Sample Weekly Planner   
Unit 2: Applied computing

The unit planner below represents one approach to delivering Unit 2: Applied computing. It is a sample guide only and teachers are advised to consider their own contexts when implementing this unit and when developing learning activities. Consideration should be given to the student cohort and available resources. Teachers should modify this sample weekly planner according to relevant school events.

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| **Area of Study** | **Suggested time allocation (Weeks)** |
| 1. Innovative solutions | Weeks 1–9\*\* |
| 1. Network security | Weeks 10–16\*\* |

\*\* Please note that the duration of each area of study is indicative only.

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| **Week** | **Unit and area of study** | **Topic/description** | **Learning activities** |
| **Area of Study 1: Innovative solutions** | | | |
| 1 | Unit 2  Area of Study 1 | Innovation and digital systems:   * current and emerging technologies (including impact) * emerging trends * characteristics of creative and innovative solutions   Functions and capabilities of digital systems used by organisations and individuals | * Students are introduced to several examples of innovation, past and present, which are discussed as a class. Examples include: the cassette recorder, CD player, iPhone, and wearables technologies. * Students work in small groups, exploring and researching innovation in greater depth through case studies. Some examples of possible case studies include: * Case study 1: smart refrigerators * Case study 2: SpaceX * Case study 3: Wearables technology in sport * Case study 4: Bitcoin and blockchain technology * Case study 5: Amazon delivery drones. |
| 2 | Unit 2  Area of Study 1 | Identifying the problem, need or opportunity  Collecting data to identify preferred solution | * The Innovative Solutions term-long project is introduced to the class. Discussion of the outcome, timeline and assessment takes place. * Students form groups, and subsequent collaborative brainstorming generates a divergence of ideas for the problem, need or opportunity that will become the focus of the group’s project. * Group undertakes a feasibility study to converge on one (achievable) problem, need or opportunity that the team will work on. * Multiple solutions to the group’s problem, need or opportunity are then identified. These are ranked from most preferred solution to least preferred solution based on student-determined criteria. |
| 3 | Unit 2  Area of Study 1 | Planning tools (e.g. Gantt charts)  Design tools and techniques:   * students work on their preferred design idea (i.e. preferred solution) | * Students construct their project plan using a Gantt chart. Roles within the group are assigned. * Students create mock-ups, pseudocode, sitemaps and/or storyboards for their preferred solution. * Each group meets with the teacher at the end of the week to present their project design idea and project plan for approval. This can take the form of a ‘sales pitch’. At this stage, groups might need to revisit alternate design ideas. |
| 4 | Unit 2  Area of Study 1 | Developing the innovative solution:   * students work on their project design * prototyping is undertaken to check for design flaws and ensure that each part of the solution works as expected   Monitoring project’s progress | * All resources needed for the project have been identified, and action taken to acquire the resources. * Students work collaboratively on project and monitor their progress against project plan. * Each group briefly meets with the teacher at the start of the week, to discuss the project objectives for the week; potential issues should be flagged. * At the end of the week whole class meeting is held to check the progress made. |
| 5 | Unit 2  Area of Study 1 | Developing the innovative solution:   * students work on their project design * design flaws that are identified are fixed * prototyping is ongoing to check for further design flaws and ensure that each part of the solution works as expected   Monitoring project’s progress | * Students work collaboratively on their project and monitor progress against project plan. * Each group briefly meets with the teacher at the start of the week, to discuss the project objectives for the week; potential issues should be flagged. * At the end of the week a whole-class meeting is held to check the progress made. |
| 6 | Unit 2  Area of Study 1 | Developing the innovative solution:   * students work on their project * testing of individual parts of the project are ongoing   Monitoring project’s progress | * Students work collaboratively on their project and monitor progress against project plan. * Each group briefly meets with the teacher at the start of the week, to discuss the project objectives for the week; potential issues should be flagged. * At the end of the week a whole-class meeting is held to check the progress made. |
| 7 | Unit 2  Area of Study 1 | Developing the innovative solution:   * students work on their project * testing and debugging of individual parts of the project are ongoing   Monitoring project’s progress | * Students work collaboratively on their project and monitor progress against project plan. * Each group briefly meets with the teacher at the start of the week, to discuss the project objectives for the week; potential issues should be flagged. * At the end of the week a whole-class meeting is held to check the progress made. |
| 8 | Unit 2  Area of Study 1 | Testing and documentation:   * testing techniques to ensure that solution works as intended * documentation for end-user of the solution | * Test: check validity of solution and make final modifications if required. * Write ‘user’ documentation (e.g. User Guide, Quick Start Guide) to accompany the completed solution. |
| 9 | Unit 2  Area of Study 1 | Solution exhibition and evaluation:   * evaluating the success of the solution * evaluating the usefulness of the project plan | * Class display and presentation of student work (i.e. proof of concept, product, and prototype). * Student self-reflection: evaluate efficiency and effectiveness of solution and project plan. |
| **Area of Study 2: Network security** | | | |
| 10 | Unit 2  Area of Study 2 | LANs, WANs and WPANs:   * functions and characteristics, strengths and limitations * security threats | * Preliminary class discussions are focused on defining what a computer network is, and the benefits and risks of computer networks, including advantages and disadvantages of wireless networks as opposed to wired networks. * Students create network diagrams to represent network topologies for LANs and WANs. |
| 11 | Unit 2  Area of Study 2 | Technical underpinnings of networks:   * hardware (e.g. cables, switches, hubs) and software * security controls (e.g. antivirus, firewalls) | * Teacher-arranged tour of the school’s IT infrastructure, focusing on networks. Follow-up activity can involve any one or more of the following: * students design a project that runs a packet sniffer to capture traffic sent over the intranet (under supervision of the school’s IT department) * students measure the effects of an antivirus/security software on a computer’s * processor performance over a period of time, with data graphed * students measure actual data transfer rates, either on the school’s network or home network. |
| 12 | Unit 2  Area of Study 2 | Network design:   * factors that influence the design of a network, such as expected capacity, cost, and building access | * Review the design of the school’s network. Are there any improvements students could suggest based on their discussions with the school’s IT manager? How does the school’s network compare to a home network and big businesses? Students consider: the network capacity, any physical obstructions that can hamper network communication, equipment and software costs, layout decisions, etc. * If old parts, including PCs and network cards, are available, students can examine how the components are connected and configured; and in the case of the computer, the configuration settings. * Students can undertake an extended project which investigates what it would take for a family home to retrofit existing home appliances, lighting, and security systems to work as Internet of Things (IOT) gadgets. |
| 13 | Unit 2  Area of Study 2 | Network applications:   * WPAN characteristics * design, construct and program a WPAN | * Class reviews the characteristics of a WPAN, and how this differs compared with other networks. * Students engage in a hands-on project through designing and building a wireless personal area network (WPAN). This can be undertaken by either: re-purposing an unused router; constructing an arduino-based network to capture and transmit data using arduino Wi-Fi shield; or via a similar microcontroller hardware/software configuration. |
| 14 | Unit 2  Area of Study 2 | Network applications:   * construct, program and test a WPAN * network storage/cloud computing | * Students complete building their wireless personal area network (WPAN). Test data is transmitted among the devices attached to this WPAN. An extension to this activity is the addition of a Network Attached Storage (NAS) device to the WPAN. * By extension, the NAS device can be used to generate further discussion on network storage and cloud computing. |
| 15 | Unit 2  Area of Study 2 | Data and network protection strategies:   * authentication, encryption, preventative practices, intrusion detection and prevention, role of ethical hacking | * Terms such as ‘authentication’ and ‘encryption’ are defined, and students research methods used to ensure a network’s security. * Students investigate the Caesar and Vernam ciphers to gain insight into the two extremes of ‘network’ cryptography, with one offering perfect security and the other being insecure. Computationally secure ciphers lie between the Caesar and Vernam ciphers. * Students explore different backup strategies (e.g. onsite vs. offsite backups; full, incremental and differential backups) and the importance of a disaster recovery plan. * Students have the opportunity to develop a program that generates a CAPTCHA (or similar) to verify a user; or engage in a debate over ethical hacking. * Media article analysis: Australia’s controversial encryption bill. |
| 16 | Unit 2  Area of Study 2 | Interactions and impacts of networks:   * risks and benefits, legislation, and ethical issues   Unit 2 revision | * Key legislation is identified, and potential impacts on organisations that do not abide by the laws regarding storage and communication of data and information are discussed. * Processes to resolve ethical issues arising from data and information security practices are identified. Students analyse and discuss the codes formulated by organisations such as the Australian Computer Society (Code of Conduct) and the IEEE Computer Society (Code of Ethics). |