Unit 5.2
We are architects
Creating a virtual space

1 About this unit

Software: Google SketchUp (used for 3-D modelling)
Outcome: A virtual gallery in which children’s work might be displayed

Introduction
As well as providing access to locations far away, computers allow us to create imaginary, virtual locations, and allow others to visualise these, trying out ideas, changing things and seeing immediately the effect those changes have. For architects, interior (or landscape) designers and civil engineers, this is a very powerful tool, and in school similar software allows children to create realistic representations of fictional places such as an art gallery, in this case.

Assessment
This unit covers AF1 and AF2. For a more detailed analysis of the assessment focuses addressed and suggestions for progression, see page 22.

Curriculum and Framework links

Primary Framework
Mathematics: Calculating, measuring and understanding shape

ICT PoS
› Developing ideas and making things happen (2a, c)
› Exchanging and sharing information (3b)

Suggested subject links
› Art and design: Children could scan in or take a photo of their original artwork before uploading to their virtual galleries.
› Numeracy: Children will develop skills in measuring and shapes.
› Science: There are opportunities in this unit to look at materials in the context of building.
› Geography: Links are possible through the extensions as children find a location for their structure, or create landscapes.
› There are many applications of virtual reality, both real and imagined, which could enhance teaching in subjects like geography and literacy.

Every Child Matters
› Enjoy and achieve
› Make a positive contribution

Learning expectations
After researching examples of art gallery architecture, the children learn to use Google SketchUp to create a virtual gallery. They scan or photograph non-digital examples of their work and then exhibit them, with their digital work, in the gallery.

By the end of this unit, children will have achieved the following learning objectives:
› To understand the work of architects, designers and engineers working in 3-D
› To develop familiarity with a simple CAD tool
› To develop greater spatial awareness through exploring and experimenting with a 3-D virtual environment
› To develop greater aesthetic awareness

Variations to try
› Children could create virtual exhibits of photos they took in Unit 5.1 – We are photographers.
› More ambitious projects might be to create a virtual reality representation of a location from a child’s creative writing or a book, or from locations linked to work in history or RE.
› The ‘virtual gallery’ route is recommended but the unit can be adapted to other contexts, such as a classroom or bedroom. Exploring classroom design could provide possibilities for children to have a voice at school or class level, looking at how the built environment is one aspect of the context for learning and teaching in school. This would be of particular relevance if the school has had any recent building work done or is planning any work, perhaps as part of the PCP.
› An alternative approach to 3-D construction is available if you have access to 2Simple’s Design and Make program, which allows children to produce printable models that they can put together.
Things to do

- Read the Core section of Running the task on pages 20–21.
- Look at software tutorials. There are extensive tutorials for Google SketchUp online, with a number for beginners at http://sketchup.google.com/intl/en/training/videos/new_to_gsu.html.
- Alternative 3-D modelling software is available, but much of it is expensive and control interfaces tend to have steep learning curves.
- It is also possible to embed SketchUp structures within Second Life style environments running on the OpenSim platform (http://opensimulator.org/wiki/Main_Page), although this is not for the faint hearted. OpenSim, if available, offers an alternative approach to 3-D modelling, although the learning curve here is also likely to be too steep for most Year 5 children.
- Spend 75 minutes familiarising yourself with the software / tools that are most accessible / appropriate for use with your class.
- Read the Extensions section of Running the task on pages 20–21. Do you want to use any of the extras provided?
- Consider getting in touch with a local secondary school or CTC who may be willing for children’s structures to be produced as physical models using rapid prototyping 3-D printers.

Things you need

- Book the laptop trolley or ICT suite, if necessary.
- Ensure that the software you need is installed.
- Encourage children to bring in digital photographs or originals of artwork they have done at home.
- To include children’s non-digital work, arrange for children to have access to digital cameras and / or scanners.
- Collect links to art gallery websites, particularly where the gallery’s design can be studied.
- Collect links to geometrically inspired sculpture.

Think about ...

- Children could compare work in their virtual space with that in the real world, e.g. helping to mount a real display of work.
- One alternative is to explore virtual worlds of appropriate computer games.

Useful links

Before you start, you might want to refer to these weblinks.

- You are unlikely to need the additional functionality, but a demo version of Google SketchUp Pro for education can be downloaded from http://sketchup.google.com/intl/en/industries/education.html. There are further details of licensing for this at http://sketchup.google.com/intl/en/industries/edu/primary.html.
- Find out more about placing buildings within Google Earth at http://earth.google.co.uk/. (See http://sketchup.google.com/training/videos/gsuge.html for relevant tutorials.)
- Student work can be found at http://picasaweb.google.com/gallery.sketchup/EducationK12# and case studies at http://goo.gl/Hi7T.
- For an application of virtual reality applied to real art galleries, see www.googleartproject.com.

2 Getting ready

e-safety

- The usual precautions should be followed when children are using the Internet for their research.
- Follow all the relevant school policies if children are to share objects or buildings they create online, taking particular care to limit the sharing of personal information.
- If using Google Earth to locate real or imaginary buildings, children should not share the location of their home, and you should check with your school leadership team before sharing the location of the school.
- When uploading examples of work to the virtual gallery, respect the intellectual property of the original artists, acknowledging sources, perhaps through virtual labels attached to the work.
Running the task – We are architects

Software: Google SketchUp (used for 3-D modelling)
Outcome: A virtual gallery in which children’s work might be displayed

Core

Step 1
> Explain to the children that they are going to create a virtual gallery in which their work might be displayed. Brainstorm a few initial ideas of the characteristics of art galleries, perhaps building on mind-mapping software and techniques from Unit 3.1 – We are researchers to collate these.
> Model the interface for Google Art Project and invite children to explore these galleries for themselves. Ask them to investigate common features of such spaces, as well as finding examples of designs that they regard as especially effective.
> Invite children to continue their investigations using Google, encouraging them to look at galleries or museums in other countries.
> Bringing the class back together, refine the list of characteristics in light of the children’s research and collate the examples they provide.
> Children sketch a few initial design ideas for their virtual gallery using pencil and paper.

Step 2
> Introduce the children to SketchUp, suggesting that they spend some time looking at online tutorials (see Things to do) and creating a few sample pieces in the environment.
> After showing the children a few examples online of geometrically inspired sculpture, such as that of Barbara Hepworth, Carl Andre and John Robinson (and perhaps reminding them of work created in Unit 4.5 – We are artists), invite them to use SketchUp to create a simple, virtual geometric sculpture that might take pride of place in their gallery.
> Allow them to receive feedback from one another on their sculptures, refining them in the light of this.

Extensions

> Collaborative editing software, such as Google Docs, PrimaryPad or Wallwisher, would be an alternative approach to gathering and categorising ideas at this stage.
> This would link well with practical modelling work – invite children to make a sculpture using building blocks or junk materials and then translate this as closely as possible into Google SketchUp.
> With access to a 3-D printer / rapid prototyping machine, physical models of children’s CAD designs could be created.
Step 3
> The children begin work on their virtual galleries, perhaps working in pairs. A typical workflow for this would be to begin with a ground plan, add walls, create gaps for doors and windows and then add ceilings or repeat for a second and any higher floor. The use of SketchUp’s 3-D Warehouse allows for fittings and furniture to be added to the space without all items having to be created.
> Children can explore the texture options for the surfaces they create, keeping in mind that their artwork is to be hung on these walls.
> Children should give attention to the internal and external features of their space. Some feedback from you and their peers at this stage would be useful.

Step 4
> Children import art to their galleries, using scanners and digital cameras where artwork does not already exist in a digital form. They should be encouraged to experiment with the placement of their art.
> The work on display need not be restricted to art. Their gallery could become an infinitely extendable virtual e-portfolio.

Step 5
> Children should experiment by creating different views of their gallery, adding these as scenes within a SketchUp animation. These animations should then be viewed by others in the class as the ‘architects’ provide commentary.
> Children should be invited to provide constructive feedback to one another. They should evaluate the success of their virtual space using the self-assessment prompts on the back of the Pupil Task Cards.

Share your children’s work at www.switchedonict.co.uk.
### Assessment guidance

Use the text below to relate the ICT skills children demonstrate to the assessment focuses and National Curriculum levels.

<table>
<thead>
<tr>
<th>AF1 Planning, developing and evaluating your work</th>
<th>AF2 Handling data, sequencing instructions and modelling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children working at LEVEL 3 should be able to:</strong></td>
<td><strong>Children working at LEVEL 4 should be able to:</strong></td>
</tr>
<tr>
<td>- Plan how they will use Google SketchUp to create and hang their gallery</td>
<td>- Import and organise examples of their art within the virtual space of the gallery</td>
</tr>
<tr>
<td>- Comment on how successful their gallery would be, if built</td>
<td>- Work in a logical order in creating their gallery structure</td>
</tr>
<tr>
<td>- Edit and improve the structure of their gallery and the layout of the art displayed in it</td>
<td>- Try out alternative ideas when creating their gallery, exploring ‘what if’ questions</td>
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<tr>
<td>- Describe how they, and professional designers, might use ICT when working in three dimensions</td>
<td></td>
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</tbody>
</table>

**Progression**

The following units will allow your children to develop these skills further:

- Unit 6.2 – We are fundraisers
- Unit 6.6 – We are publishers
Taking it further

When you’ve finished, you might want to extend the project in the following ways.

- Once children are familiar with Google SketchUp, they can use it to construct models or buildings in many other curriculum areas.
- Encourage children to stay interested in the built environment, e.g. on school trips.
- 3-D immersive worlds can provide opportunities for learning across the curriculum: be open to present and emerging possibilities here.
- With a suitable mobile phone, you might like to introduce children to at least some aspects of augmented reality, for example using the Layar browser: www.layar.com/.
- The galleries created by children can continue to be extended, with further work added over time, becoming a 3-D e-portfolio.

Cross-curricular ideas

Practical suggestions to bring this unit alive in the classroom.

Classroom ideas

- Printouts from the children’s gallery designs would make an effective display. Using Google SketchUp, children could design their own display for this or other work and work with you and teaching assistants to create it.
- More ambitiously, this work could link with design and technology tasks in which children create a physical model of their virtual art gallery.
- Examples of construction materials may be of use.

Weblinks

- Art gallery and museum websites, particularly those with information, plans and photos of the building: http://www.e-architect.co.uk/art_gallery_buildings.htm has some examples of contemporary art gallery design.
- Further information on Google SketchUp is available from http://sketchupdate.blogspot.com/. There is an extensive gallery at http://sketchup.google.com/community/gallery.html. The SketchUp Warehouse of virtual objects can be explored from within SketchUp.
- There are extensive resources online for those wishing to explore Second Life-style worlds in education. See, for example, http://education.secondlife.com/. OpenSim can be installed on a suitable server to provide a similar environment in which multiple avatars may interact: http://opensimulator.org.
- Schools using Moodle could explore the Sloodle extension: www.sloodle.org/moodle.
- There are a number of resources for educators wishing to use the 3-D virtual worlds of computer games in education, e.g. Tim Ryland’s work with Myst: http://news.bbc.co.uk/1/hi/technology/4160466.stm.

Visits

- If at all possible, a visit to a local or national art gallery should be linked to this unit, with children encouraged to explore the design of the gallery as well as the art on display.
- You could visit a local architects’ practice, or invite an architect, designer or engineer to school to discuss and demonstrate how they use CAD software models.

Books

Books on SketchUp


Books on art and museum architecture