

Lesson 3: Planning investigations

Please refer to teacher notes for a list of the English Curriculum links

TrackSAFE outcomes of this lesson

Students should be able to:

- **Describe** what they themselves need to do to stay safe on the train network
- **Explain** why they need to do those things
- **Teach** others how to stay safe near trains and tracks

3.0 Whole class learning session (10mins)

Preparation/resources: Whiteboard or electronic whiteboard

Explain to students they will be planning for an investigation which they will conduct in the following lesson. With the class:

- **Discuss** the different types of investigations e.g. research, survey, interview.
- **Discuss** the purpose of an investigation.
- **Discuss** the purpose of making a plan for an investigation, including:
 - Why plans are necessary
 - The importance of thorough planning before conducting an investigation
 - How plans help save time in the long term
 - The elements a plan should include e.g. defining the topic to investigate; establishing a methodology; setting up the investigation; establishing a time frame; conducting the investigation; collating the results; analysing and reflecting on the results; reporting on the results.
- **Work with** students throughout the lesson to determine a suitable time frame and methodology to conduct their investigations in the next lesson.

Activities

You can allocate the following activities to groups according to student learning needs.

You can also allow students to choose activities themselves. All activities provide guidance to students so they can be completed independently. These can be read to the groups if not appropriate to their reading level.

Activities are designed so that students can complete their chosen activity within a one hour lesson. Each group can be working on different activities at the same time, or choose to do the same activity.

Activity 3.1 Writing a plan: barriers to hearing (40mins)

Preparation/resources: Writing materials or computer/tablet

Develop a learning intention and success criteria for writing a plan for an investigation.

Ask students to:

- **Identify** the different sounds heard when walking to catch a train and waiting for it to arrive at a station.
- **List** the sounds.
- **Sort** (classify) the sounds into sounds we need to hear to be safe, and other sounds.
- **Think** about all the ways we can limit the sounds we hear.
- **Describe** all the barriers to hearing sounds at a railway station. For example, people may be hearing impaired, have hats or scarves covering their ears, be listening to music using ear buds or simply engrossed in conversation, either on a mobile phone or in person.
- **Choose** a barrier to hearing that is relevant to young people in your local community.
- **Explain** why you think this could make the young person in your community unsafe around tracks and trains.
- **Write a plan** to find out the extent to which this barrier blocks out the noises young people need to hear to keep safe.
- **Reflect** on how well your plan meets the success criteria for writing a plan.

Note: There is a collection of sounds that might be helpful to your investigation in the [‘TrackSAFE Sounds’](#) playlist on TrackSAFE Education You Tube channel.

Extension: Find out why people are predicting that Noise Induced Hearing Loss (NIHL) may be an increasing problem for train users in the future.

Provide opportunities for drafting, proof reading, conferencing, and publishing, when writing the plan.

Activity 3.2 Creating a survey: peer pressure (40mins)

Preparation/resources: Writing materials or computer/tablet

Develop a learning intention and success criteria for writing and planning for a survey.

Ask students to read the following scenario and complete the activities:

Sometimes doing the right thing is difficult. We know how to be safe but we end up making an unsafe choice when we are with others.

- **Think** about a time when you have been with friends and acted in a way that seemed OK at the time but seemed silly, stupid or unsafe afterwards.
- **Form** pairs with another student.
- **Share** your experiences of doing something silly, stupid or unsafe because you were showing off or because everyone else was doing the same thing.
- **Discuss** your experiences with the group.
- **Define** peer pressure. (What is peer pressure?)
- **Explain** why peer pressure matters when you are around trains and tracks.
- **Create** a survey to find out the extent to which peer pressure affects how young people in your community behave around tracks and trains. Is it an issue? If it is, what can be done to address it? **Write** a series of questions to discover:
 - The extent to which peer pressure influences the actions of young people in your community when they are around trains and tracks.
 - The nature of any actions that are influenced by peer pressure. Do the actions make students more or less safe around trains and tracks?
 - The strategies young people use to escape peer pressure that leads them into unsafe behaviours around trains and tracks.
- **Make a plan** including who you will survey, how you will conduct the survey, and how you will collate the information you collect.
- **Reflect** on how well your survey questions meet the success criteria for designing a survey. **Think** about the design of the questionnaire, how many people you intend to include in your sample, any bias in the questions, the logic of the question order, and how truthful you think the people surveyed will be.

The following links provide information to help students design suitable survey questions:

- BBC Schools - What makes a good question (interactive): <http://www.bbc.co.uk/schools/gcsebitesize/maths/statistics/questionnairesact.shtml>
- BBC Schools – Bitesize - Questionnaires: http://www.bbc.co.uk/schools/gcsebitesize/dida/using_ict/questionnairesrev1.shtml
- Designing a survey (Science Buddies): http://www.sciencebuddies.org/science-fair-projects/project_ideas/Soc_survey.shtml

Extension: Extend the reach of your survey using online survey and or poll creators to create an online survey that you can link to in your class blog or wiki. For example, you can use the following to create online surveys and polls.

- Google Forms: https://support.google.com/drive/answer/87809?hl=en&ref_topic=1360904
- Survey Monkey: <https://www.surveymonkey.com/>
- Poll Daddy: <http://polldaddy.com/>
- Poll Everywhere (Live audience feedback): <http://www.polleverywhere.com/>

Activity 3.3 Writing a research plan: stopping a train (40mins)

Preparation/resources: Writing materials or computer/tablet

Develop a learning intention and success criteria for writing a plan for conducting research. Ask students to read the following scenario and complete the activities:

"If a train traveling at 250 miles per hour is stopped dead, the passengers will continue to travel at that speed (that is, double their terminal velocity). In other words, unless you stop the train slowly, they will have more chance of surviving if you had dropped them out of an airplane without a parachute. A safe stopping distance is several miles." — The Superhero Handbook by Michael Powell

Stopping trains is hard work - so hard it is often used as a story line for comic book heroes. Superman stands in front and holds the train until it stops. Spiderman uses his webs to tie the train to lamp posts. In both cases these feats are used to show off the incredible super powers in play.

How hard is it for a train to stop? What does a train driver need to do when slowing or stopping a train? How fast do they travel? How much distance and time is needed for a train to stop?

- **Create a plan** to research stopping distances in trains and how stopping distances influence safety around trains and tracks. The TrackSAFE Education [student website](#) has some information to help you start.

Your plan should include some or all of the following stages:

Step 1: Identifying the topic – what you want to find out - the research question and subsidiary questions guiding your research

Step 2: Brainstorming possible resources that may help answer the questions.

Step 3: Finding the resources (people, places, books, websites etc.) and gathering relevant information.

Step 4: Sorting and sifting resources – making connections to the research question.

Step 5: Creating new knowledge – what did you find out?

Step 6: Communicating new knowledge – writing a report on what you have found out.

- **Share** your plan with other students and ask for feedback on how it might be improved.
- **Improve** the plan in response to the feedback other students give you.
- **Reflect** on how well your plan meets the success criteria for writing a plan.

Provide opportunities for drafting, proof reading, conferencing, and publishing, when writing the plan.

Activity 3.4 Writing interview questions: infrastructure (40mins)

Preparation/resources: Writing materials, computer/tablet with internet access

Develop a learning intention and success criteria for writing interview questions and a plan.

Ask students to:

- **Watch** the following YouTube videos, and while you are watching...
- **Look out** for train tracks and other infrastructure in the videos – the train network has both single tracks and double tracks. Some tracks have fences, and some don't. Some have overhead power lines, and some don't.
 - **Florida to New Jersey in 156 Seconds (GE Juice Train):** <http://youtu.be/sb8mk2HSJUc>
A time-lapse video showing the GE Evolution locomotive – The Tropicana Juice Train - which has the same amount of horsepower as 7 NASCAR race cars and can pull the weight of over 150 Boeing 747s!
 - **Behind the Scenes: GE Juice Train:** http://youtu.be/x5_1jyIYcUs
 - A behind the scenes look at the GE Juice Train and an inside look at the equipment you need to shoot a video from the front of a train (in the rain, for 48 straight hours).
- **Discuss** the types of train tracks and infrastructure you have seen: in real life, in movies, in cartoons and in miniature form e.g. model railways.
- **Read** – BuzzFeed: 10 of the most amazing train routes in the world: <http://www.buzzfeed.com/generalelectric/10-of-the-most-amazing-train-routes-across-the-wor>
- **Brainstorm** reasons why some places have double tracks and others single tracks. Share these reasons with the class.
- **Find out** how keeping safe around tracks might change with single and double tracks. There is information to help get you started on www.beonthesafeside.com.au.
- **Create** a series of interview questions you could ask train station staff about safe actions around single and/or double tracks in your local community.
- **Create a plan** to conduct your interview next lesson.

Provide opportunities for drafting, proof reading, conferencing, and publishing, when writing the interview questions.

Extension: Research how trains running on single and double tracks have been used in cartoons like Road Runner to make people laugh.