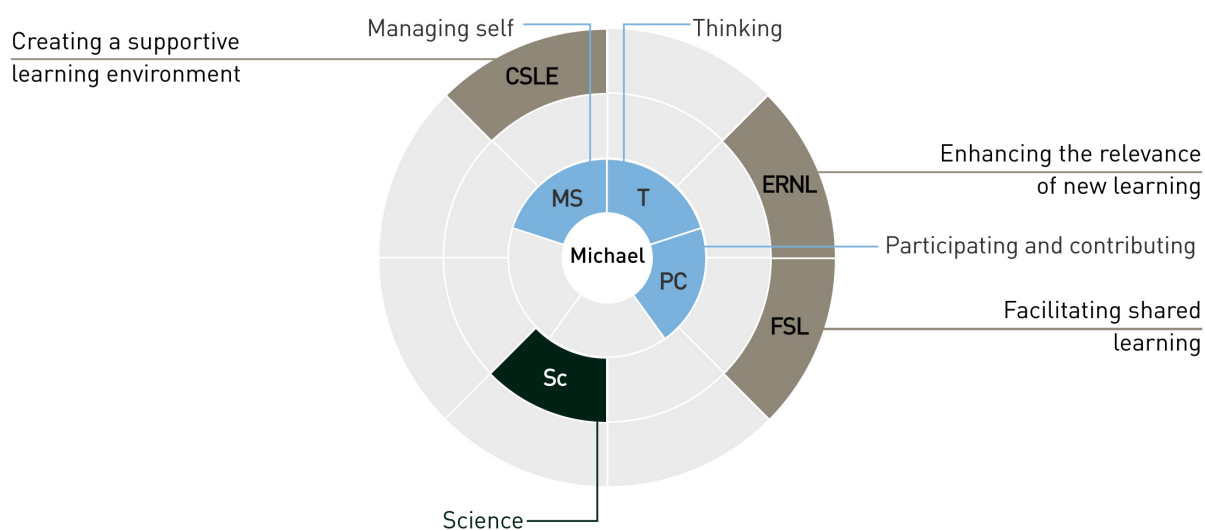


Michael the scientist

Links to the curriculum



Student background

Name	Michael
Age	5
Year	1
School	Primary

Michael is a cheerful boy and arrives at school each day with a big smile on his face. Michael has global developmental delay. He can say the words, "Mum" and "no" clearly; he can communicate, "yes". He always joins in every class activity, observing what his classmates are doing and then following suit.

Michael's programme is modified to suit his needs. Michael has friends and is accepted as an equal by his classmates. Michael is a student in a class of 24. The school receives teacher aide support for 11 hours a week as well as 0.1 FTE learning support teacher time.

Three learning stories

- 1. Will it float or will it sink?** 27 February 2008
- 2. Making a boat that will float** 29 February 2008
- 3. Finding taonga at Scarborough Beach** 7 March 2008

This string of learning stories shows Michael participating and contributing in science learning as part of a topic study. Michael gets fully involved observing, making predictions, exploring ideas, designing, and experimenting (thinking and managing self).

Will it float or will it sink?

Student	Michael	Date	27 February 2008
Topic	Floating and sinking	Observer	Yvonne (teacher)

As part of our topic study, the children investigated the phenomena of floating and sinking. They worked as a class. First they had to predict whether a group of different objects would float or sink. The objects were grouped according to the children's ideas. Their predictions were then tested. Each object was placed carefully in a bowl of water to see if the predictions were correct.



Michael shares his ideas with Anna.



Michael checks to see if his prediction was correct.

Michael sat and waited patiently for his turn. When his name was called he went straight up to Anna (teacher trainee) and got ready to choose an object as he had seen the other children do. He chose a bolt from the "sink" pile. Miss Walker asked Michael to indicate if he agreed with the prediction that it would sink. Michael indicated, "yes" and then placed the bolt in the water. It sank to the bottom straight away. When asked, "Did it float?" Michael laughed and shook his head. When asked, "Did your bolt sink?" he smiled and said, "Eaea" (his word for yes).



Michael watches carefully as another student tests her prediction.

Analysis – what learning is happening here?

Key competencies

Participating and contributing, Thinking, Managing self

Here we see Michael taking part in a class lesson, making predictions, and being able to wait for his turn.

Learning areas

Levels 1 and 2 science: Nature of Science: Understanding about science

– Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation.

Levels 1 and 2 science: Nature of Science: Investigating in science

– Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.

Levels 1 and 2 science: Physical World: physical inquiry and physics concepts

– Explore everyday examples of physical phenomena, [such as movement, forces, electricity and magnetism, light, sound, waves, and heat].

Michael was able to test the class prediction and indicate his findings about which objects would float and which would sink.

He understands the meaning of sinking and floating.

Where to next?

This was a class lesson. I would like to set the children up with the equipment to allow them the opportunity to explore floating and sinking individually or with a buddy. Maybe I could give them a challenge of creating a boat.

Making a boat that will float

Student	Michael	Date	29 February 2008
Topic	Floating and sinking	Observer	Yvonne (teacher)

The children were given the task of creating a boat that would float. We discussed shapes they thought would be best for their boats. They were not given a model as I wanted them to explore their own ideas and experiment for themselves. They were each supplied with a piece of aluminium foil and set off to try out their ideas.

Michael listened carefully to the task and collected his piece of foil and went straight to his desk to make his boat. He watched other children creating their boats and then began to make his own.

When he was happy with his design, he went outside to our patio area to try out his invention in the water tray. When his boat sank, he retrieved it and tried to modify it just as his classmates were doing. When the foil got too scrunched up to use any more, he went inside and got another piece and tried again. The photo below shows Michael going in to the classroom with his first attempt. You can see the puzzled look on his face. He did not manage to make it float in his first attempt but he kept on experimenting, trying other designs and ideas.

Excellent self management!



Analysis – what learning is happening here?

Key competencies

Thinking, Managing self

Michael confidently went about experimenting with the foil to create a boat that would float. He made several attempts and then went off to get new materials to try again.

Learning areas

Levels 1 and 2 science: Nature of Science: Understanding about science

– Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation.

Levels 1 and 2 science: Nature of Science: Investigating in science

– Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.

Michael is investigating as he keeps on trying new shapes to find one that will float.

Levels 1 and 2 science: Physical World: physical inquiry and physics concepts

Further explore the phenomena of floating and sinking by creating a boat that will float.

Michael shows that he understands the phenomena that some things float and some things sink.

Where to next?

We will look for things that float and things that sink when we visit the rock pools at Scarborough Beach.

Finding taonga at Scarborough Beach

Student	Michael	Date	7 March 2008
		Observer	Yvonne (teacher)

Our syndicate picnic at Scarborough was a great opportunity to explore the rock pool habitat to find out what living things make their homes there. It was great fun splashing through the rock pools, lifting up rocks, and making exciting finds.

We found hermit crabs, mussels, crabs, limpets, pipi, different kinds of seaweed, and starfish. There were lots of empty shells. Imagine our surprise when we discovered some of the “empty” shells were the homes of hermit crabs. None of us had ever seen a hermit crab before. The children all realised that rock pools were where the creatures lived and that was where they belonged. Each living creature was carefully returned to its home. We noticed that some of the creatures floated freely in the water while some, like anemones and shellfish, stayed stuck to the rocks.



These photos show Michael engrossed in the experience of wading in the rock pools and searching for little creatures.

Michael carefully lifted up rocks to see what was underneath. He found various creatures, looked at them closely and then put them back where he had found them. One shell he picked up turned out to be the home of a hermit crab.

He was delighted and went around showing everyone. When he had finished sharing his crab with his friends and teachers, he placed it carefully in the water and watched it scuttle off.

Analysis – what learning is happening here?

Key competencies

Participating and contributing

Here we see Michael participating and contributing in our class outing by showing the shell to others.

Learning areas

Levels 1 and 2 science: Nature of Science: Investigating in science

– Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.

Michael explored the creatures and conditions of the rock pool habitat.

Levels 1 and 2 science: Living World: ecology

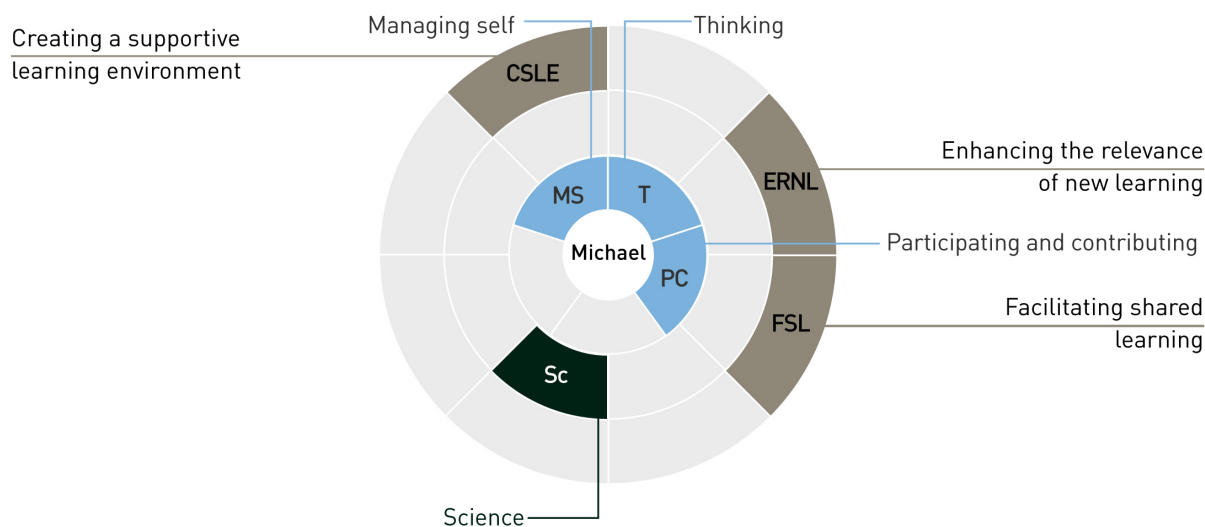
– Recognise that living things are suited to their particular habitat.

Michael was careful with the little creatures he found, holding them gently, showing them to his classmates and teachers. He showed us that he understands that these creatures belong in this habitat by carefully returning them to the place he found them.

Where to next?

We will give the children more of this type of learning experience. We will find out more about hermit crabs.

Reflection – what these stories exemplify



Key competencies

Michael enjoys participating and contributing in his class and is confident to take risks. He sees himself as a competent learner creating his boat independently. When Michael's first boat did not float, his perseverance in making another shows his developing self management. He showed us he can also make predictions (thinking).

How might these stories strengthen Michael's identity as a learner?

Michael took on an investigative role in all three learning stories (agency). He was keen to seek and find what would sink and float, in making a boat that would float, and in finding living things in the rock pools (depth). This learning occurred inside the classroom, outside of the classroom, and at the beach (breadth).

For more information on the four dimensions of agency, breadth, continuity, and depth (ABCDs), refer to *Narrative assessment: a guide for teachers*.

Learning areas

Levels 1 and 2 science: Physical World

In the first learning story, Michael shows us that he understands the meaning of floating and sinking. In the second story, we see him using that knowledge to create a boat that will float.

Levels 1 and 2 science: Living World

In the third story, Michael is exploring and searching for living creatures that live in tidal rock pools.

Effective pedagogy

What does this tell us about teaching and learning in this setting?

Here the teacher provides a safe and supportive learning environment where Michael feels able to take risks and where risk-taking is part of the classroom climate.

Facilitated shared learning is a feature of the class programme, giving children opportunities to support each other and learn from each other. The whole class is a community of learners where the children are encouraged to discuss what they are doing and offer support and feedback to each other as they work and learn.

When the children were given the challenge of designing and building a boat that would float, the teacher was enhancing the relevance of new learning about floating and sinking through a practical activity.

Reflective question for the reader

“How do I encourage students to take risks with their learning and try new roles?”

Useful resources

McKenzie, J. (1997). *A questioning toolkit*. Retrieved 26 November, 2008, from <http://questioning.org/Q7/toolkit.html>.

Ministry of Education.(2000). *Building science concepts, No. 37 L1-2, floating and sinking*. Wellington: Learning Media.

Janney, R., & Snell, M. E. (c2006). *Social relationships and peer support* [Part of the set *Teachers' guides to inclusive practices*] (2nd ed.). Baltimore, Md.: Paul H. Brookes Pub. Co.