[Learning Activities KS2](http://naacecasjointguidance.wikispaces.com/Learning+Activities+KS2)

[Pacific Northwest Tree Octopus website](http://zapatopi.net/treeoctopus/sightings.html" \t "_blank)  
  
**Design, Write and debug programs**

* Use floor robot to create specific shapes. Pre-define (or use Shape Property cards) and get children to use ‍‍‍‍floor robot to draw the shapes onto paper (using the space for the pen).
* Use existing program listings in Logo to get the children to predict the shapes produced. Use a mixture of regular and non-regular shapes, so that repeated instructions can be used as well as long sets of single instructions to produce unusual shapes.
* Create a basic Scratch program to simulate a Maze and a sprite that is keyboard controlled to go around it. This can then be grown in complexity, bit by bit: 1. Add a timer to use the Repeat loop to count down in time. 2. Add a score by allowing the sprite to 'eat' food as he goes along the maze. 3. Add a 2nd sprite to make the game 2 player, and then give him a Score variable too. 4. Make the game multi-level, so a new, more difficult maze replaces the one they have just achieved ......possibilities to enhance, can go on and on.

**Controlling Physical Systems**

* Use of floor robot which have Sensors on the front and back to respond to 'bumping' into objects
* Use a floor turtle with light sensors to be trigged as it enters or leaves a tunnel or follow a line on the floor for the floor robot to follow.
* Use a floor turtle with sound or touch sensors, as you blow a whistle the robot responds to a programmed procedure.
* Program floor robot to follow a line on the floor (using light sensor and coloured tape)
* Use a touch sensor. As the sensor is triggered the floor robot responds to a pre programmed procedure.
* Use of a Programming language to devise a greenhouse control system, whereby the sprinklers will come on if the temperature (randomly updated by the program) gets too hot, and switches off when the temperature reaches an acceptable level.

**Sequence, Selection and Repetition**

* Use real world examples to explain the concepts: Sequence - A set of instructions to be carried out in a specific order, for example a method for a cooking recipe. Selection - IF the temperature is too hot, turn the fan on, ELSE IF the temperature is too cold, turn the heating on; ELSE the temperature is just right, so do nothing. Repetition - Every week consists of the repetition of the days Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday. Use a repeating loop to count down a timer.
* Now use examples that can be programmed and create flow charts to describe them, before getting the children to develop the programs themselves.
* Create a game which repeatedly checks for various conditions (using a forever loop), such as a collision with another sprite.

**Work With Variables**

* Create a program that requires a Timer or Score and set the variables as appropriate within the program. For a example, a 30 second timer counts down from 30, one second at a time Repeat 30; Wait 1 second; Timer = Timer -1; Next.
* Capture the users name at the start of the program, and use it at the end of the game to say 'Well done {username}'.

**Various Forms of Input and Output**

* Where possible, create opportunities for the children to use a variety of different input methods, such as microphone to create their own sounds, keyboard and mouse, camera for animation or as input for movement sensors(?), and touch screen.
* Similarly, feed results of work to various methods of output, such as: screens, printers, speakers/headphones and control devices that work based on the inputs given and change something based on that information.

**EXPLAIN HOW some simple Algorithms work**

* For example, the pupils should be able to explain that the counter algorithm (described above) will work as the instructions within the loop are repeated 30 times: a single second is waited, then the counter is reduced by one. After 30 times around the loop, the counter will be down to 0, therefore having timed a session of 30 seconds. Allow this type of explanation to be worked into one of lessons where Algorithms are being developed and get the pupils to explain pre-written algorithms, as well as their own.

**Understand Computer Networks**

* Create a simple Ring Network of pupils all 'attached' to the person next to them, and passing messages around using strict rules (the protocol) about who can speak to who and which order etc. A more complicated Protocol be likened to the system of pupils only speaking when they have their hands up and the teacher asks them to contribute - more of a Star network. All pupils/computers can share resources (printers, internet connections etc), again as part of the protocol in place.
* Cisco has a good set of resources on their website, based on Peter Packet, describing how information is passed between computers and networks (<http://www.cisco.com/web/learning/netacad/packetville/pr/games.html>)

**The Internet and Multiple Services**

* Again, use the Cisco site to help explain the Internet. Remember that The Internet is the host to many different parts - The World Wide Web, Email, File Transferring, Chat Rooms and NewsGroups.
* It can be explained in terms of being a larger version of an internal network

**Presenting Informtaion**

* Pupils should understand that any work created for a particular purpose should contain accurate information and be to the highest quality in relation to their ability. Information can be researched, with reference 'Search Technologies' and 'Use Technology Safely, Respectfully and Responsibly' below.
* Pupils can create work based on presenting it to specific audiences. For example, a PowerPoint presentation about e-Safety to children aged 7-11. A poster in Publisher about The Internet for their parents/un-informed adults. The creation of a Phonics app for Reception children.
* Where possible, allow pupils to work online in collaborative projects.

**Opportunities for Communication and Collaboration**

* a range of collaborative web 2.0 tools can support this - e.g. Voicethread, or alternatively wikis and forums within a school learning platform may support this.
* providing peer feedback as part of blogging can provide relevant opportunities for this
* communication may include video-conferencing tools with others from outside the classroom, e.g. an interview with a professional sports person or a Skype with a partner class working on the same project in a different school.

**Search Technologies**

* Internet searching facilities - pupils should learn how to create the most appropriate and effective search terms and understand that specific tools will aid the use of plain words; for example, using speech marks " ", to join a multi word term, so the search doesn't look for each word individually. Using a - (minus sign) can eliminate results where a term has a double meaning ('mullet -hair' to get results about the type of fish).
* Searching for files/emails - use a part of a lesson to get the children to use the search facilities already on the operating system in place. For example, MS Windows allows you to search for files from the Start Menu, or from Windows Explorer. Use the different tools to help filter the appropriate files - \* ? etc.
* Appreciating the order of the results - children should gain an understanding of how different search engines will display the results; try the same search using different search engines and see if there are any differences in the order. Perhaps there are reasons why certain websites will always appear at the top of the list?
* Once results have been found, children need to realise that the first source of information may not always be the best, or most accurate/reliable. Researching, potentially includes finding multiple sources on the same topic, and checking the information is the same between them. Also, who is the author of the content? Could they have a biased viewpoint? This need not only apply to sources on the Internet, but also to all others, online or otherwise.

**Use Technology Safely, Respectfully and Responsibly**

* Safe use of Technology - e-Safety issues are well covered on the CEOP and ThinkUKnow websites. There are lesson plans and many resources available on both, to allow teachers to pck and choose the appropriate level and content for the classes. Be sure to follow up and update each year as they go through the school, as things will undoubtedly change from one year to the next. Re-enforce the fact that most standard Social Media sites have age limits (nearly always 13), so children in KS2 should NOT have accounts on them. However, it is worth giving them information on how to make the settings private, in order that they should keep themselves safer. The above websites also cover showing the children where to click or which website to go to if they have concerns or have witnessed/experienced inappropriate behaviour.
* Respectful use of Technology - Consider ownership issues - in school use is one thing. However, using online content for private use, should be carefully chosen, so as not to infringe copyright laws. Look for the appropriate wording and symbols on webpages; perhaps ensure that the content has a Creative Common License which allows you to use it for work that is not being used to make a profit. How about the ethical side? Search out companies whose ethical policies make sense to you, before deciding whose material to use.
* Responsible use of Technology - Very tied with Respectful use, this enables the user to 'Think' before they 'act'. Berespectful in their language and therefore responsible in their outlook to others. Remember, anything that is online is available for others to see (albeit, it may be a limited list of people).

**Variety of Software on a Range of Devices**

* Use different pieces of software to create a combination of different outputs. Ensure the software used fits the task and teaches the children how to be selective. This follows on from KS1 where they will have been introduced to some of the software already. As the children learn more they should have the capacity to choose the most appropriate software for a given task. For example, a presentation should be completed on something like MS PowerPoint, or Prezi, however, a Poster or user guide, might be better produced on Adobe FrameMaker or MS Publisher. It would be hard to create a fully interactive game using Logo, but Scratch is a little over the top for making a Sprite move around the screen to draw a square.
* If possible, use as many devices within the lessons as possible. Ensure the children have time to use laptops, PCs, Apple Macintosh's, tablets, raspberry Pi's etc. A combination of just a couple or all of these will give the children good exposure to realise there are alternative machines available.

**Visual Simulations** - models of behaviour using Scratch (cross-curricular links to Key Stage 3 Science):

* Simulate the behaviour of particles in a gas, from simple Brownian motion to diffusion of two gases:[http://community.computingatschool.org.uk/resources/861](http://community.computingatschool.org.uk/resources/861" \t "_blank)