

## Performance Standards for Stage 2 Scientific Studies

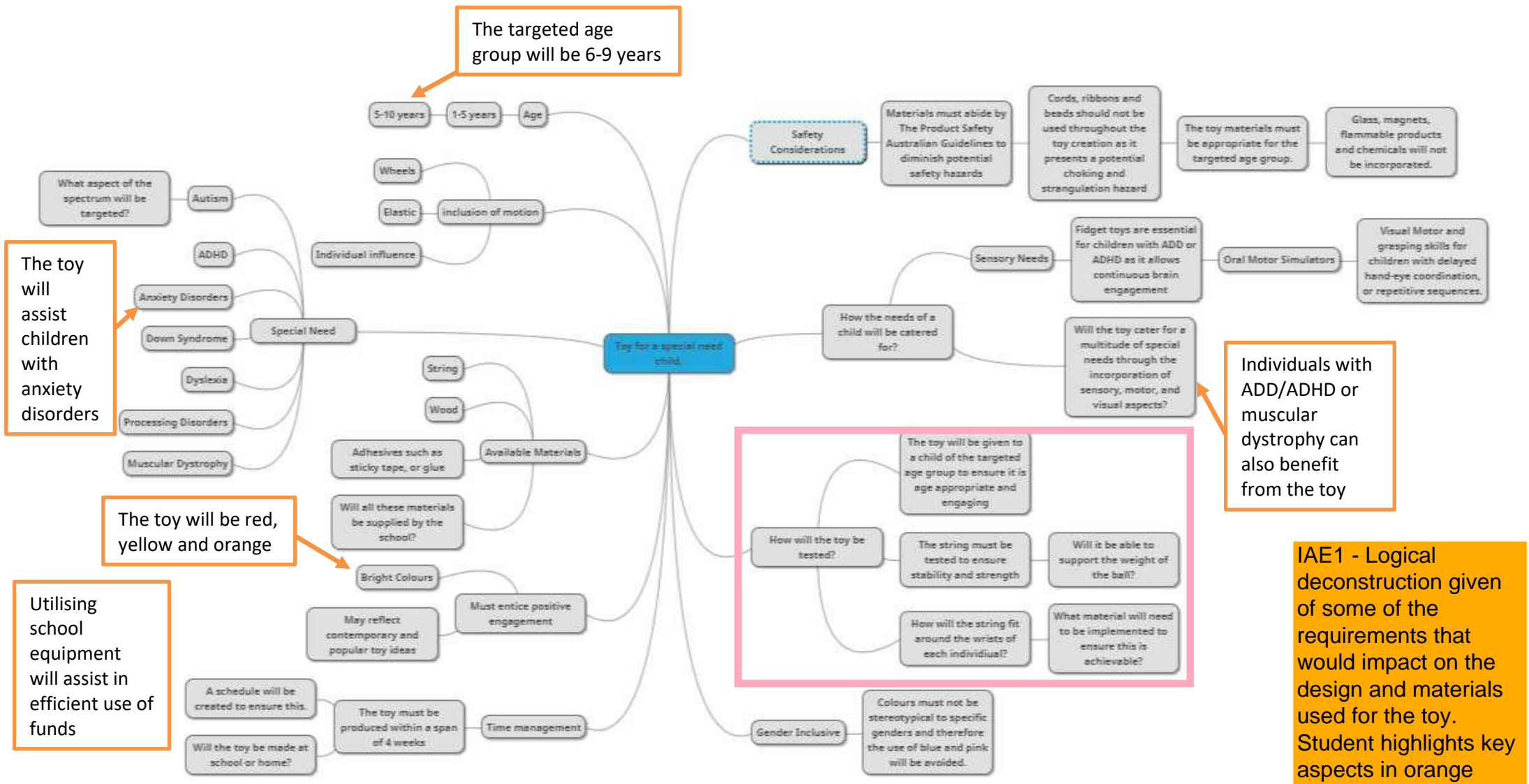
		A	B	C	D	E
Investigation, Analysis, and Evaluation	<p><b>Critically</b> deconstructs a problem and designs a <b>logical, coherent,</b> and <b>detailed</b> scientific investigation using a scientific method and/or engineering design process.</p>	<p><b>Logically</b> deconstructs a problem and designs a <b>well-considered and clear</b> scientific investigation using a <b>scientific method and/or engineering design process.</b></p>	Deconstructs a problem and designs a <b>considered</b> and <b>generally clear</b> scientific investigation using a scientific method and/or engineering design process.	Prepares a <b>basic</b> deconstruction of a problem and an <b>outline</b> of a scientific investigation using a scientific method and/or engineering design process.	<b>Attempts</b> a <b>simple</b> deconstruction of a problem and a procedure for a scientific investigation using a scientific method and/or engineering design process.	
	Obtains, records, and represents data, using <b>appropriate</b> procedures, conventions and formats <b>accurately</b> and <b>highly effectively</b> .	Obtains, records, and represents data, using <b>appropriate</b> procedures, conventions and formats <b>mostly accurately</b> and <b>effectively</b> .	Obtains, records, and represents data, using <b>generally appropriate</b> procedures, conventions and formats with <b>some errors</b> but <b>generally accurately</b> and <b>effectively</b> .	Obtains, records, and represents data, using procedures, conventions, and formats <b>inconsistently</b> , with <b>occasional accuracy</b> and <b>effectiveness</b> .	<b>Attempts</b> to use <b>some</b> procedures and record and represent <b>some</b> data, with <b>limited</b> accuracy or effectiveness.	
	<b>Systematically</b> analyses and interprets data and evidence to formulate <b>logical</b> conclusions with <b>detailed</b> justification.	<b>Logically</b> analyses and interprets data and evidence to formulate <b>suitable</b> conclusions with <b>reasonable</b> justification.	Undertakes <b>some</b> analysis and interpretation of data and evidence to formulate <b>generally appropriate</b> conclusions with <b>some</b> justification.	<b>Describes</b> data and undertakes <b>some basic</b> interpretation to formulate a <b>basic</b> conclusion.	<b>Attempts</b> to <b>describe</b> results and/or interpret data to formulate a <b>basic</b> conclusion.	
	<b>Critically</b> and <b>logically</b> evaluates procedures and their effect on data.	<b>Logically</b> evaluates procedures and their effect on data.	Evaluates procedures and <b>some</b> of their effect on data.	<b>Attempts</b> to evaluate procedures or <b>suggest</b> an effect on data.	<b>Acknowledges</b> that procedures affect data.	
	<b>Critically</b> and <b>perceptively</b> evaluates the effectiveness of collaboration and its impact on results/outcomes.	<b>Critically</b> evaluates the effectiveness of collaboration and its impact on results/outcomes.	Evaluates the effectiveness of collaboration and its impact on results/outcomes.	<b>Attempts</b> to evaluate the effectiveness of collaboration and its impact on results/outcomes.	<b>Acknowledges</b> the effectiveness of collaboration and its impact on results/outcomes.	
Knowledge and Application	Demonstrates <b>deep and broad</b> knowledge and understanding of a <b>range</b> of science inquiry skills and scientific concepts.	<b>Demonstrates some depth and breadth</b> of knowledge and <b>understanding of a range</b> of science inquiry skills and scientific concepts.	Demonstrates knowledge and understanding of a <b>general range</b> of science inquiry skills and scientific concepts.	Demonstrates <b>some basic</b> knowledge and <b>partial</b> understanding of science inquiry skills and scientific concepts.	Demonstrates <b>limited</b> recognition and <b>awareness</b> of science inquiry skills and/or scientific concepts.	
	Applies science inquiry skills and scientific concepts <b>highly effectively</b> in new and familiar contexts.	Applies science inquiry skills and scientific concepts <b>mostly effectively</b> in new and familiar contexts	Applies science inquiry skills and scientific concepts <b>generally effectively</b> in new or familiar contexts.	Applies <b>some</b> science inquiry skills and scientific concepts in <b>familiar</b> contexts.	<b>Attempts</b> to apply science inquiry skills and/or scientific concepts in <b>familiar</b> contexts.	
	<b>Critically</b> explores and understands in <b>depth</b> the interaction between science and society.	<b>Logically</b> explores and understands in <b>some depth</b> the interaction between science and society.	Explores and understands <b>aspects</b> of the interaction between science and society.	<b>Partially</b> explores and <b>recognises</b> aspects of the interaction between science and society.	<b>Attempts</b> to explore and identify <b>an aspect</b> of the interaction between science and society.	
	Communicates knowledge and understanding of science concepts coherently, with <b>highly effective</b> use of <b>appropriate</b> terms, conventions, and representations.	<b>Communicates knowledge and understanding of science concepts with mostly coherent and effective</b> use of <b>appropriate terms, conventions, and representations.</b>	Communicates knowledge and understanding of science concepts with <b>generally effective</b> use of <b>appropriate terms, conventions, and representations.</b>	Communicates basic scientific information, using <b>some</b> appropriate terms, conventions, and/or representations.	<b>Attempts</b> to communicate <b>information</b> about science.	

**Please note:**

- This is one task taken from a folio comprising of five tasks and may not be representative of the overall Folio grade.
- Notes in coloured text boxes are added to provide information and support for teachers. Parts of the student report have been highlighted with the colour that corresponds to the colour of the relevant text box.

# AT1 Inquiry Folio – Proposal

## Designing a toy for a child with special needs



This was a good opportunity to further explore how different aspects of the toy could be tested and establish success criteria for the product. For example, how would the student test the string strength? What units would this be measured in? What is the minimum strength needed for the choice of string?

IAE1 - Logical deconstruction given of some of the requirements that would impact on the design and materials used for the toy. Student highlights key aspects in orange

The task aims to create an educational toy of motion, which caters to the needs of a child who experiences mild to severe anxiety. To ensure the needs of anxiety are met, extensive research will be conducted in order to grasp a greater understanding of the disorder and the issues it presents to the psychological, social, and physical wellbeing of children. Through this greater knowledge, a toy will be crafted for an anxious child between the ages of 6-9, which provides a sense of comfort, security and reassurance, fundamentally aiding essential learning and rehabilitation.

Anxiety is a normal and healthy emotion which entails nervousness, fear, worry and apprehension, however, when an individual experiences overwhelming senses of anxiety which prevents, daily activity, social interactions, academic engagement and relationships, it may in fact be classed as a mental disorder (Felman, 2018). The condition is rapidly becoming increasingly common amongst children and teens, with a worrying 1 in 3 (36.6%) being diagnosed with the disorder (Centers for Disease Control and Prevention, 2019). To assist a child with anxiety a stress ball on a string will be crafted to offer a form of security, whilst simultaneously acting as an aid tool to manage the overwhelming and stressful tasks present in everyday life. Reassurance and familiarity will be incorporated within the toy through the string, which is able to be adjusted to fit a child's wrist, enabling the stress ball to remain connected to the individual. The sensory, fidget toy offers children a distraction from symptoms, providing a calming sensory experience, which ultimately releases tension. Although a fidget toy such as a stress ball will not cure anxiety, it undeniably encourages positive thoughts through a proficient, small toy that can be easily used anywhere, especially within a classroom setting.

The stress ball will entail warm colours such as red, yellow and orange to entice happiness and will display a 'positive' facial expression to ease nerves and act as a reassuring gesture (Gremillion, 2019). To aid sensory stimulation the 'happy' stress ball will have 'hair' constructed from chunky yellow yarn, which was specifically chosen due to its soft nature and its ability to stretch, which can distract a child from overwhelming worries.

Furthermore, the stress ball on a string will be infused with Lavender Essential Oil due to its relaxation effect which is widely believed to reduce anxiety and induce calming. A study published in Physiology and Behaviour in 2005, which focused on 200 individuals, awaiting a dental procedure, highlighted that breathing in the scent of lavender lessened anxiety and improved mood (Wong, 2019). This research evidently suggests that lavender oil can aid as a calming technique, and therefore will be beneficial to the success of the stress ball toy.

As the stress ball is linked to a child's wrist through a flexible, size adjustable string fastener, motion will indisputably become apparent as the toy is able to be used freely without the fear of it falling or rolling away. It can also be squeezed.

## Materials

The stress ball will be crafted through the use of;

- 1X Orange Balloon
- 1X size adjustable fastener
- 2X sheets of memory foam
- Yellow Chunky Yarn
- Red Elastic String
- 1X Black Texta
- Lavender Essential Oil

IAE1 - materials necessary for the solution are provided

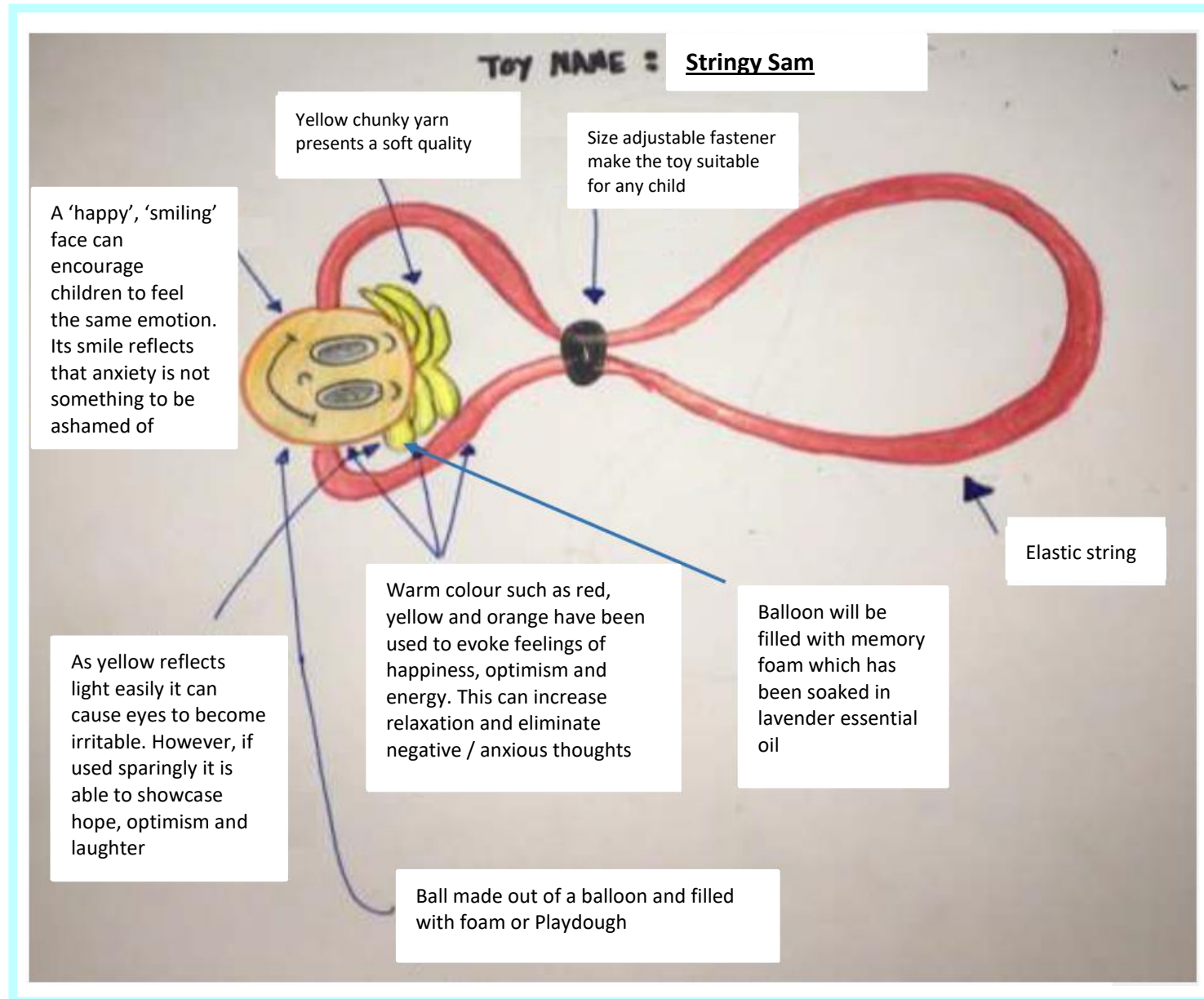
KA1 - demonstrates some depth of knowledge and understanding around mental health issues that justifies the need for this solution is provided.

KA4 - Use of research to justify the need and the design of the toy

IAE1 - some requirements of the toy have been provided. Some justification included.

Safety considerations must be acknowledged and further analysed in order to ensure no threats or potential hazards are inflicted upon a child's wellbeing. The Product Safety Australian Guidelines will be researched and closely obliged by to ensure this. The balloon can easily be cut posing a choking threat and exposes inside materials such as foam. As string presents a possible strangulation factor the toy will be targeted towards an age demographic of 6-9, due to a higher level of proficiency, awareness and greater responsibility.

## Diagram



IAE1 - Reference made to product testing for safety. Specific details of what will be tested and how this will be done (and what data will be collected) is unclear.

IAE1 - Use of annotated image helps to show what the the end result (solution) might look like on completion.

How might these be collected and what information might this provide you with?

To sufficiently test the durability of the stress ball toy, the type of string must be well considered to determine stability and resilience, which suggests how long the toy will remain functioning. The toy must portray resilience as it is crafted specifically towards children who may cause damage. The testing process may also entail the toy being arranged to a child between the targeted age group of 6-9. Through observing the attitudes displayed to the designed toy, it will identify whether or not the string stress ball is age appropriate, fun, engaging and calming, factors all significantly crucial to the emotional wellbeing of a child with anxiety.

IAE1 - suggests that product testing to measure durability of the toy and user satisfaction will be carried out, although this is not explained.

## References

- Centers for Disease Control and Prevention. (2019). Data and Statistics on Children's Mental Health. [online] Available at: <https://www.cdc.gov/childrensmentalhealth/data.html> [Accessed 2 Jul. 2019].
- Felman, A. (2018). What to know about anxiety. [online] Medical News Today. Available at: <https://www.medicalnewstoday.com/articles/323454.php> [Accessed 2 Jul. 2019].
- Gremillion, A. (2019). How color impacts emotions and behaviors. [online] 99designs. Available at: <https://99designs.com.au/blog/tips/how-color-impacts-emotions-andbehaviors/> [Accessed 1 Jul. 2019].
- Wong, C. (2019). The Health Benefits of Lavender Essential Oil. [online] Verywell Mind. Available at: <https://www.verywellmind.com/lavender-for-less-anxiety-3571767> [Accessed 1 Jul. 2019].

KA4 - communicates evidence of scientific research using conventional format

Those choosing investigations using an engineering design process for the Individual Inquiry should note that IAE2 "Obtaining and representing data" is one of the Performance Standards that must be assessed in the External component. Students need to consider what they will test for in their product or components, how they will measure this and how it will inform new iterations of the product.

Please be aware that changes to the assessment requirements for 2020 means that the 750 words writing limit has now been replaced by a limit of four A4 pages. For further information, please check the current Subject Outline on the SACE Board website.