KS2 Introduction to Abstraction Unplugged Activity:
Guess what.

Recommended year group: Any KS2
Activity duration: 30 mins
Cross-curricular links: Art and Design

Concepts and approaches

Abstraction

Overview

This is an unplugged activity in which pupils create simple models from modeling dough or draw quick sketches for a partner to guess what they are representing. In doing so they learn they are ignoring unimportant details and only including that which is most important, and in so doing are abstracting. Pupils link this idea to what is and is not included in simple computer simulations and games.

Pupil Objectives

- I can say what is important and I must include
- I can say what is unimportant and I can ignore
- I can say how a computer program (for example, a computer simulation or game) includes what is important

Introduction (5 mins)

- Invite two pupils to the front of the class to play a short 'guess what' game. Give one pupil a 'guess what' card and they must either sketch it, or make it using modelling dough so that their partner guesses what it is. The quicker their partner guesses correctly the better they have done.
- Lead a discussion to consider what enabled the guesser to work out what item was being drawn or modelled. Lead to the idea that the maker had to work out what was most important about the item, and what could be ignored, which helped the guesser work out what the item was.
- Model how to then think about and record what was included and what was ignored, creating a class example. You could use the table on slide 2 of the presentation or use a recording sheet displayed on the IWB using a visualiser. Ask pupils to help you think what was included and what was ignored for the item that was just guessed and show pupils how to add to the table. Ask pupils what other aspects might have been better to include and add to the table.
- Show slide 4 of the presentation to introduce the learning objectives, if you wish.

Main activity (15 mins)

- Group pupils in pairs. Give each pair a few 'guess what' cards, a whiteboard and pen, modelling dough and paper (or recording sheets) to note their include, ignore notes. (Alternatively group pupils in threes, and one pupil thinks of the 'guess what' item.)
- Pairs should now have time to play the game – with 1 player selecting a card and drawing or modelling the object and the other pupil guessing what has

- been created or drawn. They should then work collaboratively to work out what was included and what was ignored, adding notes about what might have been better. Ensure pupils swap roles during this time.
- As pupils are playing:
    - Circulate around groups to ensure pupils are thinking carefully about what was included and what was ignored and why.
    - Stop the whole class on a couple of occasions and compare objects or drawings being created for the same 'guess what' card to discuss what common aspects are being included or excluded.

Plenary (5 mins)

- Select two or three pairs to share examples and discuss as a class any similarities and differences in what was included or ignored. Or select any notable examples that showed surprising or interesting approaches to abstraction, e.g. examples that everyone found easy or hard.
- Ask pupils in pairs to think of computer simulation they know about (e.g a flight, driving, simulator at a theme park, planets simulator, fossil formation etc) or a computer game they know about and to think about what is included and what is not included. (Use slide 5/6/7 if needed). *See resources for a selection of simulations that could be displayed if needed.*
- Share ideas as a class and lead a discussion to explain that designers of simulations and games need to decide what to include or ignore when creating programs and that the skill of working out what is important and not important to include in essential. You could introduce the term abstraction and explain that in Key Stage 3 this is an important area of study in computing.

Differentiation

Support: Use additional targeted questions during main task to check basic understanding of what is important, not important.

Stretch & challenge:

- Challenge pupils to think about any common themes of what is and is not included across several computer games or simulations they are familiar with e.g Angry Birds and Candy Crush both have simple characters, scores, levels, bright colour but do not have complex story lines like some questing games. Looking for patterns and generalised aspects is another important computational thinking skill.
- Challenge pupils to describe a game in a minimum number of words. For example, Candy Crush is a timeline game. The player moves along the line solving problems in a step by step order. They can't move on without succeeding.

Assessment opportunities

- Informal teacher assessment of pupils during main task and plenary. Focus on understanding of:
    - Thinking what is important to include.
    - Thinking what can be ignored.
    - Being aware that thinking about what is ignored or included in computer simulations and games is an important aspect of design

Teaching Notes

Concepts and approaches

Abstraction

Abstraction is about simplifying things; identifying what is important without worrying too much about the detail. Abstraction allows us to manage complexity. In this activity, pupils abstract as they identify what can be ignored and what is important about the items they are drawing or modelling. They also consider what is ignored or included in computer simulations and games they know.

Curriculum links

Computing: Abstraction is part of the overarching aims of the computing curriculum which seeks to ensure that all pupils: 'can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.'

Art and Design: Pupils should be taught:

- to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials [for example, pencil, charcoal, paint, clay]

Prior knowledge

None, although having done Fossil Formation or another abstraction activity is an advantage.

Resources (downloadable from webpage)

- Guess what cards (or create your own topic based words)
- Modelling material e.g. playdough
- Individual whiteboards and whiteboard pens
- Paper or include/Ignore recording sheet
- Lesson presentation
- Access to the internet and/or scratch to display simulations if needed (See slide 6 of the presentation for examples.)

Related activities

KS2 Fossil Formation
KS2 Solar System Simulation
KS2 Modelling the Internet Activity