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# Mugglestones

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## What's it about?

### The Material

Mugglestones are colourful, circular, semi-transparent plastic beads, in the colours red, yellow, green and blue. The combination of material, shape and colour result in Mugglestones having a high tactile appeal. On the one hand they encourage sorting and counting, but they are also suitable for creating recognizable pictures or abstract designs.

The resulting arrangements in many cases show geometric structures (such as symmetries or displacements). Furthermore, with the help of the Mugglestones arithmetical regularities based on geometric structures, can be illustrated and discovered.

### 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
- Pursuing axis symmetry and figure displacements
- Relating shapes to each other

#### Guiding Principle of Patterns and Structures

- Sorting and structuring
- Designing a pattern
- Constructing a pattern
- Developing a pattern
- Describing a pattern

## Guiding Principle of Numbers

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

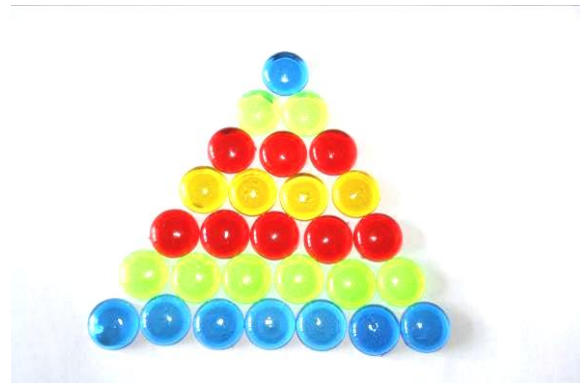
## Suggestions for the use of the materials

### Free Access

### What can be done?

The children can either work alone or in groups. Each child should be provided with at least 200 Mugglestones.

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



### *Suggestions for observation*

- Is the child building recognizable objects?
- Does the child create a pattern (flat, linear)?
- Does the child continue symmetries which have been started?
- Can the child explain the building principles being used?
- Does the child sort the Mugglestones according to colour?
- Does the child count the Mugglestones? How does the child go about counting the stones (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 patterns

### *Impulse*

- The child should explain how he/she developed his/her pattern.
- Another child should create the same pattern.
- A different child should continue the pattern.
- Yet another child should explain how the copied pattern was developed.
- The child should document his/her pattern: freehanded documentation, Mugglestones as a template, print, stamp. The image can serve as a reference for other children.
- The pattern is photographed.
  - The photo serves as a template for other children.
  - Using pieces of paper sections of the pattern can be obscured. The task is then to fill in these "holes" in a meaningful fashion.

### *Suggestions for observation*

- Is the child able to explain the pattern formation?
- Is the child able to copy a pattern?
- Is the child able to continue a pattern? Does the child recognize the underlying rule? Can he/she verbalize the rule?

### *Starting point*

Patterns with axial symmetry

### *Supplementary material*

Mirror

### *Task*

With the help of a mirror the child should discover the examples of symmetry in the pattern.

### *Suggestions for observation*

Does the child find existing reflecting axes? How does he/she proceed?

### *Starting point*

The child has sorted the Mugglestones according to colour.



### *Impulse*

- The child has to discover if there are equal numbers of stones of each colour.
- The child has to work out how many stones need to be supplemented in order to have an equal number of each colour.

### *Suggestions for observation*

- How does the child go about determining the number of stones?
  - Does the child compare the amounts – without counting – in pairs (one to one comparisons)?
  - Does the child count the Mugglestones individually, in groups, with or without touching them?

## Following Instructions

### **What can be done?**

The children can either work alone or in groups.

### **Designing, laying and continuing patterns**



### *Material*

Mugglestones; templates documented by the children (photos or drawings); patterns created by the educator or the children themselves.

### *Task*

- The child should lay a predetermined pattern.
- The child should continue a given pattern.
- One child designs a pattern. Another child copies the pattern and continues it.
- The child (with a partner) should create a pattern in which no Mugglestones of the same colour touch each other.

### *Suggestions for observation*

- Can the child copy a given pattern?
- Can the child continue a given pattern?
- Can the child explain the underlying regularity of the pattern?

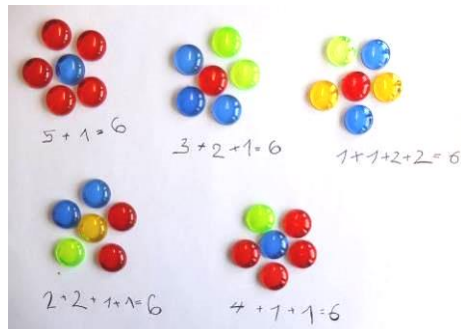
### **Segmenting Numbers**

*Material*

Mugglestones, Paper and Pencils

*Material*

The child should find different ways of segmenting a given quantity and use the Muggle stones to depict the number (e.g. in the shape of a flower). The results should be documented.



### *Suggestions for observation*

- Does the child work systematically or not?
- Does the child find all the possible ways of splitting the numbers (two/three/four summands)?
- Can the child explain the method he/she is using?

### **Documentation**

- Freehanded drawings
- Documentation with templates, stamps or punches
- Description of patterns in text format
- Documentation with the help of photographs