
Wooden Cubes



What's it about?

The material

These are wooden cubes with equal edges measuring two centimeters. These simple plain-coloured cubes are particularly suitable for building three-dimensional objects. These objects often exhibit geometrical structures such as symmetrical forms which can either be graphic or abstract. In addition the cubes can be used to illustrate arithmetic relationships through geometrical formations.

What should be stimulated?

Guiding Principle of Space and Layers

- Constructing concepts to describe positional relationships (beside, above, always in the middle, right, left ..), in order to communicate with others
- Visual perception
- Development of the idea of space

Guiding Principle of Patterns and Structures

- Developing and describing a pattern
- Examining simple geometrical patterns, describing and making predictions about how the pattern might continue.

Guiding Principle of Numbers

- Determining numbers with the material
- Establishing a visual concept of numbers
- Breaking down numbers with the material



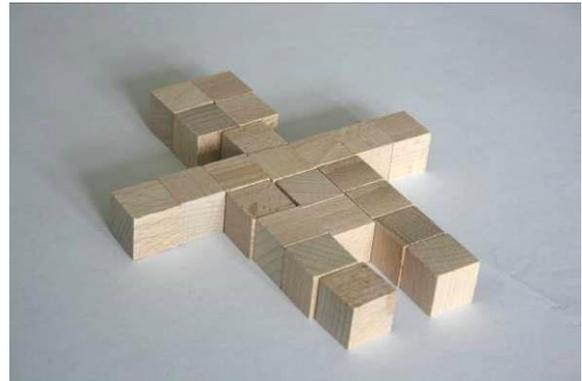
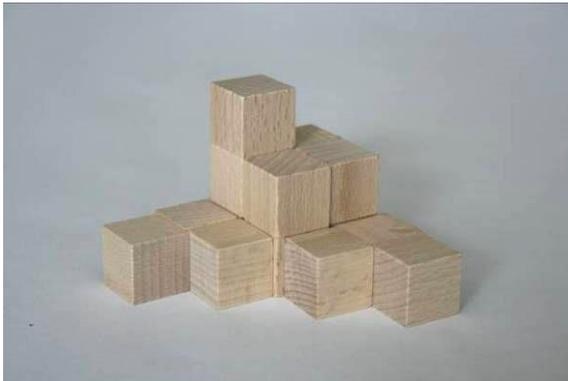
Suggestions for the use of the materials

Free Access

What can be done?

The children can either work alone or in groups. Each child should be provided with 150 to 200 cubes.

The child/The group works alone with the materials without instructions

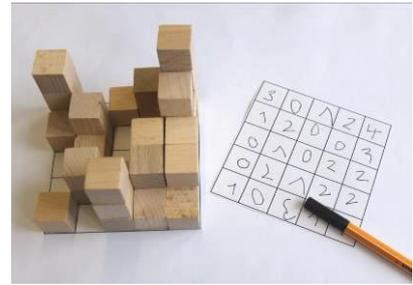


Suggestions for observation

- Is the child building recognizable objects?
- Is the child building symmetrical forms and shapes? Does the child maintain the symmetry?
- Is it possible to recognize building principles? Is the child using the building principles consistently? Can the child explain the building principles being used?
- Is the child building one or three dimensionally?
- Does the child build towers of different heights which are then compared with each other?
- Does the child count the cubes? How does the child go about counting the cubes (each one individually, divided into groups of a specific number, a few at a time, or positioned in rows/bundles)?

How to continue?

The objects which the children have created can serve as a starting point for further activities.



Starting point

the children's own objects

Possible impulse

- The child should create a building plan of one of his/her own constructions.
- Another child follows the plan and builds the same construction. Afterwards both constructions can be compared with each other.
- The objects which have been created can be photographed. The photos and the building plans can be kept for future reference for further activities:
 - The child follows a building plan and then looks for the relevant photo (as a control).
 - The building plan and the photo are already assigned to each other: The child builds either according to the plan or the photo and uses the other medium as a control.
 - The child has to assign the building plans to the correct photographs, without building the objects.
- The objects which have been built can be drawn free-handed by the children as a way of keeping a documentation.

Suggestions for observation

- Can the child make a plan of the object he/she has built?
- Can the child follow a building plan and re-create the object?
- Can the child find the photograph which suits an object?

Task

The child should determine the number of cubes being used.

Suggestions for observation

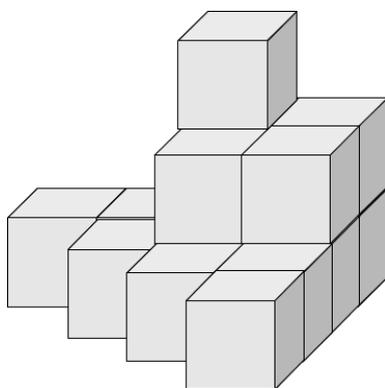
- How does the child go about determining the number of cubes?
 - Does he/she count the cubes individually?
 - Does he/she count the cubes in layers?
 - Does the child mentally rearrange the cubes?
- Does the child take into account cubes which might be hidden from view?

Following Instructions

What can be done?

The children can either work alone or in groups.

Building following pictures and templates



1	1	3	2
	1	2	2
		1	1
			1



Material

Wooden cubes with equal edges, building plans, photos, drawings and oblique views of the objects to be built (documents which have been prepared both by the children themselves and the teaching staff)

Task

- The child should build the object following the building plan and then find the suitable oblique view.
- The child should build the object with the help of the oblique view and then compare it with the relevant building plan.
- The child should develop a building plan for an object he/she has designed. Another child follows this template to re-create the object. Finally the two objects are compared with each other.

Suggestions for observation

- Can the child build an object following an oblique view?
- Can the child build an object following a building plan?
- Can the child recognize the oblique view which suits an object?
- Can the child recognize mistakes in the building plan?

Determining the number of cubes in a structure

Material

Wooden cubes with equal edges, building plans, photos, drawings and oblique views of the objects to be built (documents which have been prepared both by the children themselves and the teaching staff)

Task

- The child should first determine the number of cubes to be used, count the number of cubes required and then build the structure.
- The child builds a structure and then determines the number of cubes which have been used.

Suggestions for observation

- How does the child go about determining the number of cubes?
 - Does he/she count the cubes individually?
 - Does he/she count the cubes in layers?
 - Does the child mentally rearrange the cubes?
- Does the child take into account cubes which might be hidden from view?

Finding Cube-quadruplets (-quintuplet, -sextuplets)

Cube-quadruplets are a variety of cube formations requiring four cubes, where at least two cubes are always touching each other along their sides:



Material

Wooden cubes, adhesive tape (re-useable)

Task

- The child should build cube-quadruplets (-quintuplet, -sextuplets). For easier comparison the cubes could be glued together with adhesive tape.

Suggestions for observation

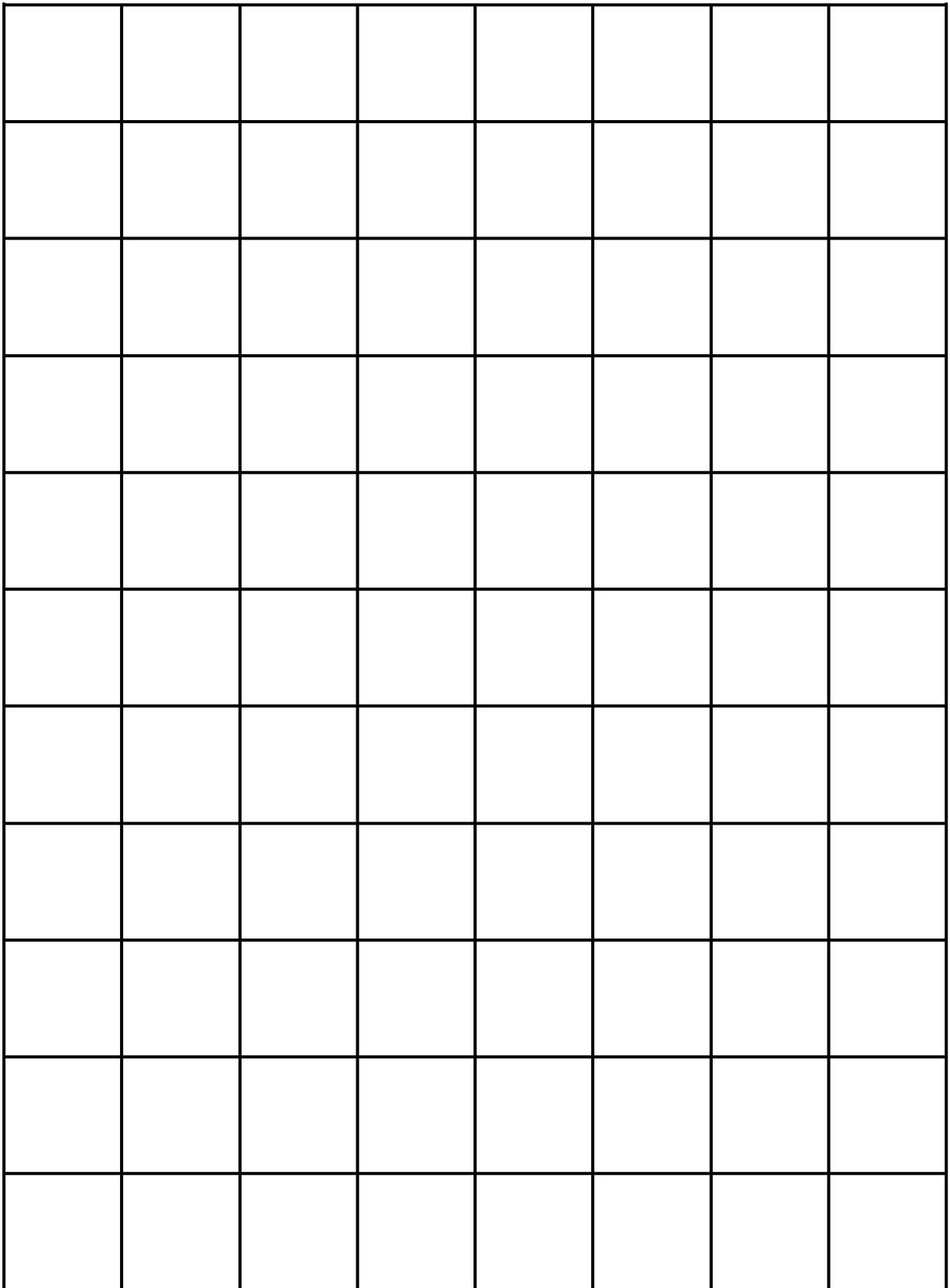
- How does the child proceed (systematically, unsystematically)?
- Does the child find all the possible cube-quadruplets?
- Can the child recognize identical cube-quadruplets?

Documentation

- Freehanded drawings of the structures
- Description/Design of structures in text form
- Documentation with the help of building plans (layouts)
- Documentation with the help of photographs



Template: Grid for Building



Template: Building Plan

