

Geometry / Names and Shapes
Mathematics and Millennials – 6th

Classify & Categorize

The **Garden Approach** allows much to be learned!

Basic Skills of **Classify and Categorize** are involved!

After Classify or Categorize, **Order** also helps learning!

Placing items in a **Logical Order** supports learning!

Single Lines - 1

Horizontal Line



Unending (Infinite)

Vertical Line



Not Curved or Broken

Single Lines - 2

Oblique (+) Line

Oblique (-) Line



Unending (Infinite)

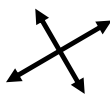
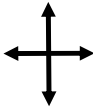
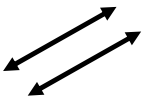
Not Curved or Broken

Pairs of Lines

Parallel

(Perpendicular)

Intersecting



Never Intersect

Lines Intersect 90°

Intersect Once

Overview of Lines

Fundamental Lines of Geometry:



Horizontal, Vertical, Oblique(+), Oblique (-)

Parallel, Intersecting (Perpendicular)

Properties: Infinite and Straight

Many Line segments & Half lines (rays) exist!

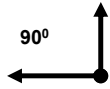
Single Angles - 1

Acute Angle



$$90^\circ > \text{Acute} > 0^\circ$$

Right Angle



90°

Equal to 90°

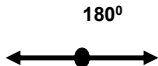
Single Angles - 2

Obtuse Angle



$$180^\circ > \text{Obtuse} > 90^\circ$$

Straight Angle

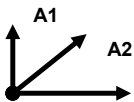


180°

Equal to 180°

Pairs of Angles

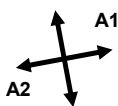
Complementary



$$A1 + A2 = 90^\circ$$

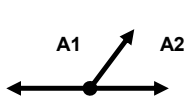
Adjacent Angles

Vertical



Two Pairs of
Opposite & Equal

Supplementary



$$A1 + A2 = 180^\circ$$

Adjacent Angles

Overview of Angles

Fundamental Angles of Geometry:



Acute, Right, Obtuse, Straight

Complementary, Supplementary, Vertical

Angles: 0° to 180° , Initial & Terminal Rays

Many angles are greater than 180° !

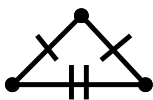
Triangles - 1

Equilateral



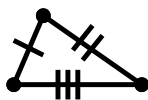
All Sides Equal

Isosceles



Two Sides Equal

Scalene

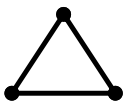


No Sides Equal

Sum of Interior Angles * $A_1 + A_2 + A_3 = 180^\circ$

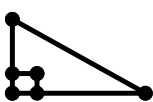
Triangles - 2

Acute



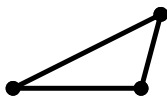
All Angles $< 90^\circ$

Right



One Angle = 90°

Obtuse



One Angle $> 90^\circ$

Sum of Interior Angles * $A_1 + A_2 + A_3 = 180^\circ$

Overview of Triangles

Fundamental Triangles of Geometry:



Triangles by Angles: Acute, Right, Obtuse

Triangles by Sides: Equilateral, Isosceles, Scalene

3-Sided & Closed Shapes, Sum of Angles = 0° to 180°

Many 3 sided shapes exists but not all Triangles!

Parallelograms - 1

Square

All Angles = 90°

Rectangle



All Sides Equal

\Leftrightarrow

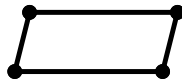
Opposite Sides Equal

Parallelogram: Opposite Sides & Angles Equal

Parallelograms - 2

Rhombus

Rhomboid



Opposite Sides Equal

\Leftrightarrow

Opposite Angles Equal

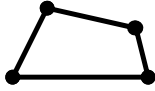
Parallelogram: Opposite Sides & Angles Equal

Non-Parallelograms

Trapezoid



Trapezium



Top & Bottom Parallel

*

No Sides Parallel

Non-Parallelogram: Sides & Angles Unequal

Quadrilaterals

Fundamental Quadrilaterals of Geometry:



Parallelograms: **Square, Rectangle, Rhombus, Rhomboid**

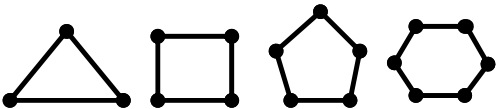
Non-Parallelograms: **Trapezoid and Trapezium**

4-Sided & Closed Shapes, Sum of Angles: 0° to 360° ,

Many Quadrilaterals exist, **but**, not all Quadrilaterals !

Regular Polygons

Regular Polygon: All Sides & Angles are Equal!

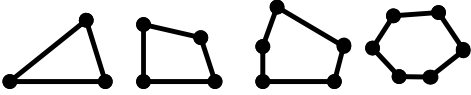


Triangle * Quadrilateral * Pentagon * Hexagon

Do you know of any other regular polygons?

Irregular Polygons

Irregular Polygon: Sides & Angles are Unequal!



Triangle * Quadrilateral * Pentagon * Hexagon

Do you know of any other irregular polygons?

Overview of Polygons

Polygons of Geometry: **Polygons = Many Angles!**

Regular: Triangles, Quadrilaterals, Pentagons, Hexagons...

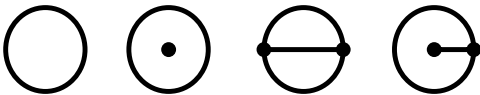
Irregular: Triangles, Quadrilaterals, Pentagons, Hexagons...

Many-sided & Closed Shapes, Sum of Angles: $180^\circ(n-2)$,

Many Polygons exist, **but**, not all Polygons!

Circles - 1

Special Characteristics of Circles:



Circumference * Center * Diameter * Radius

Do you know of any other special features of circles?

Overview of Circles

Circles of Geometry: Only (1) Circle many sizes!

Basic Parts: **Center, Radius, Diameter, Circumference**

Basic Relationships: $D = 2(R)$ $Pi = 3.14159...$

Basic Relationships: $C = Pi \times D$ or $A = Pi \times (R)^2$

Many size Circles exist, **and**, many sizes!

Solids - 1

Sphere



Cylinder



Cone

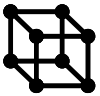


Images of 3D have Surface Area **and** Volume

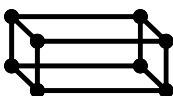
Do you know of any special features of solids?

Solids - 2

Cube



Prism



Pyramid



Images of 3D have Surface Area and Volume

Do you know of any special features of solids?

Overview of Solids

Basic 3D Images: Why 3Ds in Plane Geometry?

Rounded 3D Images: Sphere, Cylinder, Cone

Lateral 3D Images: Cube, Prism Pyramid

Classify 3Ds then Order 3Ds in similar arrangement!

Many size 3Ds exist, but, only a few categories!

Conclusion
