Waka Kotahi rail safety resource

# Internet links

## General rail links

[TrackSAFE](https://www.tracksafe.co.nz/) Not-for-profit that raises awareness and educates about safety around tracks and trains.

[KiwiRail](https://www.kiwirail.co.nz/)

[Great Journeys New Zealand](https://www.greatjourneysnz.com/)

[Auckland train network (Auckland Transport)](https://at.govt.nz/bus-train-ferry/train-services/auckland-train-network/)

[Metlink](https://www.metlink.org.nz/) Wellington’s public transport network, including rail.

[Rail (Waka Kotahi)](https://nzta.govt.nz/roads-and-rail/rail/) Waka Kotahi has primary regulatory responsibility for rail safety.

[City Rail Link](https://www.cityraillink.co.nz/)

## Electric trains

[Electric trains (Auckland Transport)](https://at.govt.nz/projects-roadworks/electric-trains/)

[Auckland’s electric trains: features (YouTube)](https://www.youtube.com/watch?v=OejJf5TujMY)

[First Test Run for Auckland's New Train (YouTube)](https://www.youtube.com/watch?v=wdEAZbGlAFs)

[Johnsonville Line, Driver’s Eye View filmed with a GoPro Hero 2 Camera](https://www.youtube.com/watch?v=_tq5ljQquLo)

[Bringing electric trains to Pukekohe (KiwiRail)](https://www.kiwirail.co.nz/our-network/our-regions/amp/papakura-to-pukekohe-electrification/)

[Southern Stations (3 new stations for Auckland)](https://www.kiwirail.co.nz/our-network/our-regions/amp/drury-rail-stations/)

[The Third Main Line for Auckland](https://www.kiwirail.co.nz/our-network/our-regions/amp/the-third-main-line/)

[Wellington Metro Upgrade Programme](https://www.kiwirail.co.nz/our-network/our-regions/wellington/the-programme-in-detail/)

## Places on the rail network

[Great Journeys NZ rail trips YouTube channel](https://www.youtube.com/user/KiwiRailScenic)

[How to stay safe at railway level crossings (Drive, Waka Kotahi)](https://www.youtube.com/watch?v=uXZA6zgSRsg)

[Living by the rail network (KiwiRail)](https://www.youtube.com/watch?v=azg4iG5MWdE)

[Track Talk (school students interview KiwiRail locomotive engineers)](https://www.youtube.com/watch?v=rrePZGR61gE) Includes discussion on the safe places to cross the tracks.

[City Rail Link Overview Animation (Auckland’s underground railway)](https://www.youtube.com/watch?v=K_fUHRpj708)

[Meet your stations (City Rail Link)](https://www.youtube.com/watch?v=CaFhKGHfsvo)

[From the train driver's seat: Kingsland to Grafton Auckland train journey 2022 (City Rail Link)](https://www.youtube.com/watch?v=lyTQg7sGl8w)

[CRL Auckland Chief Post Office – restored and reborn](https://www.youtube.com/watch?v=TVu1i2pryls)

[The new Puhinui Station is now open (Auckland Transport)](https://www.youtube.com/watch?v=W3W3c4BxzFg)

[Raurimu Spiral from Above Volume 2](https://www.youtube.com/watch?v=oH_AbzlN-Wc)

[24 hours at KiwiRail's Westfield freight terminal, Otāhuhu Auckland (our busiest rail freight terminal)](https://www.youtube.com/watch?v=O_4hSeiV0mI)

[KiwiRail Freight operations at Mosgiel distribution centre](https://www.youtube.com/watch?v=CkrsXDQOKTc)

[Experience Te Huia (Hamilton to Auckland train)](https://vimeo.com/542435341?embedded=true&source=vimeo_logo&owner=137437305)

[KiwiRail Makatote Viaduct Project](https://www.youtube.com/watch?v=aM_ZsOFc_O4)

[Trentham pedestrian underpass construction timelapse (KiwiRail)](https://www.youtube.com/watch?v=_ocwg4Gotls)

## Rail network maps

[Auckland Train Network map](https://at.govt.nz/media/1972914/auckland-train-network-march-2017-large-view.pdf)

[KiwiRail Network Map (ArcGIS)](https://www.arcgis.com/apps/View/index.html?appid=556c4a9c73914fe1983529ddf9ae5099)

[Wellington rail network map](https://www.metlink.org.nz/assets/Network-maps/RegionalRailNetwork.pdf)

[Maps of the National Rail Network (UK)](https://www.nationalrail.co.uk/stations_destinations/rail-maps.aspx)

[India Railway Map](https://indiarailinfo.com/atlas)

[London Tube Map](https://content.tfl.gov.uk/standard-tube-map.pdf)

[City Rail Link maps](https://www.cityraillink.co.nz/route-map)

[Take a walk through all the CRL stations](https://www.cityraillink.co.nz/auckland-city-rail-link-crl-train-stations)

[Newmarket Station map](https://at.govt.nz/media/1980794/at-metro-newmarket-train-station-physical-layout-and-facilities.pdf)

## Monitoring the safety of tracks

[Network Rail: The New Measurement Train](https://www.youtube.com/watch?v=WhVdTXh5XoA)

[Dr Yellow – Japan](https://en.wikipedia.org/wiki/Doctor_Yellow)

[Iris 320 – France](https://en.wikipedia.org/wiki/SNCF_TGV_Iris_320)

[Track fleet: machines and specialist trains (KiwiRail)](https://www.kiwirail.co.nz/our-network/looking/track/track-fleet/)

## History of New Zealand’s railways

[Te Ara: Building the Rail Network](http://www.teara.govt.nz/en/railways/page-1)

[Archives NZ: Railways of the Pacific Wonderland 1939](https://www.youtube.com/watch?v=yQv7P4VA4mI)

Other useful New Zealand sites include:

[DigitalNZ](https://digitalnz.org/) Search 30+ million New Zealand items across 300+ collections in one place.

[Te Ara The Encyclopedia of New Zealand](http://www.teara.govt.nz/)

[New Zealand History](https://nzhistory.govt.nz/)

[Ngā Taonga Sound & Vision](https://www.ngataonga.org.nz/) New Zealand’s film and TV archive

[Heritage New Zealand](https://www.heritage.org.nz/)

[Te Ara: Railways](https://teara.govt.nz/en/railways)

[Te Ara: Bridges and Tunnels](https://teara.govt.nz/en/bridges-and-tunnels)

[Rail history (KiwiRail)](https://www.kiwirail.co.nz/communities/rail-heritage/rail-history/)

[New Zealand History – Railways](https://nzhistory.govt.nz/keyword/railways)

[Off the tracks: New Zealand's lost railway network (RNZ)](https://www.rnz.co.nz/national/programmes/sunday/audio/2018821410/off-the-tracks-new-zealand-s-lost-railway-network)

[Rail Transport in New Zealand (Wikipedia)](https://en.wikipedia.org/wiki/Rail_transport_in_New_Zealand)

[Wikipedia: North Auckland Line](https://en.wikipedia.org/wiki/North_Auckland_Line)

[Wikipedia: Stratford–Okahukura Line](https://en.wikipedia.org/wiki/Stratford%E2%80%93Okahukura_Line)

[Wikipedia: Wairarapa Line](https://en.wikipedia.org/wiki/Wairarapa_Line)

[Wikipedia: Palmerston North–Gisborne Line](https://en.wikipedia.org/wiki/Palmerston_North%E2%80%93Gisborne_Line)

[Johnsonville Railway history by Raroa Intermediate students](https://www.livingheritage.org.nz/schools/intermediate/raroa/johnsonville/index.php)

## History: maps

[National Library of New Zealand: Cartographic Collection](https://natlib.govt.nz/collections/a-z/cartographic-collection)

[Te Ara: Early Map of Auckland 1859](https://teara.govt.nz/en/zoomify/8704/early-map-of-auckland)

[Auckland City Library: Heritage Maps](https://kura.aucklandlibraries.govt.nz/digital/collection/maps/)

[Te Ara: Early Mapping](https://teara.govt.nz/en/early-mapping)

[Hocken Library: University of Otago Maps](https://www.otago.ac.nz/library/exhibitions/he_tirohanga_ki_muri/images.html#maps)

## Safety

[Gamification to increase site safety (LEARNZ)](https://vimeo.com/736722889?embedded=true&source=vimeo_logo&owner=18869783)

[Improving safety with virtual reality training (LEARNZ)](https://vimeo.com/736720533?embedded=true&source=vimeo_logo&owner=18869783)

[Live Wire](http://youtu.be/2TQ6QCs4rqo) (Public safety video about Auckland’s overhead wires)

[Be safe around electric trains (YouTube, Auckland Transport)](https://www.youtube.com/watch?v=sq_O7O8wRho)

[Safety around trains, stations & tracks (Auckland Transport)](https://at.govt.nz/bus-train-ferry/train-services/safety-around-trains-stations-tracks/)

[Train stations pedestrian level crossing](https://at.govt.nz/projects-roadworks/train-stations-pedestrian-level-crossing/) Auckland Transport and KiwiRail are installing automatic safety swing gates to keep pedestrians safe at stations across the city.

[Overhead wires (TrackSAFE)](https://www.tracksafe.co.nz/safety/infrastructure/overhead-wires)

[Overhead Line Electrification (OLE) for Railways – 5 common questions (AlphaRail NZ)](https://www.alpharail.co.nz/overhead-line-electrification-ole-for-railways/)

[Level crossings (KiwiRail)](https://www.kiwirail.co.nz/our-network/looking/level-crossings/)

[Platforms and stations (TrackSAFE)](https://www.tracksafe.co.nz/safety/pedestrians-courses/platforms-and-stations)

[Pedestrian safety advice (TrackSAFE)](https://www.tracksafe.co.nz/safety/pedestrians-courses/pedestrians-advice)

## Future transport

[Faster, cleaner, greener: What lies ahead for the world’s railways (CNN)](https://edition.cnn.com/travel/article/future-rail-travel-cmd/index.html)

[Amazon Prime Air drone deliveries](https://www.aboutamazon.com/news/transportation/amazon-prime-air-prepares-for-drone-deliveries)

[The Martin Jetpack](https://en.wikipedia.org/wiki/Martin_Jetpack) New Zealand-based attempt at a single-person aircraft

[Future of Rail (Ministry of Transport)](https://www.transport.govt.nz/area-of-interest/infrastructure-and-investment/future-of-rail/)

# Science resources

## Games and creativity

[Wire loop game tutorial (Instructables)](https://www.instructables.com/Wire-Loop-Game-Tutorial/)

[Buzz Wire (YouTube)](https://www.youtube.com/watch?v=4g7TBXnLucA)

[How To Make A Wire Loop Game At Home Easily (YouTube)](https://www.youtube.com/watch?v=aKevnVfxXnM)

[Subatomic particle plushies (The Particle Zoo)](https://www.particlezoo.net/index.html)

[Giant Microbes](https://www.giantmicrobes.com/us/)

[Instructables: A Simple Circuit Game](https://www.instructables.com/A-Simple-Circuit--Game/)

[Instructables: Build a Simple Circuit from a Pizza Box](https://www.instructables.com/Build-a-Simple-Circuit-from-a-Pizza-Box-No-Solder/)

[Instructables: How to Make a Custom Operation Game](https://www.instructables.com/Build-a-Simple-Circuit-from-a-Pizza-Box-No-Solder/)

[Giant Buzz Wire Game](https://www.youtube.com/watch?v=_gfSxVIXH2M)

[Make an electronic circuit game (Jaycar Maker Hub)](https://www.jaycar.co.nz/make-an-electric-circuit-game)

[Buzz The Pup – DIY Circuit Game STEM Project](https://www.steampoweredfamily.com/buzz-circuit-game-stem-project/)

## Pantographs

[Pantograph and Overhead Wire (YouTube)](https://www.youtube.com/watch?v=gE-HCIdxWuc)

[Pantograph Arcing at 27,000V (YouTube)](https://www.youtube.com/watch?v=tYjIRgMHwpI)

[The amazing mechanics of the pantograph (YouTube)](https://www.youtube.com/watch?v=guviXc3kluo)

[Sparking Matangi Electric Train at Silverstream, Upper Hutt, New Zealand (YouTube)](https://www.youtube.com/watch?v=sPxG4W4mDhE)

[High Speed Beaujolais and Pantograph Action (TGV in France)](https://www.youtube.com/watch?v=A0G14ee3tR8)

## Electrical circuits

[Engineering Expert Figure 1 – Electric Railway Car Propulsion System](http://www.engineeringexpert.net/Engineering-Expert-Witness-Blog/regenerative-brakes)

[TES Teachers TV electricity circuits](https://www.tes.com/teaching-resource/teachers-tv-electricity-circuits-6082869)

[Furry Elephant: Electric Circuit Analogies](https://www.furryelephant.com/content/electricity/teaching-learning/electric-circuit-analogies/)

[Paper Circuit!](https://www.youtube.com/watch?v=BwKQ9Idq9FM)

[Introduction to Circuits (BBC Bitesize)](https://www.bbc.co.uk/bitesize/topics/zgy39j6/articles/zjm8kty)

[PhET Interactive Simulations Circuit Construction Kit](https://phet.colorado.edu/en/simulations/circuit-construction-kit-dc) This lets students design and test electrical circuits in a web-based simulation. Easy to use.

[Squishy Circuits (Maker Spaces)](https://www.makerspaces.com/squishy-circuits/) Create circuits and explore electronics using play dough.

[TED Talks: Hands on Science with Squishy Circuits](https://www.ted.com/talks/annmarie_thomas_hands_on_science_with_squishy_circuits?language=en)

[How can you change a circuit? (BBC Bitesize)](https://www.bbc.co.uk/bitesize/topics/zkj8rj6/articles/zt8vg82)

[Which of these materials make the lights go on? (TKI Science Online)](https://scienceonline.tki.org.nz/Nature-of-science/Nature-of-science-teaching-activities/Which-of-these-materials-make-the-light-go-on)

[18 science lessons to teach circuits](https://www.sciencebuddies.org/blog/circuits-lessons)

[Communicating with symbols (Science Learning Hub)](https://www.sciencelearn.org.nz/resources/1614-communicating-with-symbols)

[Challenging switches (Science Learning Hub)](https://www.sciencelearn.org.nz/resources/1615-challenging-switches)

## Electrical energy

[Electricity Glossary](https://www.ducksters.com/science/physics/electricity_glossary_and_terms.php)

[Energy stores (BBC Bitesize)](https://www.bbc.co.uk/bitesize/topics/zc3g87h/articles/zg2sn9q)

[Energise Anything activity centre](https://www.eonenergy.com/about-us/community-matters/energise-anything/animations-and-activities.html)

[Should a Person Touch 200,000 Volts? A Van de Graaff Generator Experiment](https://www.youtube.com/watch?v=ubZuSZYVBng&list=PL41778092B7768366)

[Static Electricity: Van de Graaff Generator](https://www.youtube.com/watch?v=rNEY3Yv9kC8)

[Steve Spangler Science – floating static bands](https://www.stevespanglerscience.com/lab/experiments/floating-static-bands/)

[Electroscope science experiment](https://www.youtube.com/watch?v=xanDes0tLOY)

[It’s True: Electric Eels Can Leap From the Water to Attack | National Geographic](https://www.youtube.com/watch?v=cQrEsq19TBY)

[Electric Eel: Moody Institute of Science (1954 Educational Film)](https://www.youtube.com/watch?v=NNZmlcBpRLw)

[Electric Eel Christmas Tree](https://www.youtube.com/watch?v=8oS9YuGIWMU)

## Student misconceptions about electricity

[Common Misconceptions regarding Electric Currents](https://www.physicsclassroom.com/class/circuits/u9l2e.cfm)

[Furry Elephant: Common Misconceptions about Electricity](http://www.furryelephant.com/content/electricity/teaching-learning/misconceptions/)

[Common misconceptions: Electricity (Primary Science Teaching Trust)](https://pstt.org.uk/application/files/5915/2717/3121/Common_Misconceptions_Spring_2018.pdf)

## Electricity and safety

[Static electricity destroyed Hindenburg](https://www.stuff.co.nz/science/8389214/Static-electricity-destroyed-Hindenburg)

[Staying safe at the pump (American Petroleum Institute)](https://www.api.org/oil-and-natural-gas/consumer-information/consumer-resources/staying-safe-pump)

[The science of lightning (National Geographic)](https://www.youtube.com/watch?v=h-0gNl5f4BU)

[Lightning Strike at 103,000 Frames per second (the Slow Mo Guys)](https://www.youtube.com/watch?v=qQKhIK4pvYo)

[BEST LIGHTNING STRIKES - Top 10 Countdown](https://www.youtube.com/watch?v=ebxOTBwTZHM)

[Electric shock – low voltage current (St John UK)](https://www.sja.org.uk/get-advice/first-aid-advice/minor-illnesses-and-injuries/low-voltage-electrocution/)

[Electrical safety at home (WorkSafe)](https://www.worksafe.govt.nz/managing-health-and-safety/consumers/safe-living-with-electricity/what-to-do-in-an-electrical-emergency/)

# Maths resources

## Networks

[Math Insight: An Introduction to Networks](https://mathinsight.org/network_introduction)

[Passy World of Mathematics: Network Mathematics](https://passyworldofmathematics.com/network-mathematics/) Includes rail example.

[NRICH: Delia’s Routes](https://nrich.maths.org/202)

[NRICH: Networks and Nodes](https://nrich.maths.org/1068)

## Orientation, directions, distances

[How to use a compass (NZ Mountain Safety Council)](https://www.youtube.com/watch?v=FfE3shVPyZs)

[How to use a compass (WikiHow)](https://www.wikihow.com/Use-a-Compass)

[HowStuffWorks: Which Is Better for Navigation – compass or GPS?](https://adventure.howstuffworks.com/outdoor-activities/hiking/compass-or-gps.htm#pt1)

[Track Tests – Wretch 32 and George the Poet](https://www.youtube.com/watch?v=N4ul6lh0XQ8)

## Other

[How can you measure the height of a tall tower? (HowStuffWorks)](https://science.howstuffworks.com/engineering/structural/question379.htm)

[Strange Maps](https://bigthink.com/strange-maps/)

[100 amazing maps of the world](https://www.farandwide.com/s/amazing-world-maps-74d6186e6d0e414b)

# English resources

[TKI Exemplars: Written Language: Argument](https://www.tki.org.nz/r/assessment/exemplars/eng/trans/index_e.html)

[Arguing a point (TKI ESOL Online)](https://esolonline.tki.org.nz/Media/Files/AB-Files/Arguing-a-Point2)

[Persuasive writing lesson – OREO – Opinion reason explanation opinion](https://www.australiancurriculumlessons.com.au/2012/11/09/persuasive-writing-lesson-oreo-opinion-reason-explanation-opinion/)

[Persuasive writing: Can You Convince Me? (ReadWriteThink)](https://www.readwritethink.org/classroom-resources/lesson-plans/convince-developing-persuasive-writing)

[Evidence-based argument lesson plans (Varsity Tutors)](https://www.varsitytutors.com/englishteacher/argument.html)

## Online argument mapping frameworks

[Rationale](https://www.rationaleonline.com/)

[DebateGraph](https://debategraph.org/Stream.aspx?nid=61932&vt=ngraph&dc=focus)

[Mindmup](https://www.mindmup.com/tutorials/argument-visualization.html)

# Arts

## Rube Goldberg machines

[Joseph’s Machines](https://www.josephsmachines.com/)

[I built a machine to wash my hair](https://www.youtube.com/watch?v=lLruc27jrOg)

[The Rube Goldberg Institute](https://www.rubegoldberg.org/)

[How to get there](https://www.leunig.com.au/index.php/works/poems) (Poem)

# Learning tools

## Graphic programmes

[Tux Paint](http://www.tuxpaint.org)

[Draw.To](http://draw.to/new)

[ABCya Paint](http://www.abcya.com/abcya_paint.htm)

[One Motion](https://www.onemotion.com/sketch-paint/)

[Sketchup Free](https://www.sketchup.com/plans-and-pricing/sketchup-free)

## Open source images

[Openverse](https://openverse.org/)

[Pics4Learning](https://www.pics4learning.com/index.php)

[Great Journeys of New Zealand brand kit](https://media.greatjourneysofnz.co.nz/)

## Sound effects

For pre-recorded train sound effects, refer to:

[Sound Jay](https://www.soundjay.com/train-sound-effect.html)

[Freesound](https://freesound.org/search/?q=trains)

[SoundBible](https://soundbible.com/1618-Freight-Train.html)

## SOLO Taxonomy

[Solo Hexagon Generator](https://pamhook.com/solo-apps/hexagon-generator/)

[HOT SOLO Analyse map](https://pamhook.com/tools/SelfAssessment.html#slide3,Analyse)

[HOT SOLO Generalise/In my opinion frame and self-assessment rubric](https://pamhook.com/tools/SelfAssessment.html#slide3,Generalise)

[HOT SOLO Evaluate/Argument frame and self-assessment rubric](https://pamhook.com/tools/SelfAssessment.html#slide3,Evaluate)