JUNIOR ACADEMIA

Spatial Learning Class

at Nishimachi

The focus on memory-based learning is gradually being reduced and the ability to analyze presented information quickly to solve problems is increasing in priority.

WHY SHOULD THIS TYPE OF INSTRUCTION BE STARTED AT THIS TIME?

Emphasizing the need for early childhood education, we want to use the period from pre-school to the lower grades of elementary school to develop strong skills of spatial ability, developed intuition and logical analysis.

HOW DOES THIS INSTRUCTION DIFFER FROM OTHER MORE TRADITIONAL LEARNING METHODS SUCH AS KUMON?

People with high spatial abilities are better able to assess information to see the big picture and derive overall objectives. This is helpful not only for the understanding of mathematics and languages but also for sports and other skills.

Developed Intuitive skills promote the ability to quickly identify the most important concepts. This differs from undeveloped intuitive skills which are not effective for complex problems and is difficult to reproduce consistently.

Supporting the above is the development of abilities in logical analysis which in coordination with intuitive skills promotes advanced math awareness

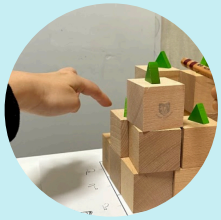
This is particularly important as the development of intuitive skills is easier in early childhood, while changing intuition becomes more difficult as you approach middle school.

EXPLANATION AND DESCRIPTION OF MATERIALS AND CURRICULUM

We have developed original materials and text that are focused on developing spatial ability, intuitive skills and logical awareness.

Our materials are methods can be used from early childhood prior to a child's ability to write by utilizing stickers and other methods that are easier for young children to grasp.

Our Activity Pillars



Spatial Ability

Numbers

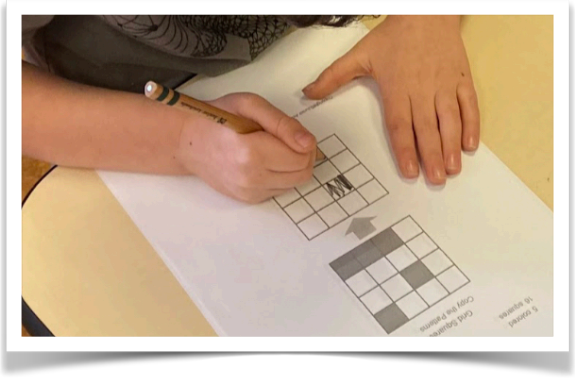
Shapes

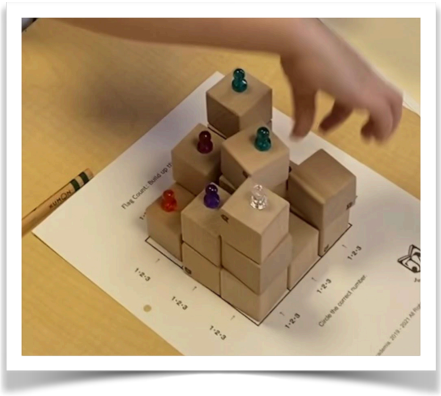
Grid Squares

[Focus]
Spatial Ability Developed Intuition Memory

[Goal]
This activity is to strengthen memory in a way which will lead to developing speed reading skills in the future.

Observe the grid of black square(s) on the top first and spot the same square(s) on the grid of blank squares at the bottom. For younger students, we offer them to use square-shape stickers. When he/she becomes comfortable with using pencils, he/she will color in the squares. Eventually, he/she will memorize the grid of black squares, cover the top grid, and fill in blank squares.





Flag Count

[Focus]
Spatial Ability Developed Intuition Counting Imagination Logical Thinking

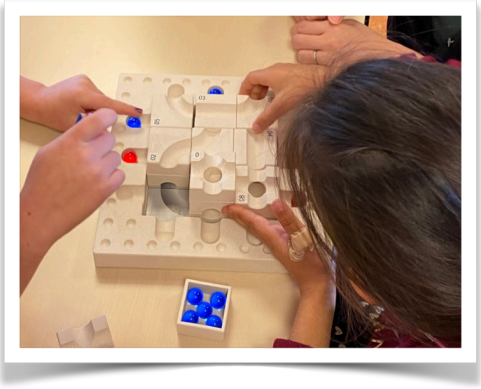
[Goal]
This activity is to strengthen logical thinking skills with an objective eye.

Start by building up wooden cubes following a described plan. Next place green triangle-shaped pieces on top and count the visible green pieces from 2 to 4 different directions. As students develop their spatial ability, they will be able to imagine how the plan will look like without using the wooden cubes.

cuboro® Tricky Ways

[Focus]
Spatial Ability, Intuition, Logical Thinking, Creativity, Imagination, Problem Solving

As students play building a marble run, they will need to meet some "tasks" to use a specific number of cubic path pieces. Once they become familiar, they will play a game to think 12 different routes working as a team.



WHAT IS SPATIAL ABILITY?

Spatial ability is the capacity to understand and remember the spatial relations among objects. This ability can be viewed as a unique type of intelligence distinguishable from other forms of intelligence, such as verbal ability, reasoning ability, and memory skills. Spatial ability is not a monolithic and static trait, but made up of numerous sub skills, which are interrelated among each other and develop throughout your life.

WHY IS SPATIAL ABILITY IMPORTANT?

Visual-spatial skills are of great importance for success in solving many tasks in everyday life. For instance, using a map to guide you through an unfamiliar city, merging into high-speed traffic, and orienting yourself in your environment (as when you are learning your way around a new school building) are all activities that involve spatial ability. Other examples of tasks requiring visual-spatial ability include packing (as when you must decide if a certain box is large enough for the objects you want to put into it) and using mirror images (as when you are combing your hair while looking into a mirror).

Spatial ability is also important for success in many fields of study. Mathematics, natural sciences, engineering, economic forecasting, meteorology and architecture all involve the use of spatial skills: For instance, an astronomer must visualize the structure of a solar system and the motions of the objects in it. An engineer visualizes the interactions of the parts of a machine. Radiologists must be able to interpret the image on a medical X-ray. Chemical sum formulas can be viewed as abstract models of molecules with most of the spatial information deleted; spatial skills are important in restoring that information when more detailed mental models of the molecules are needed. More formal evidence on the importance of spatial ability in math and science education has been compiled by many researchers, including Humphreys, Lubinski, Shea, Wai, and Webb. Some of their publications are cited in the *Readings* section below.

Traditionally, critical features of spatial ability in science education have been the skills required to construct efficient mental models of objects from verbal descriptions in textbooks or instruction. In some fields, textbooks and instruction materials have been developed that are explicitly designed to use spatial skills as a key to mastering the subject matter. Several such books are listed in the *Readings* section at the end of this document.

While the development of such materials continues to be an important concern, recent technological developments have added further emphases to the issue.

Visual-spatial ability is becoming increasingly important with the development and proliferation of new technologies such as imaging, computer graphics, data visualization, and supercomputing. Highly demanding spatial tasks include the construction of mental representations of object configuration from images on several screens representing different perspectives, as in some fields of surgery.

In other fields, powerful computer graphic technologies are being used to create complex visual images of processes that occur in the natural world. These techniques are used to depict the intricate workings of the immune system, the complex meteorological interactions that occur in a developing thunderstorm, hurricane, or tornado, and the relations of atoms and molecules in chemistry.

Despite their importance in so many fields, in science education, spatial skills rarely work in isolation from other abilities, such as logical reasoning, efficient memory retrieval, and verbal skills, and deficits in one area can often be compensated by excellence in others. An important type of exceptional talent in math and science, however, is the ability to easily switch form one efficient mode of representation to another (e. g., from a conceptual to a spatial mode and vice versa).

Excerpt from the Johns Hopkins Center for Talented Youth