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| **UNIT TITLE: JAPANESE RAIL AND THE SHINKANSEN** |
| **OBJECTIVES** |
| **Achievement Objectives:** Students will gain knowledge, skills, and experience for:**PART OF:****Achievement Standard 91171- Demonstrate Aspects of Mechanics** (6 Credit External Assessment) **AND ALL OF:****Achievement Standard 91169- Demonstrate Understanding of Physics Relevant to a Selected Context** (3 Credit Internal Assessment) **NOTE:** Specific objectives are listed below in more detail | **Year Level: 12****Curriculum level: 7 (NCEA Level 2 Physics)****Unit Duration:** **AS91171**- approximately 4 weeks of class time - **note this is not a standalone unit for teaching AS91171 in its entirety**. It is designed to either complement existing resources or to be utilized as the foundation resource which a teacher could add to and personalize to cover the entire Achievement Standard.**AS91169**- approximately 4 weeks of research and write-up time (mostly carried out outside of class time). It is suggested that this is scheduled to occur after the Electricity & Electromagnetism Achievement Standard so that students have an understanding of electric motors. |
| **INTEGRATION INTO OTHER LEARNING AREAS** |
| Partly applicable for integration with other learning areas- L2 Geography / History Achievement Standards could look at other aspects of the Japanese Shinkansen networkL2 Mathematics- a lot of the mathematical skills utilized in solving Physics problems are also necessary for success in L2 Mathematics Achievement Standards. |
| **Values:**ExcellenceInnovation, inquiry, and curiosityDiversityEquityCommunity and participation Ecological sustainabilityIntegrityRespect  | **Key Competencies:**[Thinking](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Key-competencies#thinking)[Using language, symbols, and texts](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Key-competencies#language)[Managing self](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Key-competencies#managing)[Relating to others](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Key-competencies#relating)[Participating and contributing](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Key-competencies#participating) | **Principles:**[**High expectations**](http://nzcurriculum.tki.org.nz/Principles/High-expectations)  [**Treaty of Waitangi**](http://nzcurriculum.tki.org.nz/Principles/Treaty-of-Waitangi)[**Cultural diversity**](http://nzcurriculum.tki.org.nz/Principles/Cultural-diversity)[**Inclusion**](http://nzcurriculum.tki.org.nz/Principles/Inclusion)  [Learning to learn](http://nzcurriculum.tki.org.nz/Principles/Learning-to-learn)[Community engagement](http://nzcurriculum.tki.org.nz/Principles/Community-engagement)[Coherence](http://nzcurriculum.tki.org.nz/Principles/Coherence) [**Future focus**](http://nzcurriculum.tki.org.nz/Principles/Future-focus) |
| **Assessment Opportunities:**PART OF: AS 91171- Demonstrate Aspects of Mechanics (6 Credit External) – **Specific parts outlined below** AND ALL OF: AS 91169- Demonstrate Understanding of Physics Relevant to a Selected Context (3 Credit Internal)  |
| **Unit Focus:** -NCEA Level 2 Physics Mechanics (AS 91171)-NCEA Level 2 Physics Relevant to a Selected Context (AS 91169) | **Context:** NCEA Level 2 Physics Mechanics (AS 91171)-NCEA Level 2  |
| **Section One:** **Achievement Standard 91171- Demonstrate Aspects of Mechanics** (6 Credit External Assessment)  |
| **Achievement Objectives** | **Teaching Material Link** |
| *By the end of this unit students should be able to demonstrate knowledge and understanding of:*Motion• Constant acceleration in a straight line • Circular motion (constant speed with one force only providing centripetal force). Force• Force components • Vector addition of forces • Unbalanced force and acceleration • Equilibrium (balanced forces and torques) • Centripetal forceMomentum and Energy • Momentum• Change in momentum in one dimension and impulse • Impulse and force• Conservation of momentum in one direction  | **The Microsoft PowerPoint titled, ‘Mechanics: Japanese Rail & the Shinkansen’ works through the aspects of this Achievement Standard that are listed in the Achievement Objectives.** **NOTE:** These documents do not cover all aspects of AS91171 but are designed to be used as a way to give real life context to many of the concepts in NCEA Level 2 Physics.They are designed to either: * compliment what a teacher already uses in their teaching of AS91171

 or* be built upon by a teacher developing their delivery AS91171

It is assumed that alongside these teaching resources one of the quality workbooks available for NCEA Level 2 Physics would be used. |
| **Section Two:** **Achievement Standard 91169- Demonstrate Understanding of Physics Relevant to a Selected Context** (3 Credit Internal Assessment)  |
| **Achievement Objective** | **Teaching Material Link** |
| *By the end of this unit students should be able to demonstrate understanding of Physics relevant to the context of the SC Maglev (magnetic levitation railway system).**From the NZQA Achievement Standard 91169 document:**At Achieved Level:**Demonstrate understanding* involves providing characteristics of, or an account of the physics related to the selected context.*At Merit Level:**Demonstrate in-depth understanding* involves providing reasons as to how or why the physics applies to the selected context.*At Excellence Level:**Demonstrate comprehensive understanding* involves linking ideas to integrate physics relevant to the selected context, and involves elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing the physics underpinning the context.*Note:*The *selected context* must involve physics principles that are at curriculum Level 7. It can be technological or biological. Many aspects of the physics of the SC Maglev magnetic levitation train, in particular the role electromagnetism plays in its function, relate well to the curriculum Level 7 physics principles.  | The Microsoft Word document titled, ‘Asia New Zealand Foundation AS91169 Physics 2.2- Shinkansen of the Next Generation: SCMaglev’ has a complete set of teacher and student instructions along with a mark schedule for this task. |