Assessment Schedule AS91522 v2 (Physics 3.2): Waka Ama

Evidence/Judgements for Achievement	**Evidence/Judgements for Achievement with Merit**	**Evidence/Judgements for Achievement with Excellence**
The student relates the key physics ideas to the selected context.	The student explains how or why the physics applies in the selected context.	The student links key physics ideas together to provide a coherent picture of the physics relevant to the selected context. This will typically involve elaborating, justifying, relating, evaluating, comparing and contrasting or analysing how physics applies in their context.
For example, a student should:	For example, a student should:	For example, a student should:
• Identify the sources of torque on the waka while racing. • Recognise the relationship between Torque, τ, the size of the forces, and the perpendicular distance from the line of force to the pivot joint. $\tau = Fr$	• Explain how a paddler can create a torque acting on their waka, and how it affects its angular acceleration. • Explain how the position of the centre of mass affects the stability of the waka.	• Give a comprehensive and complete explanation of the forces that contribute to a good race at a Waka Ama regatta. • Give a comprehensive and complete explanation for how the stability of the waka is maintained with external torques. Identify important axes in the waka about which these torques act. Identify which torques will affect the direction of the waka and how they do this.

• Recognise how to find the centre of mass of a waka ama with paddlers. $$X_{com} = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$$ • Recognise that angular momentum will be conserved during the motion of waka ama with no external torques. • Recognise the relationship between angular acceleration and rotational inertia. • Recognise that a change in rotational inertia will change the angular speed.	• Explain how angular momentum is maintained at 0 throughout the race. • Explain why angular momentum should be conserved by the paddlers. • Explain how changing the rotational inertia affects the angular speed.	• Give a comprehensive and complete explanation for how the conservation of angular momentum is maintained by balancing torques and how that contributes to a faster race.
• Recognise that the centre of mass is pivotal to any rotational movement of the waka.	• Explain how conservation of angular momentum is the critical issue to stability of the waka and how the position of the centre of mass factors in. • Explain how the distribution, posture, and weight of the paddlers can affect the position of the centre of mass.	• Give a comprehensive and complete explanation for how angular momentum is conserved and how the centre of mass affects the stability and speed of the waka.

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.