NZASE resource

Socio-scientific issues in primary teaching

Plastic waste. Creative Commons.

Teacher Katie Gormley, below, summarises her Master's research on socio-scientific issues for primary learners.

For primary teachers, socio-scientific issues are those where there can be more than one opinion that can be debated. These lay the foundational skills for more in-depth work at the secondary level, where science underpinnings become important.

The use of socio-scientific issues (SSIs) in the classroom may, at first, appear daunting for primary teachers. However, teachers already have many of the skills and classroom strategies to implement an SSI approach to science education.

Teachers already encourage their children to explore issues about which people may express more than one opinion, to debate these issues and write persuasive texts. For example, classes often explore issues such as whether children should be expected to do chores at home, do homework, and whether schools should have uniforms.

Using these classroom strategies, teachers can work towards an SSI inquiry simply by developing children's base of scientific knowledge about an issue, before discussing or debating the social implications of the issue.

This scientific knowledge can be developed through the more traditional science topics and the activities and resources that teachers may already be confident with. For example, a unit researching endangered species or the rainforest can be the launch pad for the debate 'Should we keep animals in zoos?'

Once the debatable issue has been introduced, and children have identified the stakeholders and started to gather differing opinions, it may be necessary to explore specific scientific knowledge in greater depth.

Although thorough exploration of SSIs requires the consideration of moral and ethical aspects of issues, alongside an understanding of the scientific basis, at the primary school level the major focus is encouraging children to understand that people may have more than one point of view.

The table below presents a selection of science topics that are often explored in primary classes, and offers some questions that could promote debate and discussion reflective of an SSI approach.

The table identifies possible stakeholders, presents additional science questions and activities that may support the debate, and suggests possible actions that children may choose to take.

When taking an SSI approach to science education, children should be encouraged to take action if possible, and to realise that they are able to instigate change. For example, children from Malfroy School in Rotorua successfully campaigned in 2020 to have plastic bread tags removed, a process that took four years. Ruby from Kororāreka Russell School campaigned to have straws removed from school milk cartons, a move that was popular with schools involved in the programme.

Usual topic approach	Area of debate	Possible stakeholders for opinions	Additional questions or science knowledge / activities	Possible readings	Possible action
Native birds of New Zealand	Should all cats be kept indoors or even banned? Should we eradicate all 'pest' species?	Cat owners (benefits for mental well being); SPCA; DoC; Local trapping groups; Predator-Free NZ; Hunters (want to continue to hunt, e.g., Tahr).	How far do cats roam? Set up tracking chutes in local area. What is a pest? Pests in Aotearoa.	*Connected* 2013, No. 4: Keep your cat inside. ARB: lw1019 – Food of wild cats.	Attach bell to own cat. Distribute bells to local owners. Get involved in local rat or possum trapping events/ groups.
Endangered species/ Rainforests	Should we keep animals in zoos?	Zoos; Overseas animal sanctuaries; DoC; Environmentalists.	What is the food web of the animal's ecosystem and how will that be affected by the loss of a species? Zoo or sanctuary visits.	Zoo and wildlife sanctuary resources. Predator-free NZ. SB: It's just not right.	Fund-raising for conservation groups either here or overseas.
Teeth/ Healthy eating	Should sugary drinks be banned at school? Should there be a sugar tax on sugary drinks?	Parents; Dentists; Tuck shop owners; Dietitians; Drink manufacturers.	How much sugar is in a drink? Read the contents, dissolve that amount of sugar in water. Place a baby tooth in glass of Coke Observe model teeth. Survey children in school, parents, dentists. How are these products marketed?	FIO Energy - Food energy. FIO Statistics in the media – Snack attack. FIO Statistics revised edition – Hearty applause. M: Hunger and excess; Global food crisis; The true cost of food.	Posters/pledge to encourage drinking water in school. Write opinion to Board of Trustees/local MP. Make personal choice about consuming sugary drinks.
Teeth	Should chewing gum be banned in NZ?	Dentists; Parents; Council representative to discuss cost of cleaning up chewing gum.	What is gum made of? What are the alternatives to gum? Fair test using disclosing tablets to see the effects of chewing gum. Does the gum biodegrade? Fair test burying different gums.	Book: History to chew on – Who made the first chewing gum?	Write to BoT with opinion. Write to local MP with opinion. Make personal choice about using gum.
Transport/ Climate change	Should council (CC) / government (govt) fund more cycle ways? Should the CC/govt give free/subsidised e-bikes to everyone? Should cars be banned from dropping children at school?	Council representatives responsible for cycleways; Cycle groups; Local MP; Disability group representative; Residents affected by proposed cycle routes; Haulage/ transport companies.	Surveys of cars in school area. Debate how various transport options contribute to climate change. Graph data about the consumption and use of different fuels.	FIO: Statistics revised ed – Gigantic Jumbo. FIO: Technology transformations – Transport trends, Pedal power.	Start car-free initiative for school. Write to council/MP to express opinion.

Usual topic approach	Area of debate	Possible stakeholders for opinions	Additional questions or science knowledge / activities	Possible readings	Possible action
Rubbish/ recycling	Can NZ really claim to be '100% Pure'? Should all plastic packaging be banned? Should there be a deposit scheme on all bottles?	Producers of foods that use plastic packaging; Environmental scientists; Environmental groups; DoC; Supermarkets.	Survey rubbish in local area. Explore non-plastic alternatives (e.g., straw, spoon, plate) to discover pros and cons. Fair test to explore how different materials/packaging decompose. Is plastic necessary for some products? Survey overseas residents and locals regarding their impressions of NZ.	SB: Use it, Wear it. SB: The long life of plastic, 'Litter at the top of the world'.	Identify an item of plastic that may be unnecessary and write to manufacturers to suggest alternatives. Instigate plastic-free lunches at school.
Ecosystems	Should the (local project) proceed? Examples include building a marina in a mangrove-lined estuary, and removing native trees to widen roads.	Residents; Developers (dependant on the specific project); DoC; Environmental scientists.	What will be the effect of the development on the ecosystem? On a field trip, sample the ecosystem to see what organisms are living there. Construct a food web from the findings. Explore the impact of different scenarios on the food web.	Find a reading about the ecosystem being impacted.	Write to local MP/paper to express opinion. Fund raise to support local environmental groups.

Key to readings: ARB = Assessment Resource Banks; FIO = Figure it Out maths series; M = MainSails; SB: Springboard into comprehension series.

A feral cat that killed 102 bats in seven days from neighbouring trees on the southern slopes of Mount Ruapehū. Photo: DoC.

Beach Road cycleway, Tāmaki Makaurau/Auckland. Photo: Bike Auckland.

Ngā Kupu

Hunga whaipānga – Stakeholders
Hangarua – To recycle, recycling
Kotahitanga – Unite; collective action
Manu māori – Native birds
Matatika – Ethical, fair, honest
(Ngā) **niho** – Teeth
Pānuitanga – Publication, reading
Pātai – To ask or enquire, question
Tautohetohe – To debate, argue
Whakaaro – To consider, opinion.

From Te Aka Maori Dictionary