

GPS in Schools – Worksheet Summary

Legend: Curriculum Content Descriptors*

- **Mathematics**
- **Science**
- **Geography**

* Additional curriculum content may also be addressed, pending advice from the Education Department.

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| Worksheet #: | 1 |
| Title: | How GPS Works |
| Background and Objectives: | This worksheet is designed to give students a basic introduction to GPS technology as they may typically encounter it, as well as a basic understanding of how GPS technology works. Students are provided with an information sheet that summarises GPS operation and can use this to complete the associated worksheet. The worksheet itself is mathematics and science oriented, providing several numerical questions and requiring students to think about the potential applications of GPS to a wide range of industries. |
| National Curriculum Content: | <p>Grade 7</p> <ul style="list-style-type: none"> • ACMNA178 - Plotting points from a table of integer values and recognising simple patterns. • AC SIS124 - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation. • ACHGS049 - Constructing tables, graphs, maps and diagrams to represent the data collected about water scarcity and liveability of places. • ACHGS050 - Creating a map to show the spatial distribution and patterns of liveability, using computer mapping software. • ACHGS052 - Reviewing the results of an analysis to propose an answer to an inquiry question. <p>Grade 8</p> <ul style="list-style-type: none"> • ACSHE227 - Considering how engineers improve energy efficiency of a range of processes. • AC SIS145 - Drawing conclusions based on a range of evidence including primary and secondary sources. • AC SIS146 - Suggesting improvements to investigation methods that would improve the accuracy of the data recorded. • ACHGS057 - Creating annotated diagrams to show a landscape and its landforms. • ACHGS058 - Using the Global Positioning System (GPS) to make a map of the features of a landform. • ACHGS060 - Reviewing the results of an analysis to propose and defend answers to an inquiry question. |

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| Worksheet #: | 2 |
| Title: | Basic Receiver Operation |
| Background and Objectives: | This worksheet gives students practical experience using a typical handheld GPS receiver (either as a standalone receiver or as an app on a mobile device). It also introduces some basic concepts of digital mapping in Google Earth. Students are provided with instructions to undertake a practical exercise under supervision and answer a series of questions about GPS performance and suitability for multiple environments. The data collected is then plotted inside Google Earth to demonstrate the applications of GPS in digital mapping. More elaborate examples of interactive maps are also provided. |
| National Curriculum Content: | <p>Grade 7</p> <ul style="list-style-type: none"> • AC SIS124 - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation. • AC SIS124 - Using information and knowledge from previous investigations to predict the expected results from an investigation. • ACHGS048 - Gathering relevant data from a range of primary sources, for example, from |

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| | <p>observation and annotated field sketches, surveys and interviews, or photographs about the impacts of and responses to a hydrological hazard, or the factors influencing decisions people make about where to live.</p> <ul style="list-style-type: none"> • ACHGS050 - Creating a map to show the spatial distribution and patterns of liveability, using computer mapping software. • ACHGS052 - Reviewing the results of an analysis to propose an answer to an inquiry question. <p>Grade 8</p> <ul style="list-style-type: none"> • ACSIS146 - Suggesting improvements to investigation methods that would improve the accuracy of the data recorded. • ACHGK053 - Investigating the natural causes and spatial distribution of a geomorphological hazard, for example, volcanic eruptions, earthquakes, tsunamis, landslides and avalanches, or of bushfires as an example of a biotic hazard that affects a landscape. • ACHGS058 - Using the Global Positioning System (GPS) to make a map of the features of a landform. • ACHGS060 - Reviewing the results of an analysis to propose and defend answers to an inquiry question. |
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| Worksheet #: | 3 |
| Title: | Applications of GPS |
| Background and Objectives: | This worksheet expands students' knowledge of GPS beyond the typical applications of a held receiver. The information sheet provides a summary of how GPS is applied to transport (marine and aviation), forestry, agriculture, surveying and scientific research (animal tracking, earth sciences, satellite positioning etc.). This is followed with questions about the possible application of GPS to such industries, including basic analysis of scientific GPS data (glacial flow and sea level rise). Hypothetical scenarios are also included, where students are asked to act as a consultant and provide advice on how GPS could be used to improve the efficiency of various tasks. |
| National Curriculum Content: | <p>Grade 7</p> <ul style="list-style-type: none"> • ACMNA178 - Plotting points from a table of integer values and recognising simple patterns, such as points that lie on a straight line. • ACSHE223 - Studying transnational collaborative research in the Antarctic. • ACSIS124 - Recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation. • ACSIS124 - Using information and knowledge from previous investigations to predict the expected results from an investigation. • ACSIS129 - Describing the trends shown in collected data. • ACHGS050 - Developing a map to show the spatial distribution of measures of the liveability of their own place, or a selected hydrological hazard in Australia and another region of the world. <p>Grade 8</p> <ul style="list-style-type: none"> • ACSHE227 - Recognising the role of knowledge of the environment and ecosystems in a number of occupations. • ACSIS145 - Drawing conclusions based on a range of evidence including primary and secondary sources. • ACSIS146 - Suggesting improvements to investigation methods that would improve the accuracy of the data recorded. • ACHGS058 - Using the Global Positioning System (GPS) to make a map of the features of a landform. • ACHGS059 - Interpreting topographic maps and digital terrain models, cross-sections or block diagrams to investigate landforms and their features. |

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| Worksheet #: | 4 |
| Title: | Monitoring Earthquakes and Tectonic Plate Motion using GPS |
| Background and Objectives: | This worksheet is centered around a dataset from a GPS site in Southern California (SCIGN station). Students are required to plot the basic East, North and Up components of the GPS timeseries, then answer questions about the station velocity |

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| | <p>and what this means for the surrounding landscape. Analysis of specific time periods shows clear seismic events, which students are required to research and discuss. The worksheet also provides a map of general tectonic motion across the California region, which students must interpret and contrast against the velocities of the individual GPS station. This worksheet draws largely on the <i>Landforms and Landscapes</i> unit as part of the Grade 8 National Curriculum, while expanding geographical knowledge of continents outside Australia.</p> |
| <p>National Curriculum Content:</p> | <p>Grade 7</p> <ul style="list-style-type: none"> • ACMNA178 - Plotting points from a table of integer values and recognising simple patterns, such as points that lie on a straight line. • AC SIS124 - Using information and knowledge from previous investigations to predict the expected results from an investigation. • AC SIS129 - Using spreadsheets to aid the presentation and simple analysis of data. • AC SIS129 - Describing the trends shown in collected data. • ACHGS048 - Collecting geographical information from secondary sources, for example, thematic maps, weather maps, climate graphs, compound column graphs and population pyramids, reports, census data and the media. <p>Grade 8</p> <ul style="list-style-type: none"> • ACSHE227 - Considering how engineers improve energy efficiency of a range of processes. • AC SIS145 - Constructing tables, graphs, keys and models to represent relationships and trends in collected data. • AC SIS145 - Drawing conclusions based on a range of evidence including primary and secondary sources. • ACHGK053 - Investigating the natural causes and spatial distribution of a geomorphological hazard, for example, volcanic eruptions, earthquakes, tsunamis, landslides and avalanches, or of bushfires as an example of a biotic hazard that affects a landscape. • ACHGS059 - Interpreting topographic maps and digital terrain models, cross-sections or block diagrams to investigate landforms and their features. |