Vision Empower & XRCVC

Teacher Instruction KIT

Tangrams and Design

Syllabus: Karnataka State Board
Subject: Mathematics
Grade: IV
Textbook Name: Mathematics Text cum Workbook
Chapter Number & Name: 17, Tangrams and Design

1. OVERVIEW

1.1 OBJECTIVE & PREREQUISITES

Objective

Students will be able to

- draw simple shapes using tangrams,
- know the perimeter and area of simple shapes,
- draw different patterns of designs using known shapes,
- draw different patterns of designs using hexagonal and triangular shapes

Prerequisite Concept

- Area and perimeter of simple shapes.

TIK_MATH_G3_CH1_Shapes

Content Index

*Kindly Note: Activities marked with * are mandatory*

Activity 2: To draw different patterns of designs using hexagonal and triangular shapes

LET'S DISCUSS: RELATE TO DAILY LIFE*

EXERCISES & REINFORCEMENT

Activity 1: Practise Problems

IMPORTANT GUIDELINES*

Exercise Reading

Perform Textbook Activity

Provide Homework

2. LEARN

2.1 KEY POINTS

- If all the sides of a triangle are equal, then it is called an equilateral triangle.
- A hexagon is a geometrical shape bounded by '6' equal line segments.

2.2 LEARN MORE

3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

Activity 1: Tangrams

Materials Required: Tangram

Prerequisites: None

Activity Flow

- *Divide the students into a group of 4.*
- *Give a tangram to each group (7 pieces tangram).*
- *Ask the students to form a square using those 7 pieces without overlap.*
- *Ask the students to assemble the seven pieces to make a square.*
- *Discuss the following questions with the children.*
    - *How many different shapes are there in your tangram?*
    - *What are those shapes? The shapes are square, parallelogram and right-angle triangle.*
    - *Ask the difference between the square and triangle. The answer is the square has 4 sides and the triangle has 3 sides.*
- *Explain about a tangram.*
    - *Invented in china approximately 200 years ago, a tangram is a two-dimensional rearrangement puzzle created by cutting a square into seven pieces (seven geometric shapes).*

- *These tangram shapes can be fitted together as a large square, rectangle, or triangle.*

3.2 CONCEPT INTRODUCTION ACTIVITIES

SHAPES

Activity 1: Draw simple shapes using tangrams.

Materials Required: Tangrams, tactile diagram of simple designs of page 116 and 117 from the book. (Refer to Karnataka state board, Tangrams and Design)
Prerequisites: Identification of shapes (refer to activity 1).

Activity Flow

- *First, take a bowl of water and put all the shapes into the bowl and let it completely dip in the water then use those shapes and ask them to make their own designs on the back of the slate. This technique of dipping the shapes in the water helps it stick to the slate and which will not move easily.*
- *Then give them a tactile diagram of designs, let them explore the diagram and ask them to draw the same design using shapes.*

AREA AND PERIMETER

Activity 1: Perimeter and Area of simple shapes.

Materials Required: Tangrams, slate and bowl of water.
Prerequisites: Area and perimeter.

Activity Flow

- *Make a group of 2, let each group pick a shape and ask them to collect many pieces of that same shape.*
- *They have studied the area and perimeter at the beginning of the year, asking them to find the perimeter and area of a slate using the shapes.*
    - *Perimeters can be found by arranging the same shapes around the sides of the slate and if each shape represents one unit then the total number of shapes will be the perimeter of the slate.*
    - *Similarly, ask them to fill half of the space of the slate. Then ask them to count the number of pieces required to fill the half of the slate, and those many shapes required will be the area of the half slate. To find the complete area of the slate, multiply the value obtained for half by 2.*
- *Using the above method, ask them to find the area and perimeter of the Taylor frame and book.*

PATTERNS

Activity 1: To draw different patterns of designs using known shapes

Materials Required: Tangrams, slate and bowl of water.
Prerequisites: Identification of shapes (square, rectangle, triangle and circle)

Activity Flow

- *Ask the students, which are the shapes that are known to them like, square, rectangle, triangle and circle.*
- *Ask them to select any one particular known shape and construct a design.*
- *Similarly, for each shape let each of them construct a design.*
- *Ask everybody's opinion about the design they have created.*
- *Also, tell them that this kind of arranging shapes without leaving gaps and not overlapping with each other is called tessellations. I.e. an arrangement of shapes closely fitted together, especially of polygons in a repeated pattern without gaps or overlapping.*

Activity 2: To draw different patterns of designs using hexagonal and triangular shapes

Materials Required: Tangrams, slate and bowl of water.
Prerequisites: Identification of shapes (square, rectangle, triangle and circle)

Activity Flow

- *Make two groups, and give 6-sided or hexagonal shapes to one group and triangular shapes to the other group.*
- *Ask them to arrange the shapes on a flat surface and ask them to observe the pattern.*
- *The pattern obtained by arranging hexagonal shapes is the same as the pattern we see in the beehive.*

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

- Different houses and buildings are built in different geometric shapes to give a new look.
- The floor tiles can be designed using different geometric shapes.
- video games, animations and things like that, are made using geometric concepts

4. EXERCISES & REINFORCEMENT

4.1 PRACTICE AND EXERCISES

Activity 1: Practice Problems

Materials Required: Tangrams and tactile diagrams.

Prerequisites: None

Activity Flow

I. *Create a square using two pieces of a triangle.*
II. *Create a triangle using exactly two pieces.*
III. *Create a parallelogram using exactly two pieces.*
IV. *Give the tactile diagram of an arrow mark and ask the students to make that shape using the tangrams.*

4.1 IMPORTANT GUIDELINES*

Exercise Reading

It is very important that the children practice their learnings as well as their Reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

Perform Textbook Activity

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

Provide Homework

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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