

Designing Teaching and Learning Assessment 2 – Bin Liners

102086

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Part A - QT Analysis

1. Intellectual quality	
1.1 Deep knowledge	
Between 2 & 3	<p>Teacher has a clear voice and is clear with his instructions – he demonstrates what is required by using the whiteboard but knowledge was treated unevenly with too many instructions.</p> <p>Teacher's writing skills on board are terrible; whiteboard is confusing to follow. There are too many things to look at and students look puzzled / confused. He does not use the whiteboard effectively and there is no focus on key concepts.</p>
1.2 Deep understanding	
4	Looks like an advanced year 9 class – students clearly know what is to be done – they demonstrate a reasonably deep understanding of the work needed as well as showing interest in the quiz.
1.3 Problematic knowledge	
4	<p>Students acknowledged problem presented; were able to make bin-liner by following instructions; easily achieved tasks as the teacher was able to provide basic reasons - linking real-life situation with science; teacher explored ideas with basic quiz.</p> <p>Multiple perspectives are presented; confusion over how government could be more responsible due to lack of information. Inaccurate information was provided - made students aware of political influences associated with plastic bags thus assuming students would understand the real environmental issue of concern.</p>
1.4 Higher-order thinking	
4	<p>Students show ability to make bin-liners using newspapers from instructions given as well as being able to create their own design – a great achievement seen in their faces.</p> <p>Students were able to identify only a few key environmental issues by thinking of how problems are associated only at home and not the general environment.</p>
1.5 Metalanguage	
4	<p>Throughout the lesson students engage with teacher with their designs of new bin-liner; students get involved in answering quiz questions; students are required to make a presentation of their designs during end-of-class; metalanguage is strong.</p> <p>However, use of worksheets to highlight cause-and-effect could have resulted in better understanding by students if the teacher had recorded their scores for later evaluation.</p>
1.6 Substantive communication	
5	Communication via oral / written exchange was achieved using “thinking tools” when discussion was made in pairs. Teacher only managed some students to make presentations; praised them for their innovations in making things.

2. Quality learning environment	
2.1 Explicit quality criteria	
Between 2 & 3	<p>Teacher made a connection through general statements between science and everyday life – but I’m not sure how he well enough linked this to the lesson outcomes. There were no explicit quality criteria to suggest students learnt anything except making a bin-liner – this is not quite meeting the outcomes required according to SC4-13ES.</p> <p>However, the teacher did check some of the students’ work; provided feedback to class activity but this still left a big hole in the purpose of the learning.</p>
2.2 Engagement	
4	<p>Despite the misdirected lesson having little to do with the required lesson outcomes, the class was engaged; students were able to form a basic understanding through observation and instruction and through practice.</p> <p>It’s not clear how seriously the work is taken to address the issue of high-density polyethylene as a non-renewable resource as some students highlighted the complications in making a paper bin-liner.</p>
2.3 High expectations	
3	<p>Most students as a norm for this class – are expected to work in pairs to do activities. From observation, they appear comfortable / happy to participate in this manner and most are recognized for doing so. The teacher encourages them to make presentations but if every pair were to present their work and if every pair had finished on time – allocated 15 minutes in the lesson plan would mean some students miss out. It appears some students have NOT worked as hard as others and NOT ALL of them have taken the risk to present.</p> <p>The main challenge was to get students to give their designs a brand name but this high expectation may have been too high as some students struggled to provide evidence of hard work in this area.</p>
2.4 Social support	
5	<p>Students appear comfortable in social environment of classroom created by teacher through positive participation and engagement. They understand the “think : pair : share” model.</p> <p>The social support is strong as students have all contributed and there is no evidence of reluctance. There is positive support for learning and mutual respect by all.</p>
2.5 Students’ self-regulation	
3	<p>Not all student show autonomy. Good to see the teacher getting assistance from more talented students that have taken the initiative to lead in making the paper bin-liners during the activities.</p> <p>Teacher regulates and helps students that are struggling by walking around the classroom, focusing with praise and encouragement.</p>
2.6 Student direction	
2	<p>The lesson is almost completely controlled by teacher except when students are asked to make improvements to a given design problem.</p> <p>A way to give students more determination or independence would be to ask them what kind of “bin-liner” they would like to “create” and evaluate their work for “production” in the next lesson.</p>

3. Significance	
3.1 Background knowledge	
3	Students discuss how paper bin-liners can be used at home and how they can get involved in helping. Students make a connection with plastic bags but no clear understanding with the production of high density polyethylene products.
3.2 Cultural knowledge	
2	There is very little cultural knowledge applied in the lesson; students appear to be from the same cultural background.
3.3 Knowledge integration	
2	<p>Little connection is made between plastic bags and the effect on the environment when mismanaged. Information provided is trivial and misinformed.</p> <p>Some students pointed out the difficulty in using paper when it gets wet versus polyethylene made bags that are water-proof. Knowledge was restricted to teacher's agenda.</p>
3.4 Inclusivity	
5	Inclusivity is "not applicable" as everyone in class appear to be in the same group and everyone has been included – no one was excluded and everyone participated in work.
3.5 Connectedness	
2	<p>Lesson addressed a real problem that students can relate to; direct connection was made between a familiar man-made product and Earth.</p> <p>However, there was a hidden agenda as the teacher attempted to influence them to change a known habit of using free plastic-bags and not advising them that mum and dad would now need to pay \$0.15 for plastic bags or \$3.00 for a pack of 30 plastic bin-liners.</p>
3.6 Narrative	
2	<p>No personal story sharing and no explanation on how the teacher or the students feel about free plastic bags supplied at supermarkets.</p> <p>Teacher could have used examples of garbage in a bag or more to the point – shopping in a plastic-bag and how plastic liners will now need to be paid for if we don't use newspapers.</p>

Part B - Lesson Plan

Syllabus: Science		Stage: Stage 4	Topic: Earth and Space
Outcomes	Assessment	Students learn about	Students learn to
SC4-13ES Explains how advances in scientific understanding of processes that occur within and on the Earth, influence the choices people make about resource use and management.	Informal formative assessment.	ES3 Scientific knowledge influences the choices people make in regard to the use and management of the Earth's resources.	Classify a range of the Earth's resources as renewable or non-renewable. Investigate some strategies used by people to conserve and manage non-renewable resources, e.g. recycling and the alternative use of natural and made resources.

Areas for improvement from my QT analysis:

1. Intellectual Quality

- 1.1: Deep Knowledge – scored **2/3**

2. Quality Learning Environment

- 2.1: Explicit Quality Criteria – scored **2/3**
- 2.6: Student Direction – scored **2**

3. Significance

- 3.3: Knowledge Integration – scored **2**

Time	Teaching and Learning Actions
N/A	Class Preparation – before students arrive <ul style="list-style-type: none"> Rearrange room so that class has tables & chairs set for group work instead of in pairs. Ensure iPads are fully charged for students to use if needed. Prepare whiteboard with neat and legible writing; provide better organisation of tasks.
3 min	Lesson Preliminaries/Administration <ul style="list-style-type: none"> Settle students into the new classroom arrangement. Turn lights down low ready for watching video. Distribute roll by passing it around instead of calling out names – 2.6 Self-Direction. Mark the roll.
5 mins	Introduction <ul style="list-style-type: none"> Welcome students and remind them of the topic. Highlight the lesson plan; make it clearly visible on the whiteboard with allocated times. Distribute worksheets in stacks for group distribution. Distribute factsheets that include QR code for more meaningful factual information. Watch the 3-minute video on the effects of plastic bags on our environment. <p>Central idea / concepts of the topic for this lesson is earth and space – ABC News story highlights important science aspects of the lesson otherwise lost in just verbal instruction – 1.1 Deep Knowledge – treated more evenly, supported with actual facts.</p>
10 mins	Direct Instruction <ul style="list-style-type: none"> Introduce students to high density polyethylene (HDPE) as a non-renewable resource used to make plastic bags. Key ideas for this lesson are cause and effect with questions being “why do we use so many plastic bags in Australia?” and “what is the effect on the environment?” Provide students access to iPads if needed or they can use their own devices for QR Codes as this will help them with the quiz – 2.6 Self-Direction. Students read factsheets for deeper knowledge – 3.3 Knowledge Integration. Another key idea is solutions with questions being “what have governments done to solve problems caused by plastic bags?” and “what can citizens do to solve problems caused by plastic bags?” Give an overview of activity: <ul style="list-style-type: none"> Designing renewable alternatives to plastic bags using newspapers. Teacher will show students a design and they will improve that design. Give an overview of thinking tools to be used: <ul style="list-style-type: none"> Introduce Think-pair-square-share model – a collaborative learning strategy that involves the entire classroom in small groups instead of only two students. Think-pair-share <ul style="list-style-type: none"> Cause-effect map Pros-Cons-Questions
11 mins	Think-Pair-Square-Share Activity <ul style="list-style-type: none"> Give students worksheets with 10 open ended question they can discuss in groups about Earth's resources and how can we do to help the environment – questions can be: “what message can we create to help community learn to recycle-reuse-repair?”

	<p>true/false statements worksheet with questions like: "the average plastic bag is used for only 5 minutes but can take up to 1,000 years to break down in the environment."</p> <ul style="list-style-type: none"> Students have 2 minutes to individually answer the questions (think). Students have 1 minute to present their ideas to class – 6 groups = 6 minutes thus allowing for collaborative work that is detailed, reinforcing the benefits of choice through specific statements – 2.1 Explicit Quality Criteria. Students then have 1 minute to discuss their responses with the student sitting next to them (pair). Teacher will then lead class discussion based on worksheets for 5 minutes (share).
11 mins	<p>Cause-Effect Mapping Activity</p> <ul style="list-style-type: none"> Give students cause-effect map worksheets. Students have 2 minutes to think of as many reasons for why we use so many plastic bags in Australia. Go around the class to check student understanding. Highlight the link between the causes identified and the production of high density polyethylene bags. Students have 2 minutes to list as many sub-effects of the production and use of plastic bags. Circulate to assist students. Teacher leads brief class discussion to summarise the environmental effects identified by the students.
4 mins	<p>Direct Instruction</p> <ul style="list-style-type: none"> Teacher to show students how to construct a biodegradable bin liner by folding 4 sheets of newspaper. The bin liner will fit into the teacher's waste-paper basket.
4 mins	<p>Pros-Cons Activity</p> <ul style="list-style-type: none"> Teacher invites students to highlight the pros and cons of the biodegradable bin liners.
11 mins	<p>Student-Centered Activity</p> <ul style="list-style-type: none"> Students to identify ways to improve the bin-liners using the MAS sheet. Students to work in groups to refine the newspaper bin-liners. Circulate around the room to assist students and groups. When they are ready, students in groups make presentations of demonstrate their improved designs to the teacher, using the teacher's waste paper basket as a test. Groups that are not ready, can decide to make a presentation (2.6 Self Direction) next lesson as they are encouraged to work on the project at home with the help of mum and dad – thus examining their own progress in relation to the explicit criteria to quality of work they produce – 2.1 Explicit Quality Criteria. Teacher to encourage peer support during class demonstrations.
1 minute	<p>Student-Centered Activity</p> <ul style="list-style-type: none"> Summarise and close the lesson. Remind students of homework in preparation for next lesson Remind students to use the QR Code with their mobile devices to find material

Part C – Academic Justification

From observation of the bin-liner lesson video, I have identified four issues according to the outlined 'dimensions' found in the *A classroom practice guide* (Ladwig, J., & Gore, J. 2006) model of pedagogy for NSW schools for intellectual quality dimension – **1.1**: Deep knowledge; quality learning environment dimension – **2.1**: Explicit quality criteria and **2.6**: Student direction; and significance dimension – **3.3**: Knowledge integration.

The lesson outcomes refer to “**choices** people make about resource management and use” or more to the point – the *misuse* of Earth’s resources – so it is appropriate to instead, approach this lesson through humanist eyes and apply psychoeducational needs based choice theory – as a teacher can’t make students do anything (De Nobile, J. 2017) but can facilitate them to make better **choices** through behaviour that satisfy their present and future needs on the environment as well as applying, to a lesser degree – goal theory – to ensure students “investigate” strategies that they can implement to their own learning of science goals. Giving students the choice to address the quality-world they are after, will encourage them to “believe” in the importance of this particular science lesson, and in turn, addressing issue 2.6 above.

The traditional “chalk and talk” method of delivering the lesson as in this video example, where a teacher stands in front of a classroom, dispensing information (Minton, S. 2012), engaging students from the top > down and putting students in pairs does not enhance the quality of the teaching model required for this type of lesson – that is – explain advancements in science that investigates strategies for better methods of conservation, recycling, and Earth’s renewable resources. The essence of science is in discovery, observation and experimentation (Ladiges, P., & Mayo, O. 2019) and this lesson falls short by all accounts, in particular through its required method of informal formative assessment needed – there is no final connection in students learning anything important between high-density polyethylene man-made products and science.

Ladwig and Gore (2006) indicated that students are required to “examine the quality of their own work and the work of others” in relation to detailed and explicit criteria provided. To better achieve this, I have changed the lesson to include students working in groups instead of in pairs on the basis that they are more likely to meet their basic needs when we enable children working in class groups (De Nobile, J. 2017) to democratically take more responsibility with their learning.

The most important aspect of this lesson is found in the learning outcomes. However, there is little evidence in the video the teacher actually achieved this. As listed on page 16 of NSW Syllabus for the Australian Curriculum Science - Years 7–10 Syllabus, Stage 4 Outcomes: “SC4-13ES - Explain how advances in scientific understanding of processes that occur within and on the Earth, influence the choices people make about resource use and management” (NESA, 2018).

To achieve this, I have included in my lesson modifications, a short ABC News story that educates children the facts on free plastic-bags and how consumers are now having to *pay \$0.15 for them* (Gee, S. 2017) instead – which does not help the environment. The story demonstrates choices people can make when going shopping, hence, addressing issue 1.1 above.

The new seating arrangement enhances classroom dynamics to cater for group-work, considering there are presentations to make in such a short-time – students in pairs would require 15 minutes for a class of 30 students. In groups of 5 students, it will only require 6 minutes in an allocated 11-minute (22) time-slot. Students working in a cooperative-learning environment are “typically absorbed in an activity (Arthur-Kelly, M., Lyons, G., Butterfield, N., & Gordon, C. 2016) as they work together in small groups towards achieving a common goal” thus addressing issue 2.1.

The newly created worksheets, designed to be used in group-work, contain QR codes for students to use with either their own mobile devices or the school iPads. This enables students to self-direct their learning as they assume responsibility to reveal in their presentation what they investigate and find whilst working at their own pace within the 11 (22) minute timeframe - again addressing issue 2.6.

To conclude, the highlight of the lesson modification is the new workspace arrangement created (De Nobile, J. 2017) to increase the significance of this science lesson. Coupled with improved information added to worksheets as well as the introduction of fact-sheets to connect class exercise with science, the lesson has become more meaningful through links made between topic and bin-liners. By integrating technology through the application of QR codes for information, students will remain more engaged and focused in gaining knowledge when they establish a connection via the group presentations – addressing issue 3.3 above.

References:

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