

ACTIVITY 01

Mazes and Graphomotor Skills with the 3D Pen

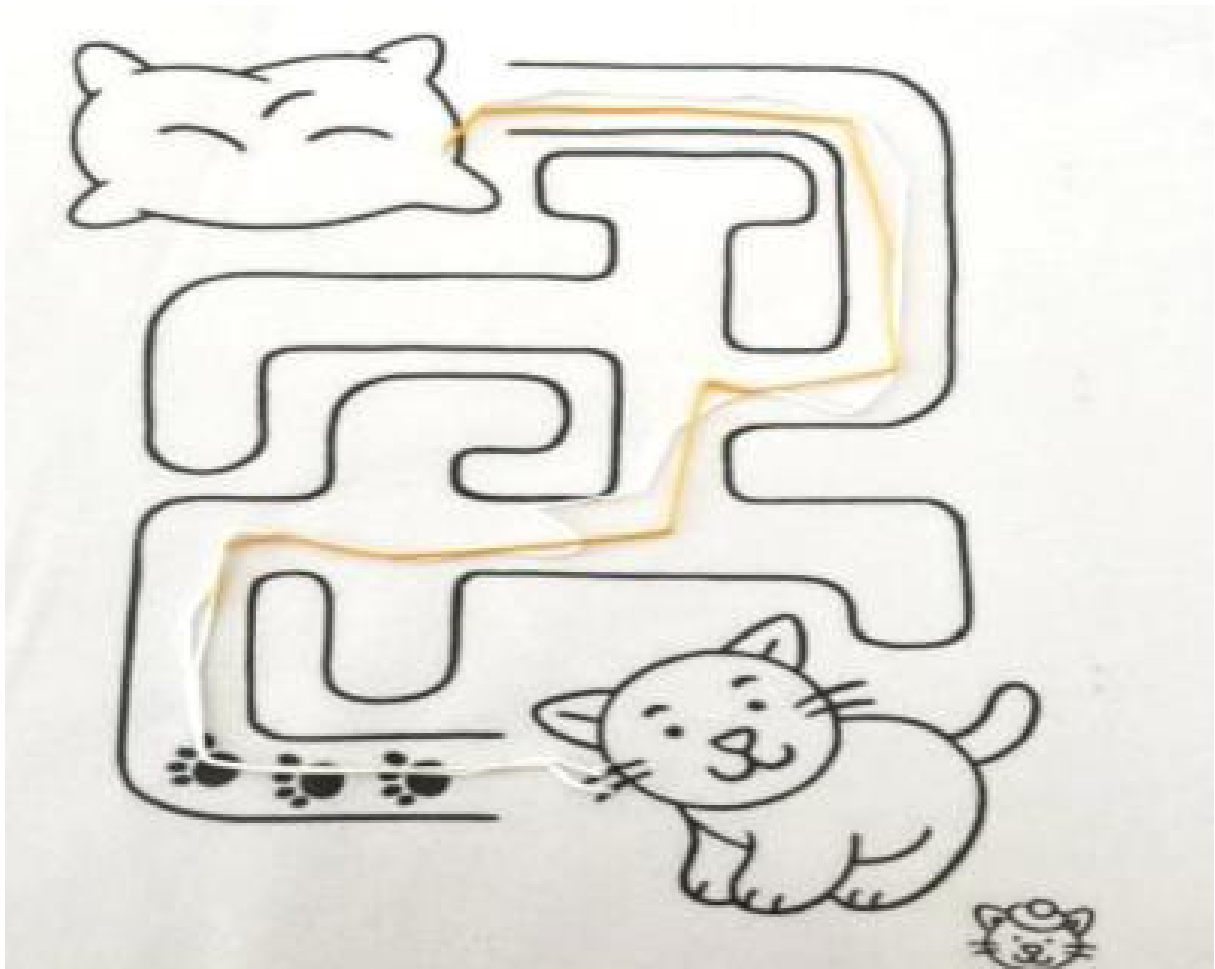


Illustration from the activity

Teaching Planning Tool - 3D Modelling and 3D Printing (STEAM)

Part 1: Conceptual Planning (General Information)

Title of the Thematic (STEAM) Unit

Mazes and Graphomotor Skills with the 3D Pen

Authors / School / Country:

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SUBJECT	Mathematics and Working with Information; Arts and Culture (pre-primary)
YEAR	Children aged 5-6 (pre-primary education)
NUMBER OF LESSONS	1-2 educational activities (free / guided play)
DIDACTIC OBJECTIVES	Develop graphomotor skills, spatial orientation and hand-eye coordination through working with a simple technical tool - the 3D pen.
SPECIFIC OBJECTIVES	The child understands the 3D pen as a tool for creating lines/shapes; distinguishes start and end of a path; perceives the direction of a line; traces mazes and graphomotor elements safely.

Note

This activity follows the project's national (SK) pre-primary/primary layout. This page summarises it in the common STEAM template format; the full original activity (procedure, STEAM links, cross-curricular connections, reflection and photo documentation) follows on the next pages.

Mazes and Graphomotor Skills with the 3D Pen

Educational Area	Man and the World of Work, Man and Nature, Arts and Culture, Mathematics and Working with Information
Subject / Domain	Mathematics and Working with Information, Arts and Culture
Topic	Mazes and Graphomotor Skills with the 3D Pen
Age Group	5–6 years (pre-primary education)
Total Time	1–2 educational activities within free play and guided play sessions

CROSS-CURRICULAR LITERACIES

Visual Literacy

The child develops the ability to understand visual language, follows lines, shapes and directions, and uses them when solving maze tasks and graphomotor elements.

Digital Literacy

The child is introduced to a simple technical tool (3D pen) as a means of creation, learns the basic rules of safe use and age-appropriate handling of technology.

Environmental Education

The child becomes familiar with responsible use of equipment, careful handling of materials and minimising waste during creative activity.

STANDARDS

Content Standard

Through play and guided activities, the child develops graphomotor skills, orientation in space and hand-eye coordination. They follow simple lines, paths and mazes, distinguish the beginning and end of a route, and gain basic experience of using a simple technical tool in creative activity.

Performance Standard

The child traces simple graphomotor elements and mazes, follows the direction of a line, creates a continuous trace using the 3D pen, observes agreed safety rules, and expresses the procedure and outcome of their activity in simple sentences.

SPECIFIC OBJECTIVES

Cognitive Objectives

- The child understands that the 3D pen is a simple technical tool for creating lines and shapes.
- The child distinguishes the start and end of a path in a maze or graphomotor element.
- The child perceives that a line travels in a particular direction.

Affective Objectives

- The child participates in graphomotor and creative activity with joy and enthusiasm.
- The child shows perseverance when tracing a line.
- The child respects agreed working and behavioural rules in a small group.
- The child experiences a sense of achievement from a completed task.

Psychomotor Objectives

- The child traces simple graphomotor elements and mazes using the 3D pen.
- The child develops fine motor skills and hand-eye coordination.
- The child uses the 3D pen in an appropriate and safe manner under teacher supervision.

STEAM CONNECTIONS

S	The child perceives movement, direction and the space in which the 3D pen moves.
T	The child becomes familiar with the function and use of the 3D pen.
E	The child creates a route in a maze or traces a graphomotor element.
A	The child works creatively with line, shape and colour.
M	The child orients themselves in space, follows direction (up, down, left, right) and order of movement.

TEACHING ORGANISATION

The activity takes place in the kindergarten classroom. Children work in small groups (3–5) at tables. The teacher works with one group at a time. Two options are offered: Option A – Maze; Option B – Graphomotor worksheets.

Organisational Forms

- Individual work – the child independently traces the maze or graphomotor element.
- Teacher-led activity – explanation, demonstration, safety supervision and individual support.
- Small group work – children observe each other and encourage one another.

Teaching Methods

Learning through play, experiential learning, guided conversation, teacher demonstration, practical activity, observation, encouragement, age-appropriate verbal reflection.

Didactic Materials

Low-temperature 3D pens designed for children; filaments in various colours; heat-resistant mats; mazes (printed and laminated); graphomotor worksheets (printed and laminated); tables and chairs adapted to the age of the children.

METHODOLOGICAL PROCEDURE

Motivation

Teacher: "I have an interesting task for you today. These are paths and mazes. Let's find out together which way the path leads and where it will take us."

Teacher points to the start and says: "We begin here and go all the way to here. First we will trace the path with our eyes and finger, and then draw it using the 3D pen."

Explaining How the 3D Pen Works

"This is a 3D pen. When we switch it on, a thin thread comes out. We hold the pen carefully, sit quietly and look at what we are drawing."

Option A – Maze

The child traces the maze with their finger first, finds the correct direction, then traces it using the 3D pen. The teacher encourages: "You are doing well. Try going even more slowly." If the child strays off the path: "Never mind, let's try again."

Option B – Graphomotor Worksheets

The child traces the graphomotor element with their finger, perceiving the direction of movement. Then traces it using the 3D pen, slowly and with focus. Teacher: "Can you see how raised it is now?"

Closing Activity

Short conversation: "Where did you start?" / "Where did you get to?" / "What was difficult for you?" / "What does this shape remind you of?"

CROSS-CURRICULAR CONNECTIONS

Mathematics and Working with Information

The child develops orientation in space and perception of direction (up, down, left, right), following paths from start to finish.

Language and Communication

The child names verbally which way the path leads. The teacher supports vocabulary development through targeted questions.

Arts and Culture

The child uses line as a visual element, perceiving shape, direction, rhythm of movement and colour.

Man and the World of Work

The child learns safety rules, good working habits and a responsible approach to equipment.

Movement and Health

Working with the 3D pen develops fine motor skills, hand-eye coordination and correct sitting posture.

PHOTO DOCUMENTATION

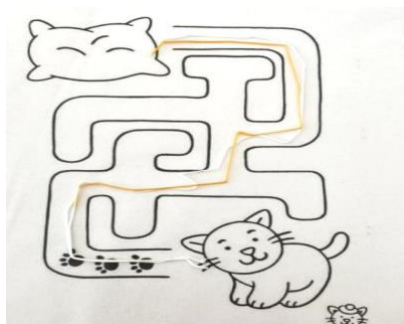


Fig. 29 Clean and completed worksheet 1

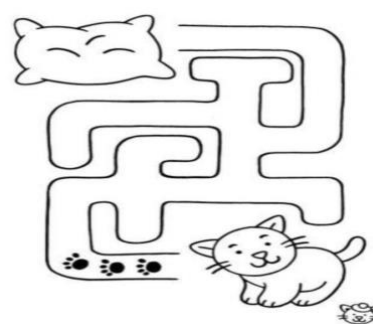


Fig. 30 Child tracing the maze path



Fig. 31 Completed worksheet 2

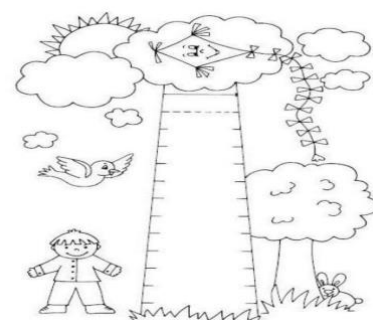


Fig. 32 Alternative worksheet options



Fig. 33 Child working with the 3D pen

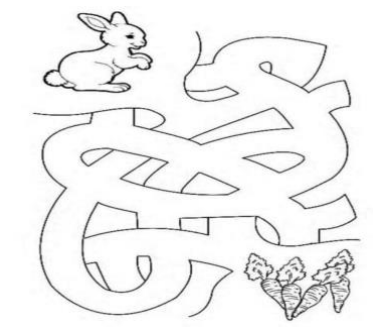


Fig. 34 Completed graphomotor exercise

REFLECTION

The activity was carried out with children aged 5–6. Children showed great interest; the 3D pen was attractive and motivating. Working with smaller groups and offering a choice between the maze and the graphomotor worksheet proved most effective. Differentiation allowed every child to experience success. Safety rules and correct pen grip needed frequent reminders, but children gradually became more focused and confident.

Recommendations for the future:

- Use even simpler patterns for younger or less able children.
- Expand the range of graphomotor worksheets to include different difficulty levels.
- Include the activity repeatedly throughout the school year as part of graphomotor preparation for primary school.



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