

Australia's report card in STEM: "Consistent effort but highly inequitable!"

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Identifying Gaps - Australia

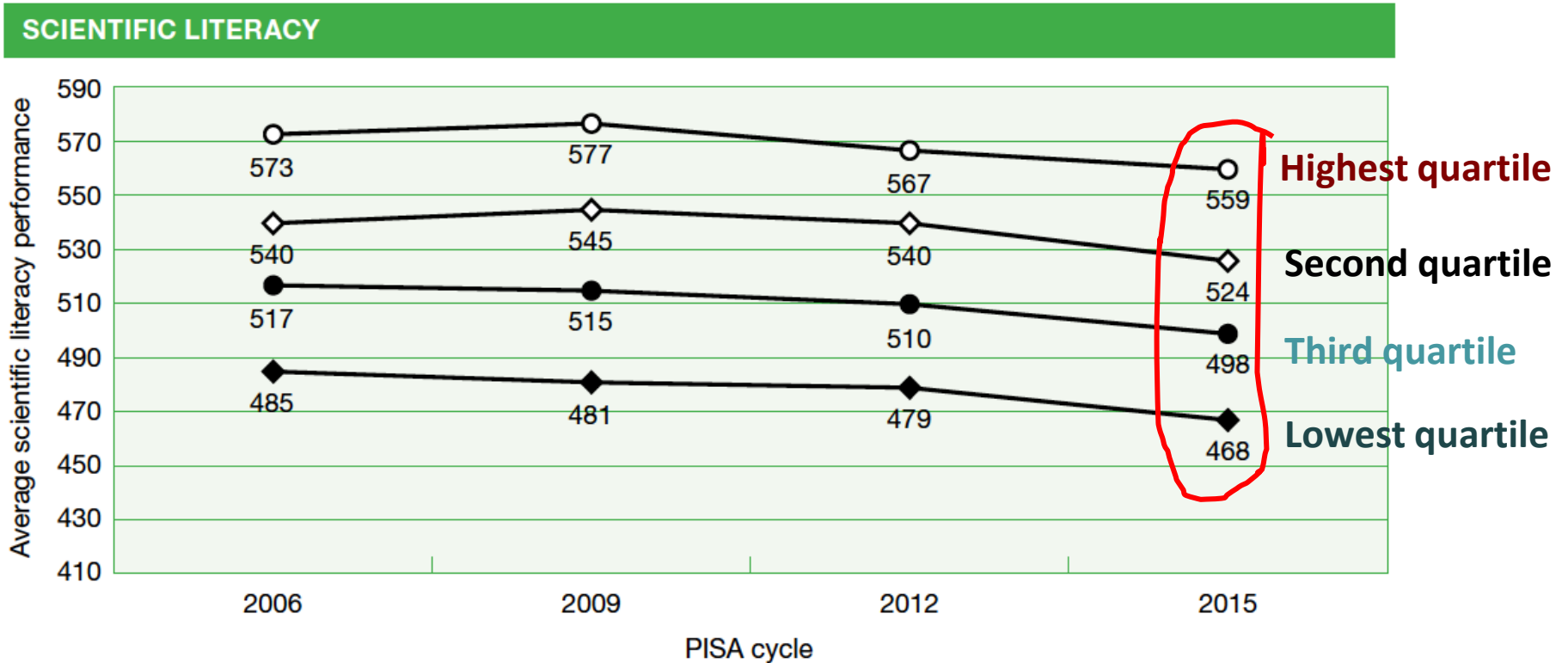
PISA results indicate that results for science generally have dropped slightly since 2009 with clear gaps identifiable in students from:

- Low socioeconomic (SES) backgrounds (Panizzon, Westwell, Elliott, 2013)
- Indigenous backgrounds
- Geographical location (Panizzon, 2009)
- Gender is an issue for mathematical literacy BUT not for scientific literacy

Other indicators identifying that the achievement of these groups of students is being impeded includes:

- TIMSS
- National Assessment Program Numeracy and Literacy (NAPLAN)
- Year 12 rates of completion
- Numbers of students entering into and completing university study

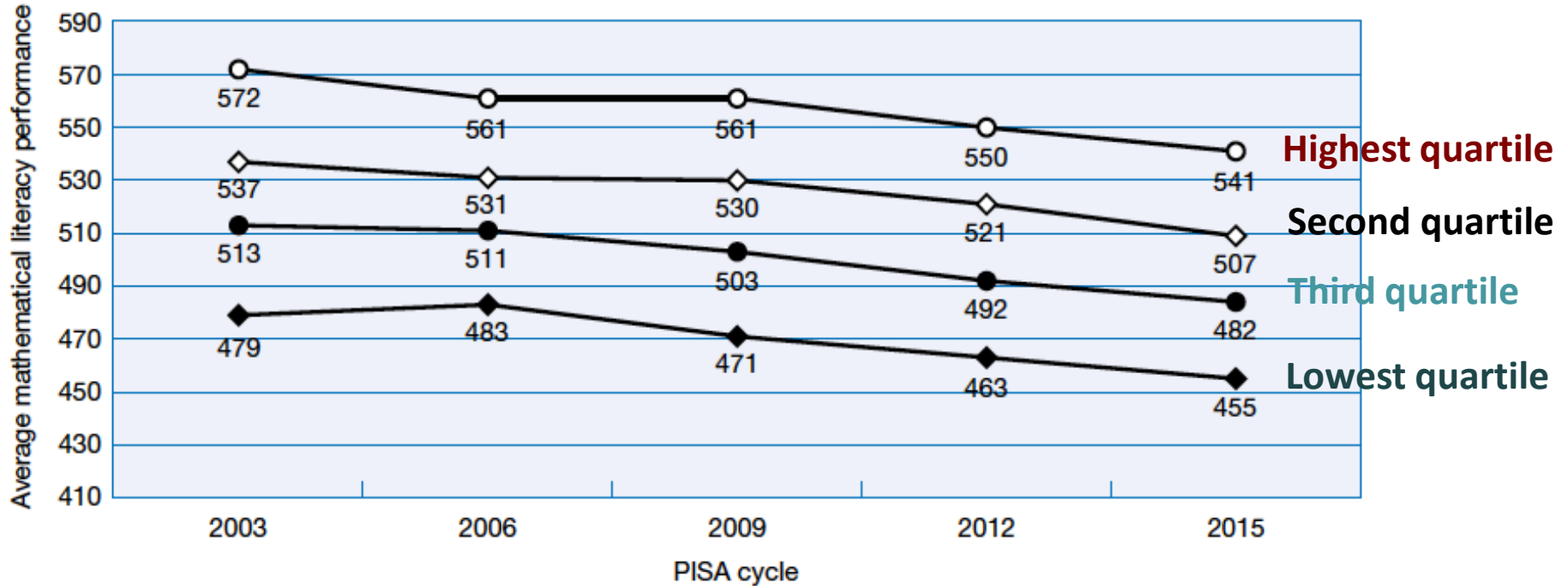
Socioeconomic Status



Difference between 559 (Highest Q) and 468 (Lowest Q) = 91 points
= 3 years of schooling or 1 proficiency level!

(Thomson, De Bortoli & Underwood, 2016)

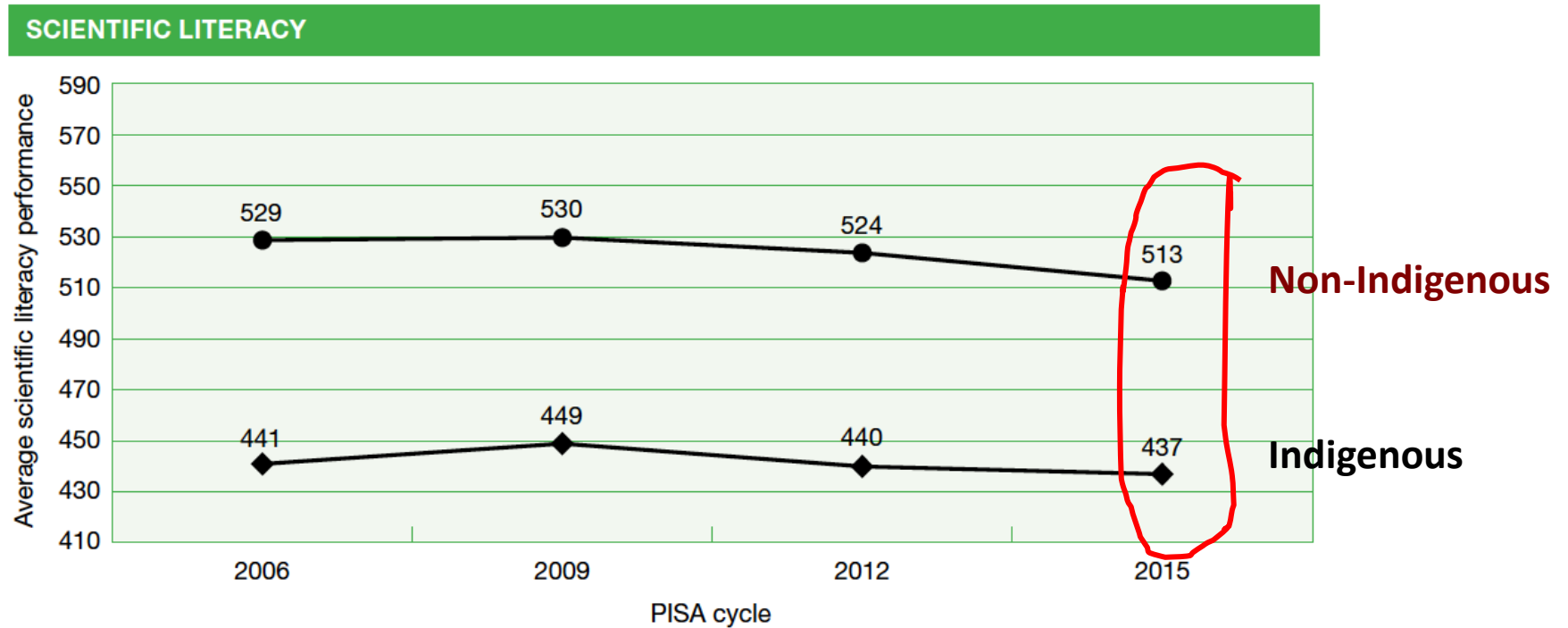
MATHEMATICAL LITERACY



Similar to scientific literacy with lower mean results.

(Thomson, De Bortoli & Underwood, 2016)

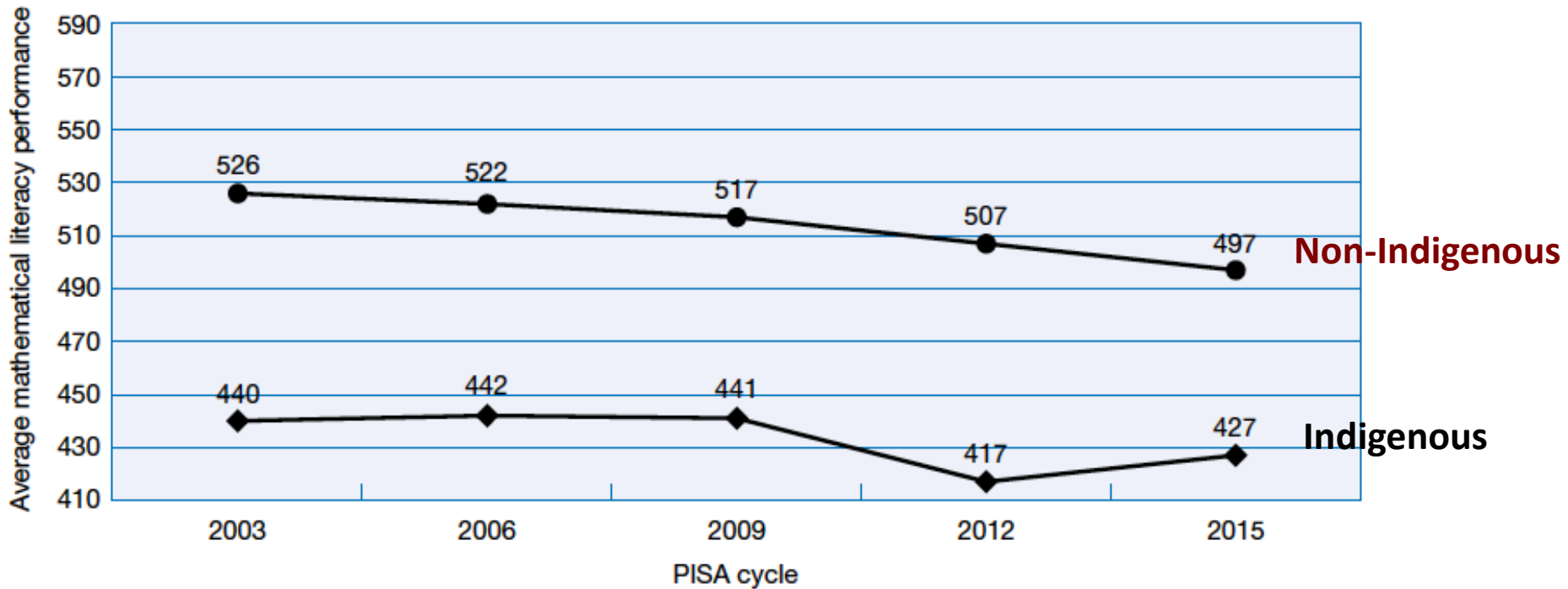
Indigenous students



Indigenous students demonstrate achievement that is 76 points below the mean for non-Indigenous = 2.5 years of schooling or 1 proficiency level!

(Thomson, De Bortoli & Underwood, 2016)

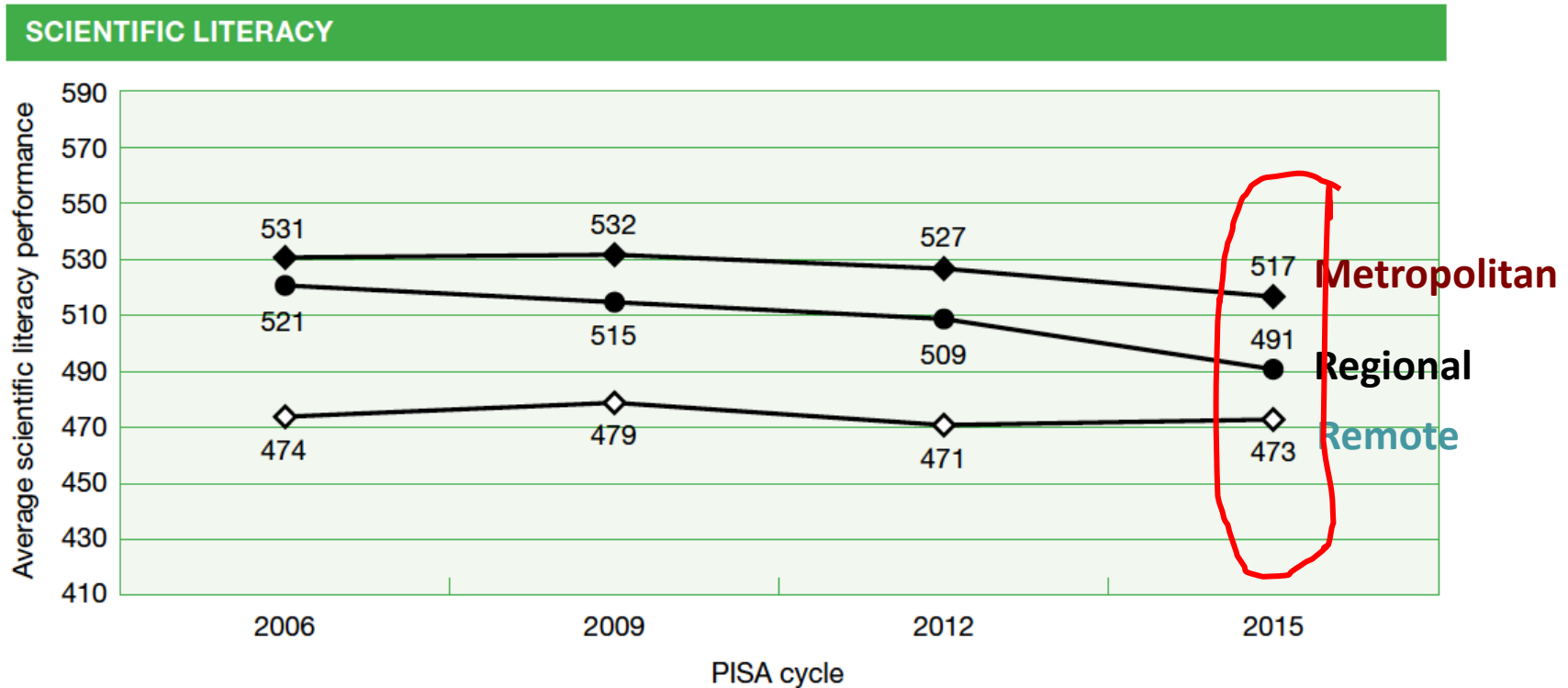
MATHEMATICAL LITERACY



Similar results to scientific literacy with lower mean scores.

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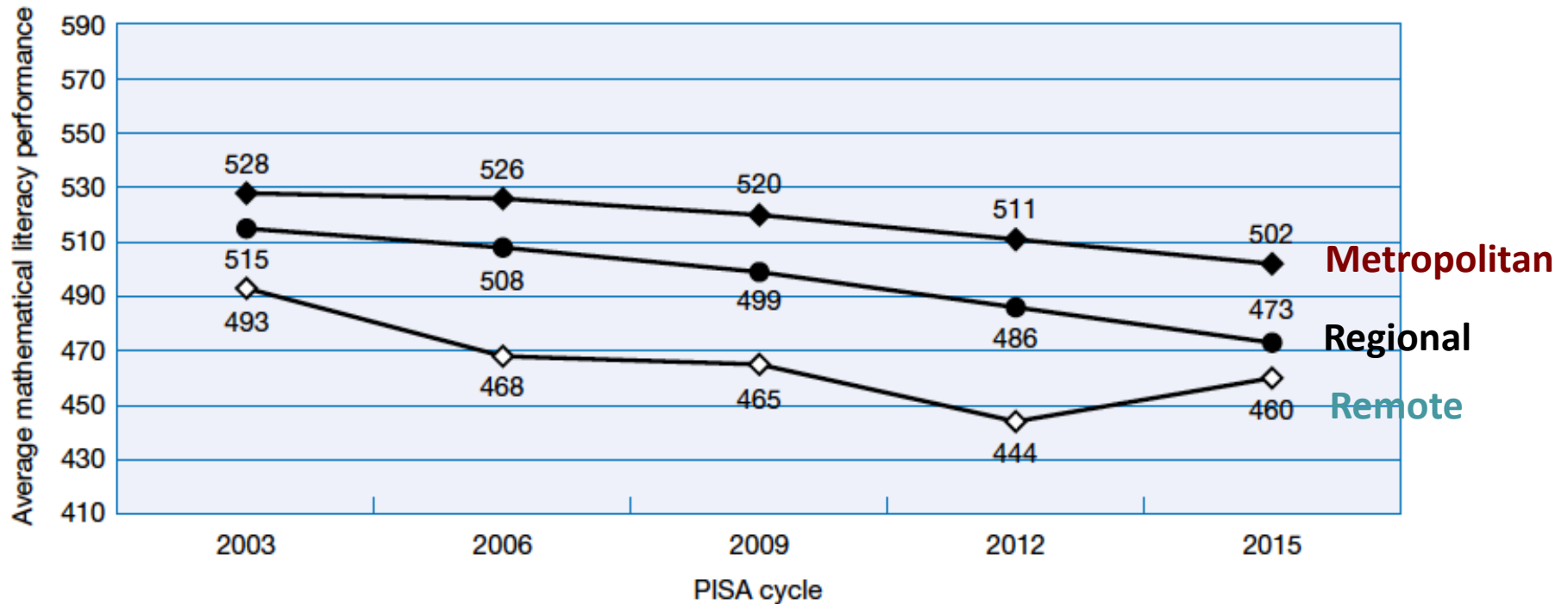
Geographical location



A difference of 44 points between the means for students located in Metropolitan schools compared to those in Remote schools = 1 year of schooling!

(Thomson, De Bortoli & Underwood, 2016)

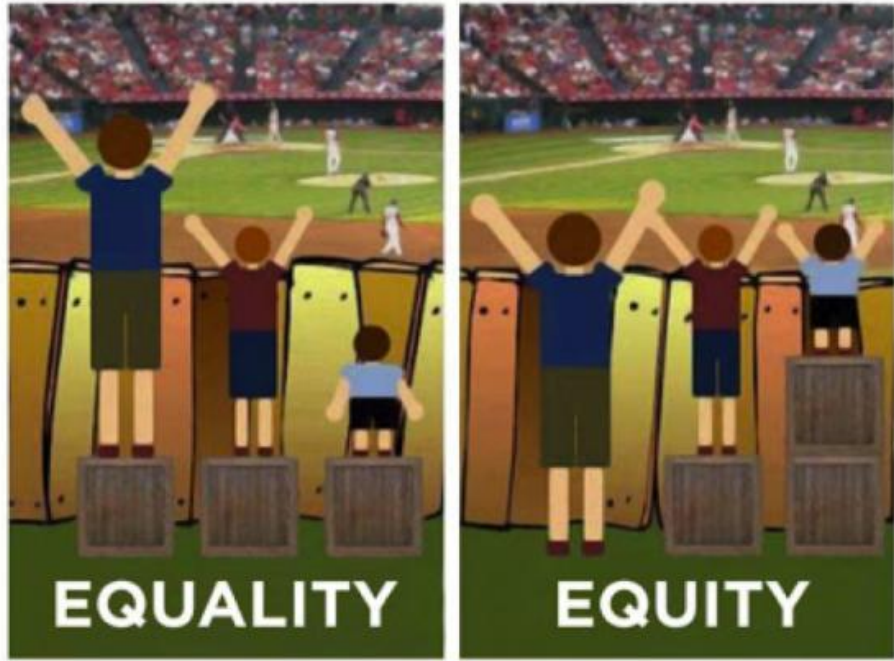
MATHEMATICAL LITERACY



Again, similar results to scientific literacy but lower mean scores!

(Thomson, De Bortoli & Underwood, 2016)

Issues



1. These students need more/different not the same as other students.

2. Ways of doing this so that it actually addresses the inequity and ↑ learning outcomes for these students while not disadvantaging other groups!!

3. Difficulty in targeting relevant students e.g. Indigenous students self-identify – alters from time to time!

4. Low SES, location and Indigeneity often interconnected so impacts are cumulative!

5. Student learning and achievement is impacted by multiple factors. So, single - simple solutions will not work!

students

teachers

Engagement

self efficacy

attitudes

confidence

motivation

interest

wellbeing

meaning
(relevance)

wellbeing - nutrition

support of
child's interests

parents

encouragement

**Student
learning**



valuing
education

meaningful curriculum

contextual approach

inquiry approach

stimulate higher-order
thinking

safe environment

value critical & creative thinking

set high expectations

positive role
models

societal value of
education

other

Beginnings of success?

Schools

- Share quality teachers among schools – e.g. Science and Maths Academy at Flinders (University) - sharing of expert teachers across schools in low SES and ‘hard to staff’ areas to ensure that physics, chemistry and mathematics are accessible to senior students.
- Support (\$) for schools to provide incentives to increase attendance rates of Indigenous students – this has actually improved.
- Targeting Indigenous health and wellbeing.

Universities

- Special funding to universities to increase the % of students from low SES and Indigenous backgrounds.
E.g., Outreach programs – help with transitioning between school and university. Scholarship availability!
- Focus on increasing students from these backgrounds into teacher education to provide positive role models – again, early days but there is some evidence of improvement.
- Emphasis on quality teaching for ALL students in preservice teacher education with a focus on dealing with *diversity in the classroom*.



What is lacking is a cohesive national strategic plan that links existing programs, agendas and sociological factors together to create a consistent and cohesive long-term educative plan based upon shared goals!

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