NAME OF THE ACTIVITY: The Blue Sky Protractor

Book Details

Title: Sister, Sister Why is the Sky so Blue?/ Hele, Akka, Agasaveke Tili Neeli?

Author: Roopa Pai **Illustrator:** Greystoke

Publisher: Pratham Books.

Book Level: GROWBY

Description: This is a story about how a brother asks his elder sister about why the sky is blue and learns about it.

MLLs Linked to:

Natural / Artificial Sources of Light (Class 5)
Self Luminious / Non-Luminious / Opaque objects (Class 5)
Rectilinear Propagation of Light (Class 5)
Importance of Sunlight / Heat (Class 6)
Straight Lines / Curved Lines (Class 4)
Construction of Angles Using Protractor (Class 5)
Construction of Angles Using Scale and Compass (Class 6)

Activity:

1. The Librarian shows the book **"Hele Akka, Agasaveke Thili Neeli?"** to the class and asks the children the following: the title of the book, who wrote it and who illustrated it.
2. Then he/ she reads up to the end of Page 8 ("VaNagalu Hagalali Nityavu Haraduvalu")
3. At this point the Librarian asks the children these questions:

    - What do you find in a sky? (Sun, Moon and Stars; clouds also)
    - What is the use of Sun? (It gives Heat and Light)
    - What are the sources of light from the sky? (Sun, Moon, and Stars)
    - What is the Colour of the Sky? (Blue)

Librarian: Now let us see if we can understand why the sky is blue.....

Part A: I am a Protractor

1) Children are made to stand in line with a separation of one arm's length.
2) Each child spreads its arms sideways. In this position, adjacent children have their arms parallel and overlapping, with finger tips just touching each other at the shoulder.
3) Then they hold their hands and rotate both arms horizontally towards the front of their bodies. Each child thus forms two triangles with its arms: one with the child to the right and one with the child to the left.
4) Further rotation will not be possible since the hands are held tight.
5) All children are asked to appreciate the triangles formed by the arms. Since the arm lengths are (almost) equal, the angles the arms form will correspond to 60 degrees.
6) As shown in the Figure 1 below, the Librarian can make children stand in parallel lines and demonstrate all values of angles:
    - Angles can be stated to be numbers written on a curve, starting with 0 degrees on the right side and going full circle to 360 degrees.
    - 60 degrees and 120 degrees as formed with the arms as shown above; 90 degrees towards the child in front; 45 degrees towards the child in front-right and 135 degrees toward the child at front-left; 0 and 180 along the right and left sides.
7) Curved and straight lines can be shown using the arm movements / positions.
8) The arm movement can be likened to a Compass (the geometrical instrument).
9) Chalk lines can be drawn on the floor, with lines emanating radially from the feet of each child in the directions formed by the angles. In this way each child becomes the Center of a Protractor forming an angle relationship with other children.

Part B: The Blue Sky

10) Now each child, standing on its own chalk-line Protractor is told that it is a molecule of air in the Atmosphere. They are guarding the Earth which is on one side of them and Space is on the other side.
11) One child is asked to be the Sun, on the space side. The child is asked to rise like the Sun,

rising from a sitting position to a standing position with arms outstretched upwards like rays of the Sun.

12) Other children are told to be Rays of the Sun. Each child is asked to adopt a colour from the VIBGYOR series; a large number of children are asked to be Blue (the colour of the School Uniform).
13) The Sun-Ray-Children stream from the Sun towards the Earth. Here they encounter the Atmosphere-children.
14) The Atmosphere children ask each Sun-Ray-Child what colour it is. If it is Violet, Indigo or Blue, the Sun-Ray-Child is "captured" (held by the Atmosphere child)
15) Green, Yellow, Red, Orange children are allowed to pass unhindered on to the Earth side.
16) Then the Librarian calls out Angle values such as 0, 45, 90, 120,135,180 degrees and so on. At each call, the Atmosphere children release one Sun-Ray-Child (Violet, Indigo or Blue) IN THAT DIRECTION. The released Sun-Ray-Children are asked to continue in the same direction that they are sent until they reach the wall of the Classroom / Library.
17) At the end, when all the Sun-Ray-Children have been sent to Earth, the Librarian asks the following questions:
    (a) Which is the main Source of Light for us? (Sun)
    (b) How do the Sun and Earth communicate with each other? (Using sunlight)
    (c) How do you think the light rays reach the earth? (In a Straight Line, through the Atmosphere)
    (d) Which light went straight through the atmosphere without interruption? (Yellow, Orange and Red)
    (e) So what colour does the Sun seem to have in the day? (Yellow)
    (f) What happened to Blue light? (It was "held" and then released)
    (g) The Librarian explains that the air molecules absorb Blue Light and then release it in all directions. Hence the Sky appears Blue.
    (h) Why is the Sun important to us? (It helps us to see things around us, removes darkness and provides heat)
    (i) Is Sun a self-luminous source? (Yes, it is a self-luminous source, because it emits the light of its own)
    (j) Name any other Self-Luminous source of Light? (Stars)
    (k) Give an example for Non-Luminous sources of Light? (Moon, Earth)
    (l) What are opaque objects? (Which do not allow light to pass through)
    (m) Give some examples for Opaque objects? (Book, Door, Chair etc)
    (n) How does Light travel? (In a Straight Line)
    (o) What happens when two Straight Lines meet at some particular directions? (It forms an angle)
    (p) List some of the angles you have seen today.

2) The Librarian then reads the complete book to the children. The Children are then asked to tell how what they did in the Activity had links with what they read in the book. These may be written in points on the blackboard.

Variations:

What to do if :

1) Children choose Colours inappropriately: Children are to be permitted to choose their own colours from VIBGYOR, however they may choose such that there are not enough of each colour. In this case, the activity can be repeated until each child has chosen several different colours and understood which passes through and which does not.
2) Too few Children:
   (a) Minimum 2 children for Atmosphere (Two rows); rest can be Rays.
   (b) Sun-Ray-Children can repeat the activity one colour at a time
3) Library Room too small: Corridor or ground is OK; draw the Protractor on lines on the ground

Result:

The Children learns about Light, Rectilinear Propagation, Luminous and Opaque objects and Different types of angles and their construction.

Appendix:

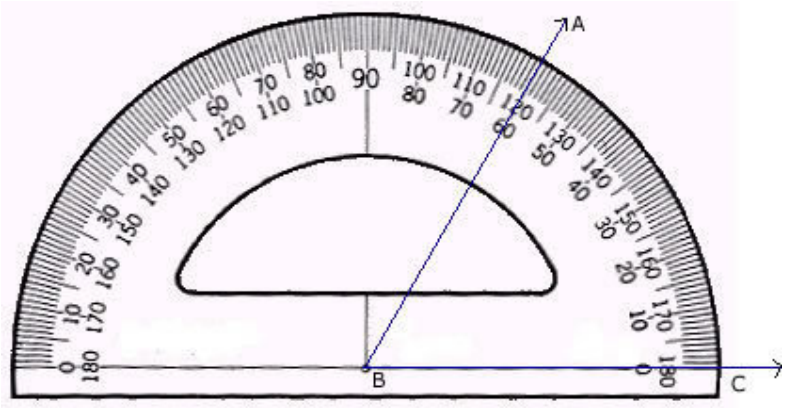

Diagram of a Protractor

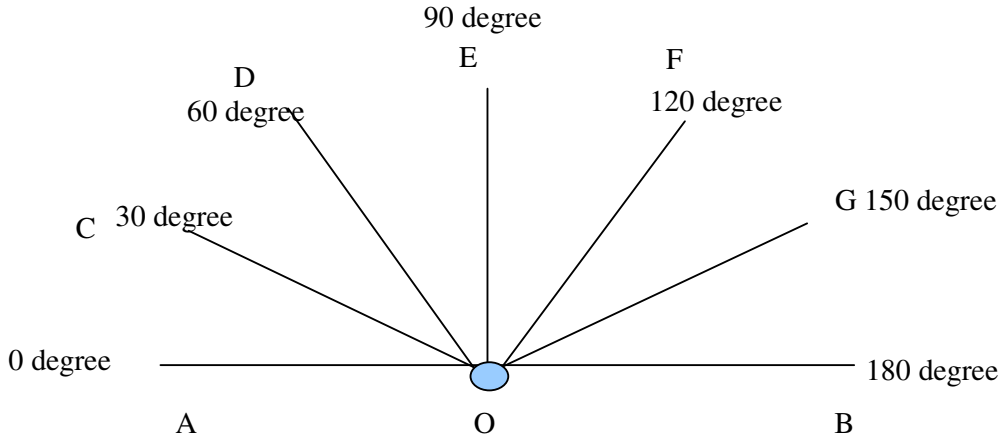

Diagram of a Human Protractor

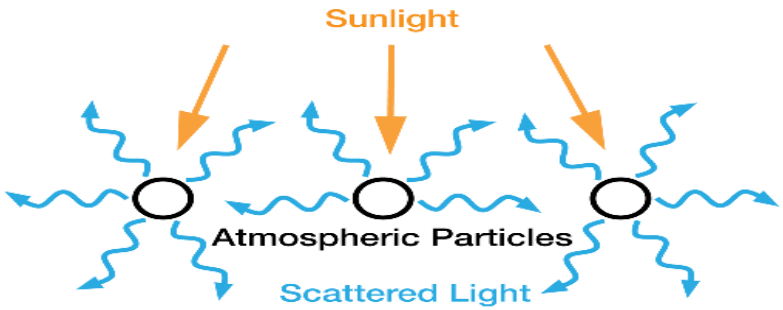

Diagram showing the Scattering of Light