

# Assessment Task Cover Sheet



Unit Co-ord./Lecturer	Dr Donna Satterthwait	<b>OFFICE USE ONLY</b> Assessment received:
Tutor:(if applicable)		
Student ID	078395	
Student Name	Emma Stubbs (Previously Salisbury)	
Unit Code	EMT630	
Unit Name	Secondary Science Education Pedagogy	
Assessment Task Title/Number	Assessment Task 2	
Word Count	2189	
I declare that all material in this assessment task is my own work except where there is clear acknowledgement or reference to the work of others <b>and</b> I have complied and agreed to the University statement on Plagiarism and Academic Integrity on the University website at <a href="http://www.utas.edu.au/plagiarism">www.utas.edu.au/plagiarism</a> *		
Signed E.Stubbs		Date 01/06/2016

\*By submitting this assessment task and cover sheet electronically, in whatever form, you are deemed to have made the declaration set out above.

Assessor's feedback:

**Assessor: Dr Donna Satterthwait**

This two-week inquiry-based sequence of lessons takes place within a Year Seven Science class on classification as part of a larger biological unit of work. This lesson sequence focuses on the key curriculum content description of ‘classification helps organise the diverse group of organisms (ACSSU111)’ (Australian Curriculum Assessment and Reporting Authority [ACARA], 2015, P.11).

This lesson sequence has been developed through the process of backwards design. Backwards design is where the key learning outcome of the sequence is developed first, followed by the assessment piece to demonstrate the students have achieved the learning outcome and finally the tasks required (Wiggins & McTighe, 2011). In this sequence the key learning outcome is that students develop an understanding of classification and its role in the natural world. Students will also develop tools through which classification is to be achieved, such as constructing dichotomous keys for classification of inanimate objects which is then extended to living creatures increasing in complexity.

Within this sequence of lessons there are many points at which the teacher can assess students’ current levels of understanding, and go over material or modify teaching practice to ensure the key learning outcome is achieved by all. With these formative assessment pieces, the students are required to recall prior knowledge and relate it to the new area and therefore they are constantly building on their understanding. This sequence of lessons also incorporates the key cross curricula capability of developing literacy.

Every teacher is a teacher of literacy within their own subject, just as every teacher should aim to develop the general capabilities numeracy, critical thinking and problem solving skills (Australian Curriculum Assessment and Reporting Authority [ACARA], 2015, P.4). Formative assessment tasks are used throughout this sequence

to develop student writing skills. At a number of points, students are asked to reflect on what they have learnt and supply an answer to a question and be able to justify that answer using the scientific techniques developed in the course of the unit. Teachers are therefore able to not only develop the student's scientific inquiry and reasoning skills but also pick up any reading or writing issues that may not have presented in the students previous work. Students are also required to write in complete sentences to improve their scientific writing skills.

Finally the tasks and topics themselves were designed. These topics begin with an introductory look into classification and aim to uncover any prior knowledge or assumptions about the classification topic. By beginning with a quick quiz and class discussion, the teacher can ensure all students are on the same level of basic understanding as the unit is commenced. This sequence of lessons is also designed to scaffold students learning. By beginning the unit with very basic, introductory lessons and then increasing complexity as the lessons continue, students are able to build on their content understanding and begin to develop their own reasoning and rationale as the unit goes on. As the tasks increase in complexity, the lessons become more student focused, with the teacher gradually withdrawing the scaffolding and adopting a more supporting role, offering help and prompting where necessary, moving from the teacher-centred lessons to student-centred inquiry based lessons.

Education, and particularly science education, is about developing critically thinking students curious about the world and trying to develop understanding of concepts. This can be best achieved using hands-on inquiry based lessons, allowing students to develop their own understanding and develop strategies to work through different solutions (Gormally, Brickman, Hallar, & Armstrong, 2009).

While the main assessment piece is the end of unit test, continuous formative assessment is taking place through observation, activities within the classroom, homework sheets and group discussions. All of these tasks are used as assessment for learning. By gathering as much data on how the students are performing as possible, the teacher can focus in on key learning areas not being met and modify teaching practices to improve the student's learning.

The test at the end of the unit is summative assessment, and assessment of learning, and will give the student a grade. The students are much more likely to achieve a higher grade in this assessment however, due to the scaffolding and constructive approach designed in this lesson sequence (Biggs, 1996).

Grade Criteria	E	D	C	B	A
	Well Below Standard	Below Standard	At Standard	Above Standard	Well Above Standard
Construction of Dichotomous Key	Key incomplete, very few objective features used, unsatisfactory layout.	Key incomplete or with few errors, combination of objective and subjective features used.	Satisfactory layout of key, mostly objective features used.	Good layout of key, minor errors in construction, sound use of objective features.	Well constructed layout of key, excellent use of objective features.
Classifying Unknown Organism	Incomplete, or poor reasoning, selection of features mainly subjective with no explanation. Many errors in spelling, or no explanation given to assess.	Unsatisfactory reasoning to classify organisms, combination of objective and subjective features used with little explanation. Many spelling errors	Satisfactory reasoning to classify organisms, errors made in regard to features used and correct classification, some spelling errors	Sound reasoning to classify organisms, with few errors selecting features. Very few spelling and grammar errors.	Excellent reasoning to classify organism, correct identification of objective features, little or no spelling or grammar errors.

	Topic	Learning Activity	Resources	Learning Outcomes
Lesson 1	Introducing Classification	Initial test of understanding, creating a group definition of classification and a 'celebrity heads' style game	Excerpt Osbourne & Freyberg Quiz, Picture cards of animals and keys to animal classes (Osbourne & Freyberg, 1985).	Gauge students prior knowledge of classification, uncover any misconceptions
Lesson 2	Introducing Dichotomous Keys	Creating a dichotomous key of the class and testing it. Pencil case key	Handouts of pencil case activity with key and pictures (Appendix 1)	Introduce concept through activity and investigate student understanding of basic concepts
Lesson 3	The Lolly Key	Creating and designing a dichotomous key of lollies	Small bag of different lollies, A3 poster paper and table of lolly names (Appendix 2)	Students ability to use knowledge learnt to create a dichotomous key
Lesson 4	The Plant Kingdom	Hands on classification of plant samples, using information and premade keys. Mystery items requiring explanation	20 plant samples, guiding question sheets, posters of features of plant groups, table to be filled out.	Ability to identify plant samples based on classification information, use of reasoned judgement to place mystery sample in class.
Lesson 5	The Animal Kingdom	Creating a poster of features of animal groups and examples	A3 poster with blank table, worksheet of statements and animal pictures, glue and scissors (Appendix 3)	Ability to determine common features of animal groups, use of animal pictures to show understanding
Lesson 6	Assessing the Unit	Creating a dichotomous key of animals and plants presented, and explanation of 'Odd' plants and animals.	End of unit test (Appendix 4)	Assessing the level of understanding the students have gained from the unit and literacy and reasoning development.

<b>Learning area:</b> Biology: Classification 1		<b>Date:</b> 30/05/2016
<b>Topic:</b> Introduction to Classification	<b>OH &amp; S</b>	
<b>Key question:</b> What is classification and why does it matter?	Basic Science Lab Safety rules	
<b>Learning objectives:</b> <i>By the end of the lesson students will have developed a basic understanding of classification and why it's important. Students will also begin to understand there are differences within and between groups and appreciate what are distinctive questions.</i>		
<b>Anticipatory set:</b> Draw on students' prior knowledge by asking key questions: <ul style="list-style-type: none"><li>• What is classification?</li><li>• Why is it important?</li></ul>		<b>Checking for understanding &amp; feedback</b> <ul style="list-style-type: none"><li>• Collecting quiz to review during the lesson and to reassess at the conclusion</li><li>• Participation in developing explanation and observing participation within class discussions and celebrity heads game.</li></ul>
<b>Communicating learning objectives:</b> Today we will be learning about classification and what characteristics we use to sort items into groups		
<b>Input, modelling &amp; learning activities:</b> <ul style="list-style-type: none"><li>• Teacher to begin with the extract of Osbourne &amp; Freyberg Quiz to gauge prior knowledge and misconceptions.</li><li>• Begin class discussion about classification at the supermarket, adding leading questions such as “Where would I find an apple? Or How would I know where to look for ice-cream?”</li><li>• Students, in pairs, are then to come up with an explanation of what they think classification is, and how it is done and to share with another group, before returning to the whole class discussion.</li><li>• After copying down ‘What the Scientist says’ students return to their pairs and play animal celebrity heads – using a handout of key features.</li></ul>		
<b>Guided practice:</b> Teacher to introduce new topic and begin class discussion		

and prompt development of ideas with ‘Supermarket’ classification. Students to collaborate and share ideas on classification to construct shared understanding before getting the scientific definition. This is a specifically designed strategy to help students build understanding and construct meaning.	<ul style="list-style-type: none"><li>• Tour of classroom while students are discussing their definitions and playing the celebrity heads game, prompting when necessary, to ensure students are asking appropriate questions and selecting scientific characteristics.</li></ul>
<b>Conclusion:</b> Students revisit initial thoughts on what is an animal and a plant and how we use characteristics to group similar things	
<b>Independent practice:</b> For homework, students to consider other places – like the supermarket – where classification is needed and to discuss these with a classmate.	

<b>Learning area:</b> Biology: Classification 2		<b>Date:</b> 01/06/2016
<b>Topic:</b> Classification and Dichotomous Keys	<b>OH &amp; S</b> Basic Science Lab Safety rules, particularly with students moving around the lab.	
<b>Key question:</b> How do Dichotomous keys work? What is a good characteristic?		
<b>Learning objectives:</b> <i>By the end of the lesson students will have built on their basic knowledge of classification and will have seen and then constructed a basic dichotomous key.</i>		
<b>Anticipatory set:</b> Draw on students’ prior knowledge by asking key questions: <ul style="list-style-type: none"><li>• What do we remember from last lesson?</li><li>• What do we use to group similar items together?</li></ul>		<b>Checking for understanding &amp; feedback</b> <ul style="list-style-type: none"><li>• Teacher to lead discussion, posing thoughtful questions to guide discussion to the types of characters that should be used, for example “Can anyone see a problem with long hair or not long hair?”</li><li>• Teacher to walk around the classroom and see how the students are going in their pairs working out the names of the pencil case items, asking questions of</li></ul>
<b>Communicating learning objectives:</b> Today we will be learning about dichotomous keys and we will see how they can work for many situations.		
<b>Input, modelling &amp; learning activities:</b> <ul style="list-style-type: none"><li>• Teacher to begin with writing out Dichotomous key definition on the board and students to copy it down.</li><li>• Begin class discussion about what are ‘good’ characteristics to use and lead students towards thought of ‘Subjective vs Objective’ characters.</li><li>• All students to stand up to create a class key, starting off with very basic distinctions, ie normal uniform or sports uniform, white socks or not white socks, allowing the students to offer the objective characters as much as possible, ending the key with each student being identified</li><li>• Select three volunteers and get another couple of students from different grades to come in and work out which student is which using the key.</li><li>• Students then work through the handout (Appendix 1) to solve the key of the silly pencil case.</li></ul>		



<p><b>Guided practice:</b></p> <p>Teacher to introduce dichotomous keys and their use to classify organisms and get students to copy out the definition on the board – this can be useful to get the students to settle after lunch. A class discussion is then lead by the teacher to get the students thinking about which characters to select, which is needed for the following activity. From this point on, the development of the key is almost completely student based, with minimal interruptions from the teacher allowing the students to work through the key themselves. Allowing an unknown student to come and use the key highlights to the student that it does work.</p>	<p>the pairs to show an example of how they worked it out.</p> <ul style="list-style-type: none"><li>• Collecting hand out and marking to make sure all students have got the concept, identifying students that may need more help as the unit progresses.</li></ul>
<p><b>Conclusion:</b></p> <p>Students complete the handout in pairs and hand it in at the end of the lesson.</p>	

<b>Learning area:</b> Biology: Classification 3		<b>Date:</b> 03/06/2016
<b>Topic:</b> Creating a Key	<b>OH &amp; S</b>	
<b>Key question:</b> What characteristics will we need to group and separate the items we have?	Basic Science Lab Safety rules Equipment – Poster paper, rulers, pens, Lolly bags.	
<b>Learning objectives:</b> <i>By the end of the lesson students will have developed, in pairs, a dichotomous key about lollies – using their understanding of Objective vs Subjective characters.</i>		
<b>Anticipatory set:</b> Draw on students’ prior knowledge by asking key questions: <ul style="list-style-type: none"><li>• What do we remember about dichotomous keys?</li><li>• What about the characters we use to classify?</li></ul>		<b>Checking for understanding &amp; feedback</b> <ul style="list-style-type: none"><li>• Check for understanding within the group discussion on which characters to use to classify.</li><li>• Asking other students to provide feedback on other groups’ keys.</li><li>• Collecting keys and tables at the end of the lesson to mark and provide feedback for next lesson.</li></ul>
<b>Communicating learning objectives:</b> Today we will be constructing a dichotomous key about lollies		
<b>Input, modelling &amp; learning activities:</b> <ul style="list-style-type: none"><li>• Begin by asking the anticipatory set of questions to refresh the students’ memory of characteristics.</li><li>• Students to work in pairs with the hand out (Appendix 2) and to make up silly names for the lollies in the bag.</li><li>• Pairs then work to construct a key to classify and separate the lollies.</li><li>• When finished the students are to swap with another pair and see if they can work it out.</li></ul>		
<b>Guided practice:</b> Teacher to begin with class discussion to ensure students are aware of the characters a scientist would use and then to explain the task. The teacher then takes a step back and observes the pairs working through the task and debating which characters to use. Checking often to ensure that only objective characters are used. Posing questions when the teacher believes there may be gaps in understanding.		

<b>Conclusion:</b> Students reform back as a class and discuss what they learnt about the type of characters used, what worked and what did not. Lollies are to be eaten only once outside the lab!	
<b>Independent practice:</b> For homework, students are to take home the Mr. Men picture sheet and create a key so the teacher can work it out next lesson.	

<b>Learning area:</b> Biology: Classification 4		<b>Date:</b> 06/06/2016
<b>Topic:</b> The Plant Kingdom	<b>OH &amp; S</b>	
<b>Key question:</b> What are the characters to define each phylum of the plants?	Basic Science Lab Safety rules particularly with students moving around the lab.  Set up of 20 plant species around the lab, information about the 5 plant groups on posters	
<b>Learning objectives:</b>  <i>By the end of the lesson students will have an understanding of the features of each of the plant phyla and be able to look out for them in the specimens. Student will then be required to apply this knowledge and provide a sentence or two on the classification of the two mystery plants.</i>		
<b>Anticipatory set:</b>  Draw on students’ prior knowledge by asking key questions: <ul style="list-style-type: none"><li>• What do we know about the Kingdom of Plants?</li><li>• What different types of plants are there and how would we separate them?</li></ul>		<b>Checking for understanding &amp; feedback</b> <ul style="list-style-type: none"><li>• Walking around the showcase of plants and questioning the students on how they have made decisions.</li><li>• Meeting up with each pair from last week, returning the key and provide feedback. Allowing the students to discuss any issues they are having with the content.</li><li>• Ensure all students</li></ul>
<b>Communicating learning objectives:</b> Today we will be learning about classification of plants and their key features.		
<b>Input, modelling &amp; learning activities:</b> <ul style="list-style-type: none"><li>• Early arrival of the teacher to have all plants set up around the room and tables to be filled out by each student. Once student has filled out the table indicating which plant group the specimen belongs to, they are to go up to the teacher’s marking sheet and check.</li><li>• Introduce the different plant phyla and new scientific vocabulary to be used.</li><li>• Posters are set up around the room to guide the students on what to look for.</li><li>• Any incorrect answers are to be redone in collaboration with a classmate.</li></ul>		

<ul style="list-style-type: none"><li>• Students then to have a look at the mystery plants, classify them and provide justification.</li><li>• After this, students can retrieve their Mr. Men homework and swap with a classmate and have a go. Students are encouraged to provide peer feedback.</li></ul>	are moving through the task and are providing justification for their choices of phyla classification of the mystery plants.
<b>Guided practice:</b> <p>This is a very hands-on style lesson, to allow students to construct meaning by doing. The teacher plays a small role within this inquiry lesson, catching up with students about the unit so far and scaffolding if they require any additional help. As this class is student-centred, this does free up the teacher to ‘check-in’ with all students and discuss their work from last lesson in an effort to improve learning outcomes.</p>	
<b>Conclusion:</b> <p>Students are to reflect on the mystery plants and the justification used to classify them into a plant group.</p>	

<b>Learning area:</b> Biology: Classification 5		<b>Date:</b> 08/06/2016
<b>Topic:</b> The Animal Kingdom: Vertebrates	<b>OH &amp; S</b>	
<b>Key question:</b> Animals are so varied, what features can we use to classify?	Basic Science Lab Safety rules A3 poster paper, scissors, glue.	
<b>Learning objectives:</b> <i>By the end of the lesson students will have grouped characteristics of animal groups and classified animals into groups with like characteristics</i>		
<b>Anticipatory set:</b> Draw on students’ prior knowledge by asking key questions: <ul style="list-style-type: none"><li>• What did we learn about the plant groups last week?</li><li>• Are there animals which look very different but have things in common?</li></ul>		<b>Checking for understanding &amp; feedback</b> <ul style="list-style-type: none"><li>• Walk around the groups checking for understanding, asking individual students for their reasoning behind their choices.</li><li>• Prompting when necessary to ensure all students are actively participating.</li><li>• Checking for relational understanding between using these characteristics to make scientific dichotomous keys.</li></ul>
<b>Communicating learning objectives:</b> Today we will be building on the last few lessons and start to look at the vertebrates within Animal Kingdom, and features of each class. Working backwards and putting the characteristics into groups. (Appendix 3)		
<b>Input, modelling &amp; learning activities:</b> <ul style="list-style-type: none"><li>• Students in small groups are to work through a list of features, some specific to only one class, some across multiple classes.</li><li>• Students are to cut out these characters and stick them onto their A3 table, with characters they are unsure about to be left at the bottom.</li><li>• Students are then to cut out the example animals and place these into classes.</li></ul>		
<b>Guided practice:</b> The teacher again plays a supportive role within this class, moving around the groups and offering assistance when needed. Gauging the level of debate between the students and answering any questions students may have about the content of the unit. In this lesson, the teacher is looking for		

students to collaborate and problem-solve amongst themselves, allowing other students to scaffold their peers' learning with also reaffirms their own knowledge.	
<b>Conclusion:</b> Join back together for a class discussion on what we found interesting and what problems the groups encountered. If students still have characters in the box on the bottom of the page, this is discussed as a class so students can learn from each other.	
<b>Independent practice:</b> Reflect on what we have learnt in this unit to prepare for the end of unit test next lesson.	

**Lesson 6: 10/06/2016 - End of Unit Test – Please see Appendix 4A and 4B**

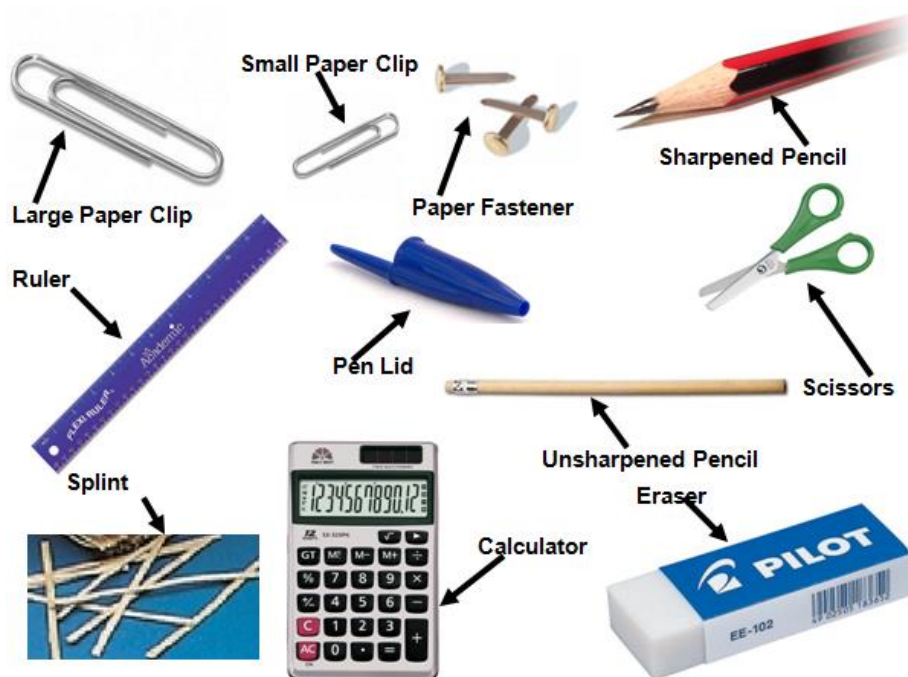
## References

- Australian Curriculum Assessment and Reporting Authority. (2015, December 15). *The Australian Curriculum: Science* (Version 8.1), Year 7 all curriculum elements, all curriculum dimensions Retrieved from <http://www.australiancurriculum.edu.au/download/f10>
- Biggs, J. (1996). Enhancing teaching through constructive alignment. *Higher education*, 32(3), 347-364.
- Gormally, C., Brickman, P., Hallar, B., & Armstrong, N. (2009). Effects of inquiry-based learning on students' science literacy skills and confidence. *International journal for the scholarship of teaching and learning*, 3(2), 16.
- Osborne, R., & Freyberg, P. (1985). *Learning in Science. The Implications of Children's Science*. Heinemann Educational Books, Inc., 70 Court Street, Portsmouth, NH, USA.
- Wiggins, G., & McTighe, J. (2011). What is backward design?. *Understanding by design*, 7-19.



## Appendix 1

### Silly Pencil Case



Work Sheet to fill out:

### Silly Science Dichotomous Key

Name \_\_\_\_\_

A Dichotomous key is a very valuable tool that can be used to identify many objects, such as plants, or animals.

The Key below will help you identify the Silly Science name for common classroom objects.

- |      |  |             |
|------|--|-------------|
| Q1a. | The item is made with metal                | Go to 2a    |
| Q1b. | The item is not made with metal            | Go to 5a    |
| Q2a. | The item is made of only metal             | Go to 3a    |
| Q2b. | The item is made of metal and plastic      | WIDGET      |
| Q3a. | The Item is Silver                         | Go to 4a    |
| Q3b. | The Item is Gold                           | CLIPPER     |
| Q4a. | The Item is longer than 3cm                | SUPER DUPER |
| Q4b. | The Item is shorter than 3cm               | ITSY BITSY  |
| Q5a. | The Item is <u>Soft</u> or Flexible        | Go to 6a    |
| Q5b. | The Item is <u>Hard</u> or Not Flexible    | Go to 7a    |
| Q6a. | The Item has lots of Numbers               | WADGET      |
| Q6b. | The Item has no Numbers                    | OOPSEY      |
| Q7a. | The Item needs electricity/battery         | GADGET      |
| Q7b. | The Item does not need electricity/battery | Go to 8a    |



Appendix \_2A:

Lolly Dichotomous Key

Picture	Real Name	Silly Name
	Milky Way	“Spacey”
	Jelly Snake	“Slither”
	Mintie	“Freshy”
	Sherbet Lemon	“Sucker”
	Gummy Bear	“Squiggy”
	Marshmallow	“Melty”
	Strawberry & Cream	“Top-deck”
	Cola Bottle	“Drink me”

Appendix\_4B:

Mystery Animal:



1. What Class does it belong to?
2. Why do you think it belongs to that Class?

(Answer Questions in *Full Sentences* to improve scientific writing skills)

Mystery Plant:



3. What Phylum does it belong to?
4. Why do you think it belongs to that Phylum?

(Answer Questions in *Full Sentences* to improve scientific writing skills)