice
The action plan.

To investigate my inquiry question I have designed a 9 week unit of work encompassing the first area of study of the unit 2 Environmental Science curriculum. The unit scaffolds the learning and skills needed by students to take ownership of their learning and gives them the opportunity for them to take ownership of this learning through the use of learner centred activities. At the core of this action plan is the notion that students will take ownership of their learning if they are engaged with the content and curriculum that encompasses it. To this end I have created the necessary resources, inputs, activities, fieldwork tasks and assessments for the students to complete with minimal direct instruction from myself and greater autonomy for the students. Throughout the unit, or action plan, I will encourage students to peer teach, discuss and navigate their learning through a completion list of tasks and learning outcomes which in turn will engage students who struggle to meet the learning outcomes or who achieve beyond the learning outcomes and attempt to give them ownership of this learning as a result.

In the first week of the action plan I will scaffold the necessary skills and foundational knowledge of the area of study using our schools phased learning cycle. The phased learning cycle operates throughout the school and is separated into 6 phases; engager, outcomes, input, construction, demonstration and reflection. Using this phased learning cycle will enable me to engage students in Group A and Group B, as well as Group C, and familiarize them with the routine of the class as well as the expected development of their learning in class. Through scaffolding the foundational skills and knowledge of the area of study in week 1 I will be able to monitor each group's conceptual understanding of topics and adjust future lessons accordingly. Giving each student a strong foundation in the basics of the area of study will provide students with a reference point, and consolidated prior learning, to progress through the unit with confidence. I will use PowerPoint presentations and learning activities to scaffold this learning.

During the second week of the action plan I will begin to introduce the idea of student ownership of learning through the provision of learning tasks that require less and less teacher instruction to complete. Instead of directly instructing the students to complete various learning tasks I will offer them choices in what and how they complete each lesson but use the phased learning cycle to continue to scaffold this choice. I will use a completion list to further guide student choice, highlighting the work that needs to be completed in order to meet assessment task deadlines and learning outcomes.

During the third, fourth, fifth and sixth weeks of the action plan students will continue to work independently on the learning activities described in the lesson plans and completion list, as they move towards completing SAC 1 of unit 2 and preparing for the area of study's fieldwork task. I will use this time to work with students in both Group A and B to either support or further develop their learning. I will support students who struggle to meet the learning outcomes with focus groups and 1:1 tutoring in class or outside and will offer extension work to students who achieve beyond the learning outcomes.

In weeks seven, eight and nine students will participate in two fieldwork tasks. The first fieldwork task will see the students apply their conceptual knowledge of measuring and using environmental indicators to assess the health of a wetland ecosystem. The second fieldwork task will see them create a monitoring program for the Yarra River as an example of a local water resource. Students will select appropriate environmental indicators to use in their monitoring program, gather data using these environmental indicators and evaluate their effectiveness through a fieldwork report and extended

response SAC.

4. Implementing the action plan.
Mentor/Experienced Colleague visits – date: 14th July, 2014
Signature
Summary of discussion and actions arising:

Our lesson on Monday was focused at introducing students to what environmental indicators are and how they can be used to assess the health of the environments around us. The lesson began by getting students to come up with 5 questions about what environmental indicators are and how they can be used to measure environmental change. This activity attempted to engage students using their natural curiosity and drew upon each students' prior knowledge of these concepts. This activity gave students ownership over their learning where they were responsible for the degree of challenge they set themselves in creating their questions. Students of differing learning levels were engaged by this task as it did not require them to exhibit their knowledge to the class and instead enabled them to reflect on what they might be interested in within the topic as well as highlighting the knowledge they wish to gain from the unit. Students were then required to answer the questions they had come up with using a combination of their text books and internet resources.

The next part of the lesson revolved around the presentation of a PowerPoint which provided students with information about the basics of environmental indicators. Students had the opportunity to read and process the information from the PowerPoint at their own pace. After students had read through the PowerPoint I asked them some key questions to expand on the students' current understanding of environmental indicators and allow them to make notes from this information either on the PowerPoint itself or in their notebooks. This created a revision resource for them and a point of reference for them in future lessons.

Students were to then complete the learning activity, contained in the Google Document, at their own pace as well, and direct their learning to the concepts of the lesson they thought they needed further development in. The learning task required students to apply their knowledge of environmental indicators by answering questions about their use in environmental monitoring and also required them to apply their knowledge to an air quality case study which provided them with a context in which to use this information. This task gave me the opportunity to work with Group A students on an individual basis or small group basis to consolidate their understanding of the lesson's concepts. Students in Group B were able to move through the document at their own pace and ask for clarification where they need it, they were also encouraged to assist their peers through the use of table groups and sharing their ideas with their peers.

I concluded the lesson by getting the students to reflect using our Google+ page. They were to reflect on the areas of the lesson they found interesting and engaging. The students then had to ask themselves what they would do differently in the lesson if they were to do it again and what elements of the lesson they found challenging. Finally the students had to reflect upon how their learning, during the lesson, engaged with or disengaged with their learning preference/style.

Discussion and professional conversation.
After the lesson ABE and I discussed the different components of the lesson highlighting the length of time I spent speaking to the class and talking to the PowerPoint. ABE suggested that I present smaller and more condensed amounts of input to the students and let them complete the learning activities instead to develop their understanding. By giving students all of the information they need to complete the learning tasks in the input section of the lesson I effectively remove the benefit of the construction of knowledge in the learning activities as the students are simply recalling the information I have just delivered. In the following lessons I will follow this advice and focus on giving students the opportunity to construct their own understanding of the knowledge and skills through less direct instruction. In order to provide greater autonomy for my students I will create a completion list and resources for them to

direct their learning. This completion list will consists of all the activities, lessons and information the students will need to complete to satisfactorily meet the outcomes of the area of study. It is my hope that by giving students agency over the way in which they work through the tasks that they will be able to work at their own pace, take responsibility for their learning, remain engaged in class and ultimately improve their learning outcomes. This revision to my learning plan is also in response to the feedback received from the students at the end of Semester 1 where they requested greater ownership of the lessons and less teacher focused lessons.

Implementing the action plan.
Mentor/Experienced Colleague visits – date: 5th September, 2014
Signature
Summary of discussion and actions arising:

As an essential part of my action plan, I ran and planned two fieldwork tasks for my students. Today saw the second of the two fieldwork tasks carried out along the Yarra River. The class had spent the previous two lessons planning and creating the monitoring program the students were to carry out, assessing the health of the Yarra River. The students had come up with a hypothesis indicating their belief that water quality of the Yarra River, upstream of the city, would be healthier than the downstream water.

We began the day meeting at Flinder's Street Station, at our designated meeting point. I used this opportunity to go through the day's itinerary and the basic occupational health and safety requirements we needed to be mindful of when working near water and in the field. We then boarded a train to our first destination of Rushall Station/Merri Creek. When we reached Merri Creek the students collected their data and recorded their results in their fieldwork booklets. We then discussed what are results were showing us and what conclusions we could begin to make from these results about the health of the river. After our discussion we discussed whether our current monitoring program was being effective in providing us with a snapshot of the ecosystem and what improvements we could make to it. We continued onto our two other sampling sites using public transport to reach Dight's Falls and Flinder's Street Station where students collected further results and continued to discuss the conclusions they were drawing from the data. Throughout the day I made sure I spent time with Group A students to support and monitor their data recording. I noticed Student AA was engaged in collecting his data for odor at the sampling sites but was not interacting particularly well with other students. Students AB and AC were consistently trying to gather more data from the sites we visited and were having rich discussions with their peers about the results they were getting. Student BA, BB, BC and BD all engaged thoroughly with the tasks and data gathering and attempted to answer the questions my mentor teacher posed to them based on their results.

After we had completed sampling the water at our final site I went over the day's results with the students and asked them to make some conclusions about the health of Yarra River and why this might be the case. The discussion we had was insightful but the students were clearly tired and were not providing many responses. On reflection of this moment I would have liked to pose more questions to open up a dialogue on how we could modify the monitoring program to extend for a longer period of time rather than providing us with a snapshot of the ecosystem's health on this day.

Discussion and professional conversation.
After the fieldwork I discussed with my mentor the notion that during fieldwork the differences in learner ability was not as clear as all students were engaged with applying their knowledge and skills of the area of study to the tasks at hand. ABE identified that although I worked hard to involve student AA his passive personality meant that it was extremely difficult to engage him in the greater group discussions. It was clear from my efforts that I had planned the day with my learners in mind and the tasks were well suited to gather the data

the students needed to complete their monitoring program. The lead up to the fieldtrip demonstrated my ability to facilitate a democratic classroom and to give students ownership of their learning. This fieldwork was the centre piece of my action plan as it tied together all of the learning components we had completed in class and got students to apply this knowledge in a real world setting. I believe the students found the fieldtrip to be especially meaningful as they were the ones that created the monitoring program and selected the environmental indictors to use in the program. The student data collection booklet they put together demonstrated their understanding of the data they would need to assess the health of the river system and once again showed their engagement with the assessment task and their learning.

During our time at the sampling sites I enjoyed talking to the students about their results and was impressed with the insights they were developing when attempting to attribute the reasons for their results. Whilst I was able to answer the students' questions throughout the day, I was aware that some of my responses were not as clear or helpful as I would have liked and this indicated to me a need to attend further professional development on fieldwork and observe other practioners delivering fieldwork tasks to students. To address this area of improvement and meet the needs of students in the future I have begun working with GRA to assist her in running the Dynamic Earth fieldtrips next year.

Implementing the action plan.
Mentor/Experienced Colleague visits – date: 4th December, 2014
Signature
Summary of discussion and actions arising:

Friday's lesson was a chance to demonstrate to my colleagues the progress I had made in being able to engage students in Environmental Science at the both ends of the learning spectrum.

I began the lesson by using Socrative to run a quiz on world biomes, to assess the depth and breadth of my students' knowledge and what understanding they had constructed during our previous two lessons exploring terrestrial and aquatic biomes. I chose to use Socrative for this task as it allowed me to create an interactive quiz to engage the students in the task and the tools built into Socrative allowed me to monitor their responses in real time. Monitoring their responses in real time meant that I could assess the class' progress with the task and get early finishers to continue on with completing their biome poster or website.

Once all students had completed the Socrative quiz I gave students time to complete their biome poster or website task, ensuring that I assisted students on a 1:1 basis by sitting beside them and looking closely at their work. Students who had finished the biome poster or website task could move on to completing their holiday homework task early and meant they were not wasting time in the lesson do menial tasks with little relevance to their learning. I then spent time working with students who needed further assistance with referencing using the APA style and used the interactive whiteboard to demonstrate some examples of this.

Towards the end of the lesson I revisited the results from the Socrative quiz and went through the answers students had selected. I was careful not show students who had got the answers wrong or right and instead focused on why the correct answer was correct. I attempted to model to the students the ways in which they could answer the questions and asked clarifying questions when the results indicated that many students had got the answer wrong. The students quickly picked up that there was some issues with the last two questions on the quiz, due to mistakes I had not addressed or noticed during the tests construction. Instead of palming it off as a 'test' within a test I embraced the feedback and asked the students how the mistakes should be remedied. This gave way to a good discussion on interpreting graphs and images and the students demonstrated their understanding of the construction of graphs throughout the discussion.

Throughout the lesson I focused my attention on the students I had identified of as low learning ability or were passive in their work. I sat with each student to ensure I knew where they were up to in the task and provided them with strategies to make the work more manageable if they were behind.

Discussion and professional conversation.
After the lesson I discussed with CHI and WBR the importance of moving around the classroom effectively and strategies to get passive students to complete work in class. I was able to move comfortably around the classroom and spend time with students on a 1:1 basis offering praise and encouragement to each student. It is important that while I am working with students on a 1:1 basis that I continue to monitor what is going on elsewhere within the classroom to discourage off task behaviour by students. We also discussed how I answer questions posed by the students. WBR suggested it is sometimes better to pose more probing questions or rephrase the question back to the student and assist them in answering their own question, instead of providing them with the answer straight away. This strategy creates a powerful learning opportunity for the student and assists their development of problem solving behaviours and skills. This was an aspect of my practice I had identified as requiring further development and CHI and WBR provided me with some strategies to do this.

5. Evaluating the effectiveness of practice.

Assessing the learning of students.

My inquiry question allowed me to assess the degree to which I can support and extend students in my classroom whilst engaging students in meaningful and quality learning. This inquiry enabled me to identify areas of practice that I need to further develop in order to improve the learning outcomes of my students. The student centred approach of the inquiry allowed me to focus on the individual learning of my students who struggled to meet the learning outcomes of VCE Environmental Science and those students who consistently achieve beyond the learning outcomes. The student centred nature of the action plan allowed me to intervene at my students' point of need and focus on the knowledge my students need to improve rather than basing the next sequence of work on what they should know. Through developing student ownership of their learning I intended to not only engage students with quality learning but also improve their learning outcomes across the board. You can see the impact this action plan has had on the learning of my students through the results below.

Student AA

	SAC 1 – Environmental Issue Website	SAC 2 – Jock Marshall Reserve Practical Report	SAC 3 – Yarra River Monitoring Program Response	Exam
Raw Mark	19/100	10/18	32/57	42.5/85
Percentage	19%	56%	56%	50%
Comment	Student AA continued to demonstrate significant disengagement with the class throughout the action plan. Student AA did not respond to continued intervention or support encouraging him to demonstrate his knowledge or complete his work in a timely manner. Student AA did not take ownership of his learning when offered the chance to work at his own pace and through selected learning activities. It was clear from his responses to the questions in class and through discussions that he had not been completing the required work in the completion list and as such his conceptual understanding of many concepts was lacking. Whilst he did reach the specific outcome I had set for him, achieving over 50% in the two fieldwork tasks, student AA demonstrated a lack of depth in his understanding of the concepts of area of study 1 and overall did not exhibit increased engagement with the class. Whilst student AA is able to identify different environmental indicators and select appropriate indicators to use in a monitoring program he is unable to justify his selections. He demonstrated a developing understanding of how to create a monitoring program but could not accurately explain or attribute the results from the fieldwork tasks in terms of their causes. Student AA has met the outcomes for area of study 1 of Unit 2 but has done minimal work to do so. **Specific outcome:** Achieve above 50% on unit fieldwork task and practical report.			

Student AB

	SAC 1 – Environmental Issue Website	SAC 2 – Jock Marshall Reserve Practical Report	SAC 3 – Yarra River Monitoring Program Response	Exam
Raw Mark	38/100	16/18	43.5/57	58.5/85
Percentage	38%	89%	76%	69%
Comment	Student AB reacted positively to the action plan and took great pride in taking ownership of her own learning. Her results on the two fieldwork SACs demonstrated her knowledge of environmental indicators and her ability to appropriately select indicators to create a monitoring program. Her responses to the Yarra Monitoring			

	Program Response SAC demonstrated her operational knowledge and understanding of environmental processes and human disturbances that can lead to environmental degradation. She could accurately discuss and explain the reasons behind her environmental indicator choice and identify the different types of indicators when presented with a range of options. Student AB began to avoid focusing on small details in her work and instead focused on the big picture messages and knowledge of the area of study. She has met the specific outcome I set for her and has met the outcomes for the area of study. **Specific outcome:** Achieve at or above 70% on unit fieldwork task, and practical report, and demonstrate her understanding of the connections between concepts through her verbal and written responses.

Student AC –

	SAC 1 – Environmental Issue Website	SAC 2 – Jock Marshall Reserve Practical Report	SAC 3 – Yarra River Monitoring Program Response	Exam
Raw Mark	42/100	15/18	31/57	52/85
Percentage	42%	83%	54%	61%
Comment	Student AC struggled at times to engage with the plan of learning I had created to give him ownership of his learning. During class he would stay mostly on task but would occasionally exhibit off task behaviour which detracted from his learning. In trying to support student AC I worked closely with him to clarify and further develop his understanding of the unit concepts. However it was clear from his responses in the Yarra River Monitoring Program Response that he had not continued to work on his understanding of the concepts developed in the work to be completed in the completion list. His responses reflected his inability to justify or analyse the results from the monitoring program on the Yarra River and did not explore the consequences of human disturbances to the environment. In terms of his skill development Student AC could identify the differences between environmental indicators and select appropriate indicators for use in a monitoring program, but like student AA, he could not justify why these indicators would be effective or useful. Student AA met the specific outcome I set for him and has met the outcomes for the area of study, however his end of semester exam result reflected greater effort and engagement is still needed in class, despite the support and intervention I gave him. **Specific outcome:** Achieve at or above 70% on unit fieldwork task, and practical report, and demonstrate her understanding of the connections between concepts through her verbal and written responses.			

Group B students –

Students in Group B easily met my specific outcome I had set for them. The nature of these students meant that they highly engaged with the opportunity to direct their own learning and work at their own pace. Students in Group B spent time working with their peers in many lessons and worked as peer mentors to the rest of the class in an informal capacity. Students in Group B responded positively to the two fieldwork tasks and the completion list, delivering greater detail and accuracy in their written responses in the SACs. Whilst the students took advantage of the opportunity to manage their learning personally I felt that throughout the action plan I did not place enough emphasis in extending the learning of these students and as such wonder if their learning outcomes could have been further improved.

Reflection.

This inquiry process assisted me in understanding my teaching practice in a number of ways and also helped me identify areas of my practice that I require further improvement in. Through investigating my inquiry question I have learnt the inherent

value in engaging students of all learning abilities through student ownership of their learning and employing a student centred approach. This inquiry helped me to focus on providing students with authentic learning opportunities and the opportunity for them to take ownership of their learning. It is clear from the results of my action plan that whilst students enjoy taking ownership of their learning, as demonstrated through the engagement of students with the completion list aspect of the action plan, that not all students have the capacity or drive to manage their own learning. As such I need to develop in my students the capacity to manage their own learning before I give them the opportunity to do so on their own.

The revisions I made to my learning program in Environmental Science for the duration of my action plan greatly impacted upon student engagement. Through my action plan I was successful in engaging students who struggle to meet the learning outcomes and who achieve beyond the learning outcomes as well as students who are developing their understanding of unit concepts. Student engagement throughout the duration of the action plan remained high for the most part and demonstrated that I can use a variety of activities and tasks to assist students in constructing knowledge and meaning in an engaging manner. Through the use of a completion list and fieldwork tasks I was able to cater to students of different learning styles and abilities. By using ICT in the classroom I was able to deliver a variety of learning tasks which utilized real data and explored unit concepts in greater depth through case studies and articles published on the internet.

From my inquiry I was made aware of the amount of time I spent engaging in explicit teaching during lessons and how this was negatively impacting the engagement of my students with the subject. By giving students the resources and information they needed to construct the knowledge and skills embedded in the area of study I was able to reduce the time I spent giving direct instruction and instead allowed students to learn by doing rather than being given all the answers before starting work on an activity. I changed the way I used PowerPoint presentations to deliver lesson content from a stand and deliver methodology to a student paced approach where students could work through the PowerPoint presentations and complete the learning tasks within, asking clarifying questions when needed.

Through giving students ownership of the course and lessons I was able to spend time with individual students in groups A, B and C without compromising the learning of other students. I was able to extend students in Group B through consistent and challenging tasks which required research, analysis and creation of products. For students in Group A I was able to support their learning at their point of need and use focus groups to capitalize on misunderstandings of concepts and use them as learning tools for other students who needed clarification of concepts as well. Group C students benefited from being able to choose their learning pathway and engaged with a mixture of extension work and focus groups to develop their understanding of area of study 1. The student centred learning in my lessons also allowed me to hold focus groups clarifying questions students had about the lesson content or concepts from a previous lesson. These focus groups enabled me to work with students who wanted assistance with their understanding of unit concepts without disturbing those students who were confident in their grasp of the same concepts. These focus groups also further developed the idea of a democratic classroom whereby students could select to join these focus groups or continue on with their other work.

The results of my action plan showed that I had made a measured difference in my students learning outcomes. The revisions I made to the learning program for students in Group A enabled them to meet the learning outcomes and demonstrate their knowledge of unit concepts in their written work. Student AA was able to accurately

identify environmental indicators and their use in a monitoring program as well as demonstrate his understanding of how environmental indicators can assess the health of an ecosystem. Student AB and AC both achieved the set outcomes I created for them and demonstrated an ability to apply and justify their knowledge of environmental indicators in different settings and in different tasks. My experience of planning extension work for Group B students throughout my inquiry demonstrated that I need to further develop my understanding of extension activities to improve the learning outcomes of these students more effectively. Whilst the students in Group B will excel in the work presented to them and negotiate difficulties with minimal intervention it is not enough to just provide them with more work to complete in order to extend them, instead the tasks must get them to use their knowledge and skills in different ways and in different settings. The fieldwork tasks attempted to address this area of my practice and feedback from my mentor demonstrated that I achieved this objective.

To continue to support the learning of my students I will endeavor to develop my ability to create meaningful extension tasks to improve the learning outcomes of my students. I will do this through professional development sessions and further discussions with my colleagues. Additionally I will continue to explore when it is appropriate, and most beneficial to my students, to give them ownership of their learning. It is clear from the way my students met the outcomes I set for them that students are capable of using their time effectively to complete set tasks but it is obvious that students cannot maintain sustained ownership of their learning at all times without negatively affecting their learning outcomes.

The results and observations from my action plan indicate to me that creating a unit of work providing students, for the most part, with ownership of their learning is inefficient in improving their learning outcomes. During the action plan most students in my class did complete the set work required of them, however, some students clearly did not embrace the challenge of the tasks and did not complete the level of work required to substantially improve their learning outcomes.

In the future I aim to include snapshots of student ownership of learning throughout my lessons as it is an effective way of allowing students to demonstrate their knowledge and skills. Furthermore, giving students' ownership of their learning does engage students of all learning abilities and attempts to involve passive learners in the greater class community.

To further my practice in engaging students of different learning abilities in my classroom I would like to undertake further professional development which would refine my understanding of how to engage, motivate and involve passive learners and learners with special needs, as I see these areas as essential components to improving learning outcomes for my students. Additionally I would like to develop learning tasks and units of work which engage students in working with Monash University academics and longitudinal studies of ecosystems.