SHEFFIELD SEND COMPUTING SCHEME OF WORK 2016

Introduction:
The Sheffield SEND Computing Scheme of Work was written in response to the needs of teachers in special schools teaching pupils with a range of special educational needs and disabilities. It aims to provide ideas, resources and guidance for teaching the Computing Curriculum to learners working from P5 to approximately KS1 level (level 1 and 2 on the old National Curriculum levels). Levels have been retained in order to assist teachers in identifying the correct activities for their learners.

The Scheme of Work contains 5 strands, each with a very different weighting:

1. **What is a Computer?**
2. **Communication: Multimedia**
3. **Communication: Data**
4. **Programming & Algorithms**
5. **Online Safety & Digital Literacy**

This provides a breadth of content that covers the three areas of the National Curriculum for Computing: Information Technology, Digital Literacy and Computer Science, whilst providing relevance to and meeting the priorities of learners working at lower levels.
Strand 1. *What is a Computer?* is ideally taught at the beginning of the year to revise how to access the school computers and tablets, and will supplement other strands. *Online Safety & Digital Literacy* should be also taught alongside another strand; it fits in most naturally with *Communication: Multimedia*, and individual units signpost the Online Safety that can be taught within them. Please see the *Online Safety Appendix* for more details.

Weighting:
We would recommend the following weighting of the main strands 2, 3 and 4, with strands 1 and 5 taught alongside them as appropriate:

Communication: Multimedia	**Communication: Multimedia**	**Communication: Multimedia**
Communication: Data	**Programming & Algorithms**	**Programming & Algorithms**

So in a school year made up of 6 half terms, 3 would cover Multimedia, 2 would cover Programming and Algorithms, and 1 would cover Data. The different strands can be taught in any order, and this may depend on links with other curriculum areas.

How to use the Scheme of Work:
<u>Units</u>

Each strand contains a number of individual units, for example *2c. Photographs; 4a. We control technology; 3b. Sorting*. For the majority of the units there are 3 versions, **Purple, Blue** and **Green** relating to the three approximate levels:

Some units are not appropriate at the lower levels, and may not be included in the Purple or Blue versions.
Each unit contains a number of activities and resources for delivering the content. This provides a number of different ways of teaching the same concepts to pupils whose rate of progress is slower than in mainstream settings. It is not envisaged that every activity is taught in one go, rather the teacher can choose one or two suitable tasks that fit with other topics being taught, or to move on from what has been taught previously. During a half-term a combination of units from one strand may be taught to develop knowledge, for example a class might investigate *Sequencing Instructions* before applying what they have learnt in programming *Bee-Bots*.

Units in the *Communication: Data* strand should ideally be taught in order, but units in the remaining strands are fairly self-contained and can be visited in any order.

Cross-curricular delivery

The scheme was written so that individual units could be taught as part of a larger cross-curricular topic, or to support other subjects such as English, maths and science as well as life skills.

A sample long-term plan for primary and secondary is included to show effective combinations of units that might fit into a topic. There is also a Cross-curricular mapping document, with a selection of common topics and how to link them with Computing.

Mapping Coverage

There is a sample mapping document for schools to use to help teachers map what units and activities have been covered each year, to avoid repetition.

Bespoke Schemes of Work
A school can request a bespoke Scheme of Work, mapped to their themes and software. They will then receive a set of Medium Term plans, with detail for every half term of work. These will contain 2 or more units plus specific ideas for teaching the topics being covered and links to resources. Teachers of a specific year group of phase should then have access each half term to the Medium term plan, and the units for that term.

Assessment
Each unit contains progression statements, and there are overarching progression documents for each strand. Please see the *Assessment Appendix* for more information.

P5-6	Communication: Data

3b. Sorting Objects

Objectives: *To identify objects belonging to a category; to sort objects according to key criteria*

Suggested Activities:

i. As a class practise identifying objects of one category, e.g. using a whiteboard resource, touch all of the food items/animals/cars.

ii. Use ChooseIt! Maker or similar to create activities to choose objects belonging to a single category.

iii. Pupils take photos, with support if required, of objects belonging to a single category, e.g. colours, food, animals. These can then be displayed in a slideshow. Pupils may be able to record a voiceover for each slide.

iv. Ask pupils to match objects and images or symbols to create pairs of items, e.g. animals, food and drink, classroom objects. This can be done with physical objects, or as a drag and drop activity in a digital resource, e.g. Pic Collage, ActivInspire. See also Resources for matching games and apps.

v. Investigate groups of objects and their properties. Follow the Barefoot lesson plan: Sorting Objects, and adapt according to topic. Use a sorting mat to support pupils.

vi. Give pupils pairs of images with different quantities (1 or 2/many). Ask them to sort them into two piles according to quantity.

vii. Create simple pictorial representations of data collected from the class on the board, e.g. pupils' pets; favourite snack – add an image for every instance of an animal or snack. Ask pupils to find matching items and move them into a group. Ask pupils simple questions (which has more? how many?) about the data.

RESOURCES	
Weblinks	
Barefoot Activity: Sorting Objects - *You will need to register for a login (free) to access this* http://www.twinkl.co.uk/ - *Search for 'sorting' to find a number of printable resources to sort objects* Matching colours, animals or shapes – *Online game of snap to match pairs*	
Software	**iPad Apps**
ChooseIt! Maker Busy Things – *mathematical patterns, snap*	ChooseIt Maker TinyHands Sorting 1, 2 and 3 TinyHands Lotto matching puzzle games Matching Pairs – Educational Learning Game

Assessment
Most pupils should be able to: *- Match pairs of objects or images*
Some pupils will be able to: *- Identify objects that belong to a single category* *- Sort objects into two categories with support*

P7-8	Communication: Multimedia

2c.Taking and editing photographs

Objectives: *Know how to use a digital camera/tablet camera; choose photos for a purpose; choose an effect to change a photo*

Suggested Activities:

i. Look at a variety of photos on a theme. Discuss what they show and which photos they like best. Create a slideshow of photos for pupils to move through independently.

ii. Model searching for photos online for a topic, using simple keywords in a Google or Bing image search, or similar. Pupils choose photos and copy and paste into document with support. If appropriate they can add simple captions.

iii. Ask pupils to take photographs using a digital camera or tablet on a theme (for example materials / seasons / mini-beasts / shapes). They then choose the best photographs to add to a slideshow with support. You could discuss why they chose particular photos.

iv. Pupils open a photo in photo-editing software on tablet or computer (they may need support for this step). Explore and choose effects from a selection, for example different filters, to apply to the photo to change it. Can they choose effects to make the photo look old/scary/summery etc.? Save and display photos, either as print outs or online. For example create a class Flickr or Google Photos account or a class blog.

v. Create a book cover for a story studied in English, using 2Publish or PowerPoint. Add an image from a selection, or take a photograph. Pupils could take freeze-frame photos – of a pupil acting out a scene from the story. Add a title and save the file.

vi. Take photographs of the class against a plain background and upload to the computer. Model how to use the *Remove Background* tool in PowerPoint to cut out pupils and add a different background behind (for example for World Book day, or as a freeze frame from a story). Pupils may require support for this activity.

vii. Use Photobooth on the iPad for pupils to investigate different effects on their own image. Take photos, add to Pic Collage and add a caption, for example they could create a poster of different emotions. Photo Lab Picture Editor and MQRD apps have good effects, but need supervision.

viii. Create a postcard or greetings card, using an edited photograph with simple text in a template. See the online tools in Resources.

ix. Create a Photostory (slideshow) on a topic: choose or take photographs, add to software, apply effects and filters, add text and music with support. For example to show different festivals, tell a ghost story, retell an event.

x. Use the following software to create activities using photographs on a topic being studied, to reinforce learning:
   - Jigsaw Maker

- SwitchIt Maker slideshow
- ChooseIt! Maker
- Drawing Pad (iPad - add photo as background for pupil to draw over)
- YaKit Kids or ChatterPix (iPad - choose a photo of the pupil or object, add eyes and mouth, then record themselves talking or making sounds).

Online Safety & Digital Literacy (see appendix)

- ✓ Discuss *Personal information* – do you want everyone to be able to see your photo? Ask permission when you take photos of other people. Discuss how photos can be changed.
- ✓ Discuss inappropriate images in relation to *Searching for information online*. What should you do if you see something you don't like?

RESOURCES	
Weblinks	
www.ribbet.com – Free photo-editing software www.befunky.com – Free photo-editing software, collage maker and a range of templates to make cards, invitations, menus etc. https://www.canva.com/create/postcards/ - Create a postcard (requires login) https://www.flickr.com/ - Search for and save photos online (requires Yahoo account) https://photos.google.com/ - Save images online with Google account	
Software	**iPad apps**
PowerPoint 2Publish PhotoSimple Jigsaw Maker ChooseIt/SwitchIt Maker PhotoStory 3 for Windows Slideshow Maker	Photoshop Express BeFunky Pic Collage YaKit Kids Chatterpix Photo Lab Picture Editor (*contains adverts*) LiveCollage – Instant Collage Maker (*contains adverts*) MQRD Live filters 30 Hands, Shadow Puppet Edu, Adobe Spark Video – *create a photostory or slideshow*

Assessment
Most pupils should be able to: *- Use a digital camera or tablet to take photos, with support if required* *- Choose an image from a selection for a purpose* *- Understand you can view photos taken on a camera or tablet*
Some pupils will be able to: *- Combine photos and text to present information with support* *- Choose effects and filters to change a photo* *- Choose the appropriate technology from a selection to take a photo*

NC1-2	Programming & Algorithms

4b. Sequencing Algorithms

Objectives: *To understand what an algorithm is; to sequence steps in a task; to create an algorithm for others to follow*

Sequence and Algorithms are key computational thinking concepts. You can learn more about these and other concepts at http://barefootcas.org.uk/. The main message is that the order of instructions in an algorithm is important, and that instructions need to be clear and precise.

Suggested Activities:

i. Discuss an everyday activity, such as brushing teeth, having lunch, buying a snack, getting dressed. Act out the activity, using props as necessary. Provide pupils with images of the activity, either print outs or in a digital document, and ask them to put them in the correct order to show the steps of the activity. Write captions for each photo. Explain that this is called an algorithm – a sequence of instructions to get something done. Discuss what happens if the order of instructions is incorrect e.g. if you put your shoes on before your socks.

ii. Provide pupils with key parts of a familiar story, in an appropriate format, e.g. text, images or audio on a recordable button. Ask them to put the parts into the order they appear in the story. Can they retell the story using the parts as prompts? See the Story Sequencing activity for more ideas.

iii. Pupils can create their own algorithms by taking photos of an activity, adding to a document and labelling. For example how to log onto the computer, making a glass of squash, catching the bus. Discuss the importance of the instructions being clear and in the right order. This could be done as a series of slides in a presentation, as a poster, or a comic strip. See the Barefoot Lego Algorithms activity for one way of doing this.

iv. Use music, song and dance to look at sequences using these activities (login required for the Barefoot activities):
   - Barefoot Activity: Dance Moves Algorithm: create a sequence of dance moves
   - Minibeast Rhythms: create clapping rhythms using the words (*bee-tle / cat- er-pill-ar / snail / butt-er-fly)*, for others to follow in a sequence using the Scratch resource. For other topic areas, pupils can choose 4 images in an order and stick to the board.
   - Barefoot Activity: Musical Sequences: create tunes by sequencing notes
   - Barefoot Activity: Heads, Shoulders, Knees and Toes Algorithm: sequence a well-known song

v. Complete the Jam Sandwich Robot activity – pupils give you instructions to make a jam sandwich, but they need to be clear and precise, otherwise the activity will go wrong. This could be done with a range of tasks, e.g. cleaning teeth, putting on coat. Provide key words for pupils to write better instructions.

vi. Pupils work in pairs, sitting back to back: give one pupil a simple shape or image, and they have to give clear and precise instructions to the other person to draw the image (without them seeing it). Compare the two images once finished. Discuss the importance of using precise instructions, and how to make the task easier (e.g. using a grid and reference points, a shared vocabulary etc.)

Online Safety & Digital Literacy (see appendix)

- ✓ Create sequences of instructions relating to Online Safety messages, for example what to do if you see something upsetting online.

RESOURCES	
Weblinks	
These Barefoot activities contain comprehensive lesson notes. You will need to register for a login (free) to access them: Barefoot Activity: Lego Algorithms Barefoot Activity: Story Sequencing Barefoot Activity: Heads, Shoulders, Knees and Toes Algorithm Barefoot Activity: Dance Moves Algorithm Barefoot Activity: Musical Sequences Minibeast Rhythms http://www.wikihow.com/Teach-Sequencing-to-Preschool-Children - examples and sets of images for sequencing activities Phil Bagge's Jam Sandwich resources Phil Bagge's Human Crane resources	
Software	**iPad apps**
PowerPoint/Word 2Publish/2Write Comic Life	Pic Collage Pure Flow (flow charts) Notability Strip Designer/Comic Life Sequences – Preschool Exercises

Assessment
Most pupils should be able to: *- Identify the steps of a known task* *- List the steps of a known task in order* *- Understand what an algorithm is*
Some pupils will be able to: *- Explain that the order of instructions in an algorithm is important* *- Use clear and precise instructions in an algorithm* *- Create an algorithm for someone else to follow*