

Navigation and GPS (40-assignment)



This is an integrated instructional module designed specifically to operate within the LJ ScanTEK Modular Technology Program environment. It includes a 10-assignment exploratory curriculum and a further 30-assignment in-depth curriculum. The exploratory curriculum and the in-depth curriculum are each split into two parts. Each part includes a pre-test and post test. The module includes hardware, software and curriculum materials sufficient to provide a complete learning experience.

The curriculum incorporates continuous assessment through questions. When used in conjunction with a ClassAct networked management system, this provides instant feedback of student performance. The assessments begin with a comprehensive pre-test. This quiz includes questions for each subsequent assignment, together with questions that will specifically test math and reading ability.

Every assignment starts with a series of questions designed to track inventory. These ensure that any missing items are located before they are needed.

Each assignment is divided into a series of tasks. Hands-on tasks form the core of the student work. Where appropriate, these are accompanied by research tasks based upon illustrated textbooks and on-screen applications. Assessment questions are incorporated into each task.

Typical 10-assignment topic areas include:

- Four figure grid references
- Map scale
- Latitude and longitude
- Using a compass for navigation
- Four cardinal compass directions
- Navigation systems, past and present
- GPS readings of degrees, minutes and seconds
- Planning a route using latitude and longitude
- Operation of an atlas software program

Typical 10-assignment activities include:

- Follow grid references to locate treasure on a computer.
- Use a scale to work out distances between sites from a map.
- Global Positioning Systems.
- Use a GPS receiver to obtain a position reading.
- Identify a position on a computerized atlas from a GPS reading.
- Discover latitude and longitude lines.
- Use a computerized atlas to find latitude and longitude co-ordinates.
- Find the four cardinal compass directions using a magnetic compass.
- Present one map distance scale in other forms.
- Find distances between places using a computerized atlas.
- Examine the different types of maps used for different purposes.
- Explore how computer map technology shows the Earth's surface.
- Discover how maps represent the three dimensional shape of the Earth's surface.
- Use contour lines to create a side view of land shown on a map.

Typical 10-assignment activities include (continued):

- Explore the relationship between forms of travel and changes in GPS readings.
- Plan an efficient flight route across the USA using latitude and longitude co-ordinates.

Typical 30-assignment topic areas include:

- Six figure grid references
- Locations
- Bearings, distances and headings
- Aircraft maneuvers using a flight simulator
- Airspeed, artificial horizon and primary flight
- Heading and altitude
- Pitch attitude
- Magnetic and gyroscopic compasses
- Maps and grids
- Route planning
- Navigational instruments
- Submarine navigation
- Bearing calculations
- Pythagorean Theorem
- Sea routes
- The VOR radio navigation system
- Flight takeoff procedures
- GPS mapping and positioning accuracy
- Route planning

Typical 30-assignment activities include:

- Use a GPS receiver to store position data.
- Locate your position data on the planet using a computer atlas.
- Generate routes on a GPS receiver that show direction and distance left to travel.
- Use a book to research methods used by explorers in different parts of the world.
- Discover how aircraft maneuvers are carried out with a flight simulator.
- Use the airspeed and artificial horizon instruments to control an aircraft in a flight simulator.
- Discover what the primary flight instruments used in nearly all aircraft are called and what they do.
- Use instruments to control the heading and altitude of an aircraft in a flight simulator.
- Experiment to find safe and unsafe methods of maneuvering an aircraft using a flight simulator.
- Use an orienteering compass to find bearings.
- Examine the development of the compass in the history of navigation.
- Take bearings and measure distances to make a route plan.
- Find places on maps using six figure grid references.
- Use an orienteering compass to find a bearing on a map.
- Use a ruler and map scale to find real distances from a map.

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Typical 30-assignment activities include (continued):

- Find bearings and distances on a map to plan a journey.
- Find out about the exploration of North America in previous centuries.
- Use bearings and real distances to track people on a map.
- Find out about the exploration of the Pacific Ocean by Captain Cook.
- Use bearings and distances to guide a submarine simulation.
- Explore the development of devices used to aid undersea navigation.
- Apply math principles to calculate bearings and distances from a chart to plan single legged routes for a submarine simulation.
- Apply math principles to calculate bearings and distances from a chart to plan double legged routes for a submarine simulation.
- Use computer atlas software to plot and compare sea routes around the world.
- Follow the procedures on a checklist to make an aircraft take off in a flight simulator.
- Find out about the instruments and controls used by the pioneers of powered flight.
- Use a flight simulator to find out how a radio guidance system can be used to keep an aircraft on a flight path.
- Examine the uses of an aircraft instrument called the Horizontal Situation Indicator.
- Follow the procedures on a checklist to make an aircraft land in a flight simulator.
- Use GIS software to compare statistics for different countries.
- Use GIS software to compare countries by looking at their population structures, or demographics.
- Identify polluted areas on a map using data given with GPS position readings.
- Use data given with GPS readings to draw a map.
- Discover how a GPS receiver is able to locate your position on the surface of the planet.
- Examine the effects that inaccuracies in GPS readings can have.
- Explore a system that is used to improve the accuracy of GPS.
- Evaluate the operation of bus services on a GPS bus tracking system simulation.
- Use a GPS bus tracking system simulation to design your own bus timetable.

- Use route planning software to plan the quickest and the shortest ways to drive between two cities.
- Use route planning software to compare estimates for journey times between different cities.
- Use route planning software to plan a road trip that involves several legs.
- Discover how you can improve the realism of a plan for a road trip.
- Explore the impact that changes in input values have on the output estimates of route planning software.
- Perform cost analysis for delivery route plans to select the best one.

Each assignment is designed around a list of performance objectives. These lists include academic, technical and occupational objectives. The assignments are written in such a way as to enable a student to attain the performance objectives, with the assessment questions linked to these in order to provide a measure of true competency.

The performance objectives are used by the ClassAct management system to generate a comprehensive portfolio of student competency reports. Default reports supplied with this module include:

- Entry report
- Technical/Occupational Exit report
- Basic Skills report based upon the federal SCAN's report.

The items supplied with this instructional module include:

- 10-assignment On-Screen Student Assignment Guide CD
- 10-assignment Student Assignment Guide
- 10-assignment Student Workbook
- 10-assignment Instructor's Guide
- 30-assignment Student Assignment Guide
- 30-assignment Student Workbook
- 30-assignment Instructor's Guide
- Computer Aided Instruction Software
- Book: 'Explorer'
- GPS receiver
- Flight Simulator software
- Trip planning software
- Ruler
- Computer joystick
- Microsoft Encarta software
- Orienteering compass
- Interactive atlas reference sheet
- Set of compass cards
- Belle Valley map sheets
- Flight Simulator reference sheet
- Trip planning software reference sheet

Additional items required:

- Computer

Module Facts

For Technology Program, order as:
ST370/40 Navigation and GPS

	No.	Average time
Assignments	40	45 minutes
Extension Activities	4	45 minutes
Total		33 hours



LJ Technical Systems
Web site: www.ljgroup.com