# Vision Empower & XRCVC

**Teacher Instruction KIT** 



Syllabus: Karnataka State Board Subject: Math Grade: 5 Textbook Name: Karnataka State Board Chapter Number & Name: 6. Angles

# **1. OVERVIEW**

**1.1 OBJECTIVE & PREREQUISITES** 

## Objective

- Introducing an angle
- Representation of an angle
- To measure an angle using protractor
- Types of angles

## **Prerequisite Concept**

• Circle *TIK\_MATH\_G4\_CH7\_Circles* 

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Kindly Note: Activities marked with \* are mandatory

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org : VisionEmpower

number: VE\_TIK\_M\_G5-06

user: admin@example.com

## **2. LEARN**

### **2.1 KEY POINTS**

1. Angle: In geometry, an angle can be defined as the figure formed by two rays meeting at a common endpoint. Angles are measured in degrees, using a protractor.

- Vertex: The common starting point in an angle is a vertex.
- Arms: The two rays forming an angle from a fixed point are arms. They are also called the sides of the angle.

 2. Right angle: It is the formation of a 90 degree angle when there is the meeting point between two perpendicular straight lines. Which is called a right angle is an 90° angle.
3. Acute angle: An acute angle is an angle that measures less than 90 degrees. ... For example, in an equilateral triangle, all three angles measure 60°, making it an acute triangle.

4. Obtuse angle: An obtuse angle is any angle larger than 90 degrees. In other words, if the angle formed where two line segments meet goes beyond a right angle, it's obtuse.

### 2.2 LEARN MORE

### **3. ENGAGE**

**3.1 INTEREST GENERATION ACTIVITY** 

# INTRODUCTION TO AN ANGLE

#### Activity 1: Introduction to an angle

Materials required: Geometry kit, parchment paper, Prerequisites: Concept of lines and drawing lines

Activity Flow

Before studying angle, let us do one interesting thing. Draw a dot anywhere on the parchment paper. Name this dot 0. This dot 0 is called point. From this point draw as many straight lines as you can. Ask the students, how many did they get?

Draw another dot and name it P. Join OP. A line segment OP with endpoints O and P. A line segment is a part of a line. A line has no endpoints like a line segment. A line has many line segments in it.

Have you ever thought why we say sun rays and not sun lines? Is ray different from a line? Yes, it is. A ray has one fixed point. It cannot go in both directions like that line. For sun rays, the Sun is the fixed point and thus we say the light comes as sun rays.

Draw one more point other than O and P and call it R. Now join OR and OP. What will you find? Two lines and a common point O. This is an angle.

#### 3.2 CONCEPT INTRODUCTION ACTIVITIES CONSTRUCTION OF AN ANGLE Activity 2: Construction of an angle

Materials required: Paper, Ice cream sticks, Model of a clock and tactile model of an angle, parchment sheet and geometry kit, strips of paper. Prerequisites: Concept of lines and construction of a circle

#### Activity Flow

*Start with the discussions for the following questions in the class:* 

- Ask them, when they stand in a line for march-past, they will turn to their right or left, according to the instructions. Ask while turning can they say, how much they have turned?
- Ask them, how much they have to turn the tap to get water?
- Ask them if they have observed the regulator of a fan or volume button? To increase or decrease the speed of a fan and volume respectively, we have to turn the knob of the regulator. What is the measure of this rotation?
- The drivers of any vehicles will turn the steering wheel. How can we measure the rotation of the steering wheel?

Explain to them the concept of an angle by showing the model of a clock or by joining the two ice cream sticks such that they share a common initial point through which it forms a corner. Also show them the working model of a clock and the two hands in it will always make an angle for every rotation, where rotation of the hands can be represented as an angle. But here to measure an angle both hands should be fixed.

Similarly, ask the students to list the real life examples which they come across in their daily life.

For example:

- Opening the door.
- Opening the book or turning the page.
- Opening the lid of the box.

### Follow the activity:

- Ask the students to think about the first few examples which we discussed in the beginning about an angle and ask if they have observed that everything was about rotation in a circle.
- Now, ask them to take a compass and keep one hand fixed and rotate the other hand on the parchment sheet to get the circle.
- Mark the centre by putting a pin and ask them to put two pins on the boundary or circumference of a circle with some distance in between. Name the centre as 0.
- Now, let them tie thread from the centre to both the pins and pasting paper strips to both pins from the centre in place of thread. And name one of the lines from the centre as OA and the other line from the centre as OB.
- Ask them, what do they observe? If they move the line OB, keeping OA fixed without changing its place at O.

Answer: This measure of the movement of line is called an angle.

- An angle has two rays and one common point.
- Vertex: The common starting point in an angle is a vertex.

• Arms: The two rays forming an angle from a fixed point are arms. They are also called the sides of the angles.

#### **REPRESENTATION OF AN ANGLE**

#### Activity 3: Representation of an angle

Materials required: Long sheet of paper, tactile diagram of an angle Prerequisites: Concept of intersecting lines

### Activity Flow

Ask them to fold the paper in half again, fold the paper from left to right or left to right and crease it. After that let them release or unfold the paper and ask if they could see a formation of an angle between the adjacent folds of paper.

Also, show them the tactile diagram of an angle. Here in the tactile diagram OA and OB are the two rays. These arms or the sides of the angle. The point O is called the vertex of the angle. So, we represent the angle as AOB or BOA as shown in the circular figure.

#### **MEASUREMENT OF AN ANGLE USING PROTRACTOR**

#### Activity 4: To find measurement of an angle using protractor

Materials required: Push pins, geometry kit, parchment paper, paper strips, circular paper Prerequisites: Construction of circle and line

### Activity Flow

- Ask the students to draw a big circle on parchment paper.
- Let them put a pin at the centre along with joining the initial point of the two paper strips.
- Now, let each of them make their own angles by keeping one side fixed and move the other side.
- Ask them, in which model the angle formed is greater? Ask them, how do they do it? Answer: In order to answer the above question, let us understand how to measure an angle. Ask the students to rotate the strip of paper from a fixed position. When this strip of the paper comes back to its original position, one rotation will be completed. We call this rotation as one complete angle. This one rotation will trace the complete circle. If the circle is equally divided into 360 parts, we get 360 angles. This one angle is called one degree. So the measure of one complete angle in a circle is 360 degrees.
- This can be observed in rotating the regulator of the stove, fan, steering, tap etc.
- In order to introduce a protractor which is an instrument to measure an angle, a few activities are as follows.

- Ask the children to fold the circular paper exactly in half then you get a semicircle and then fold the semicircle into half then you get the two creases meeting at one common point. Then ask the student to mark the centre of a circular paper.
- Ask them to fold the paper along its centre or make half fold.
- The measure of the angle at the centre is 360 degrees. Therefore, half of this must be 180 degrees.
- This measure of 180 degree is called straight angle. There is an instrument in the geometry kit called a protractor. Observe its shape. We can measure the angle using a protractor. In this protractor 0 to 180 is marked.
- Similarly, if we fold the semi circles then if we unfold and see, will get 4 parts. 4 equal parts of 360 degrees is 90 degrees. Ask them even in march past, how many equal rotations they take to come back to the initial position? Answer: 90 degree

Steps to measure an angle using protractor:

- Place the protractor on the common point of the two lines. This is the beginning of the two lines.
- One side of the angle should coincide with the baseline with 0 degree of the protractor.
- Now count from right side 0 degree and move towards left and stop till you meet the other line which coincides with the protractor at some point and count the degrees on the protractor.
- Then take out the protractor.

### **TYPES OF ANGLES**

### Activity 5: Types of angles

Materials required: Geometry kit, parchment paper Prerequisites: To construct angles

### Activity Flow

*Right angle: The angle having its measure as 90 degrees. Example:* 

- 1. Rotation in march past.
- 2. Every 3'clock, 6 clock, 9 clock and 12 clock will make 90 degree in clock.
- 3. Edges (sides) in Book, Taylor frame, Slate etc.

Try these:

- 1. Ask them to fold circular paper along its centre. Then you get a semicircle, again fold the semicircle. Then unfold and ask them to observe. Then explain to them that each quadrant is of an angle 90 degree.
- 2. Also ask them to construct using ice cream sticks.
- 3. And ask them to draw at a right angle using a protractor on a parchment sheet.

Acute angle: The angles which are less than 90 degrees. Example:

- 1. Time 4: 30 and 5:30 will be an acute angle.
- 2. The ladder kept inclined to a wall.
- 3. Cloth hanger and Flowers arranged in a vase.

Try these:

- 1. Ask them to stretch their fingers in hand and the angle between fingers will form an acute angle except the angle between thumb and forefinger.
- 2. And ask them to draw an acute angle using a protractor on a parchment sheet.
- 3. Show them the tactile model of an acute angle.
- 4. Ask them to construct using Ice cream sticks.

*Obtuse angle: The angles which are more than 90 degrees and less than 180 degrees. Example:* 

- 1. The time is 7 o'clock, 8 o'clock, 9:30 etc.
- 2. The angle between the back of my couch and the seat.

Try these:

- 1. Ask them to draw an obtuse angle using a protractor on a parchment sheet.
- 2. Show them the tactile model of an obtuse angle.
- 3. Ask them to construct using Ice cream sticks.

### 3.3 LET'S DISCUSS: RELATE TO DAILY LIFE\*

- Angles are used in daily life. Engineers and architects use angles for designs, roads, buildings and sporting facilities. Athletes use angles to enhance their performance. Carpenters use angles to make chairs, tables and sofas.
- Cloth-hangers, scissors, arrowhead, partly opened-doors, pyramids, Set squares, an edge of a ruler, an edge of tables, cycle spokes, wheels, mouth openings, birds wings etc

# 4. EXERCISES & REINFORCEMENT

### **4.1 PRACTICE EXERCISES**

### **Activity 6: Homework problems**

Materials required: Geometry kit, parchment paper Prerequisites: To construct angles

### Activity Flow

- 1. Draw any six angles using scale and measure them using a protractor.
- 2. Write the measure of the angle formed at 3 o'clock, 11 o'clock, 4 o'clock, 1:30 o'clock and 8:20 o'clock.
- 3. Choose the right answer from the following.
  - a) Example for obtuse angle.
    - a) 90 degree
    - b) 78 degree
    - c) 125 degree
    - d) 180 degree
  - b) Example for acute angle.
    - a) 35 degree
    - b) 80 degree
    - c) 90 degree
    - d) 175 degree

4. Classify the measures of angles into acute, obtuse and right angle: 16 degree, 180 degree, 88 degree, 179 degree, 45 degree, 90 degree, 100 degree, 35 degree, 143 degree.

### 4.2 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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