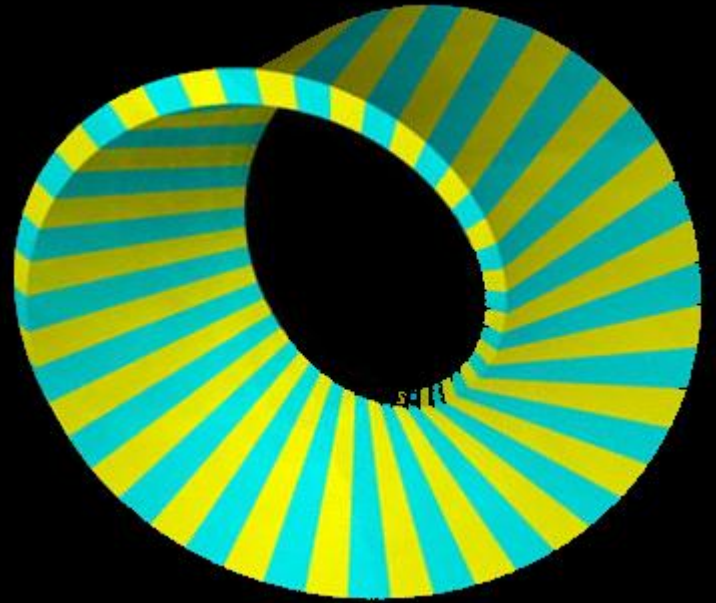


Geometry

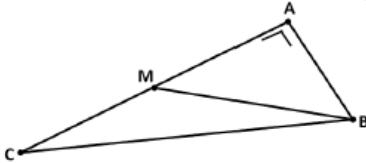
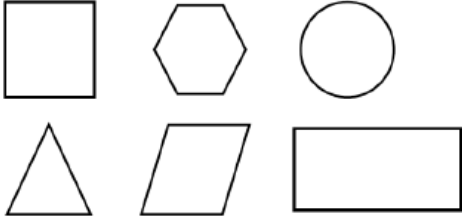
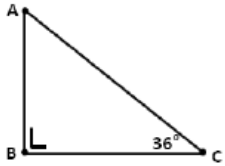


Van Hiele Model of Geometric Thought

Thinking at Different Levels



Thinking at Different Levels

A	<p>In $\triangle ABC$, BM is a median</p> <p>Prove that Area of $\triangle ABM$ = Area of $\triangle MBC$</p> 
B	<p>Name the following shapes</p> 
C	<p>Find the angle $\angle BAC$</p> 
D	<p>I have 4 sides and all of my interior angles are right angles. What am I?</p>
E	<p>Prove that a vertex angle of a regular pentagon is trisected by diagonals drawn from that vertex.</p>

←Level 4, Deduction

←Level 1, Visual

←Level 3, Relational

←Level 2, Descriptive

←Level 5, Rigor

Thinking at Different Levels

"Look at Figure 1.
Since $OA = OB$, (radii),
therefore OAB is an
isosceles triangle."

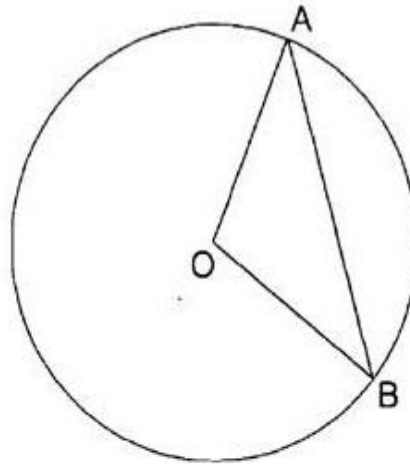


Figure 1

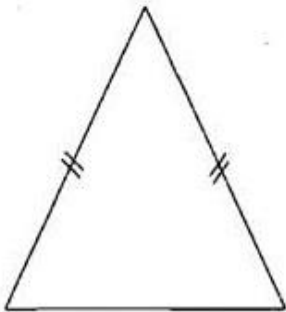


Figure 2

The student at level 1 is thinking, "No,
it doesn't look like an isosceles
triangle" because to him an isosceles
triangle looks like Figure 2.

Level 4, Deduction

Level 1, Visual

Level 3, Relational

Level 2, Descriptive

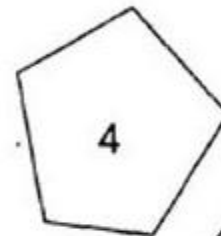
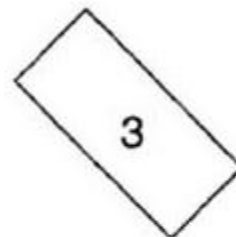
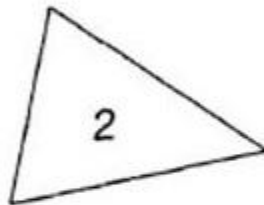
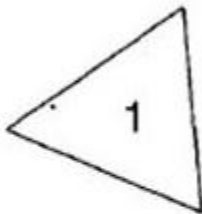
Level 5, Rigor

Thinking at Different Levels

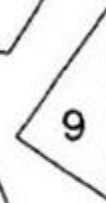
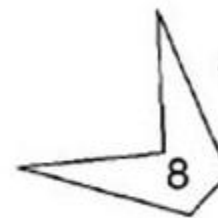
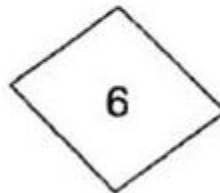
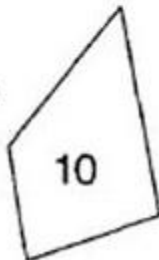
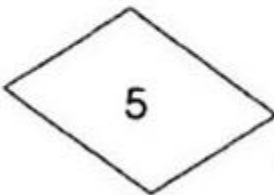
A

Example: Sort the following figures into groups explaining why you sorted them that way.

B



C



D

E

Prove that a vertex angle of a regular pentagon is trisected by diagonals drawn from that vertex.

←Level 5, Rigor

THINKING OF DISELENGING CGA612?

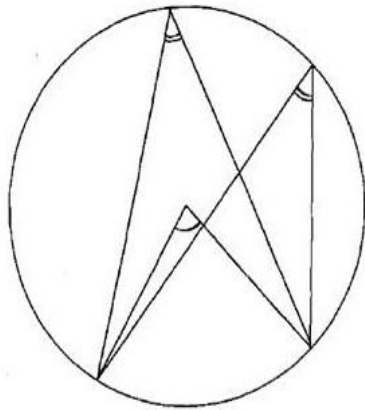


Figure 4

Name all pairs of "angles in the same segment" you can find in Figure 6.

O is the centre of the circle

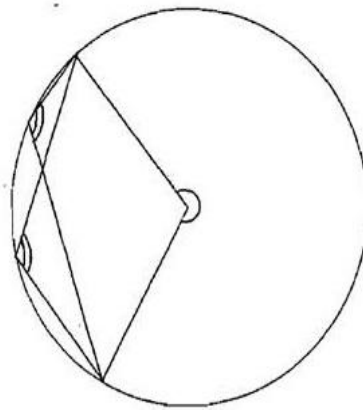


Figure 5

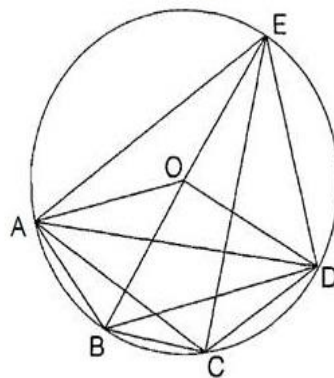


Figure 6

Level 4, Deduction

Level 1, Visual

Level 3, Relational

Level 2, Descriptive

Level 5, Rigor

Thinking at Different Levels

Model may:

- explain why many students encounter difficulties in geometry
- clarify many shortcomings that you have noticed in your students' learning
- offer ways to improve it



Learning during Different Phases

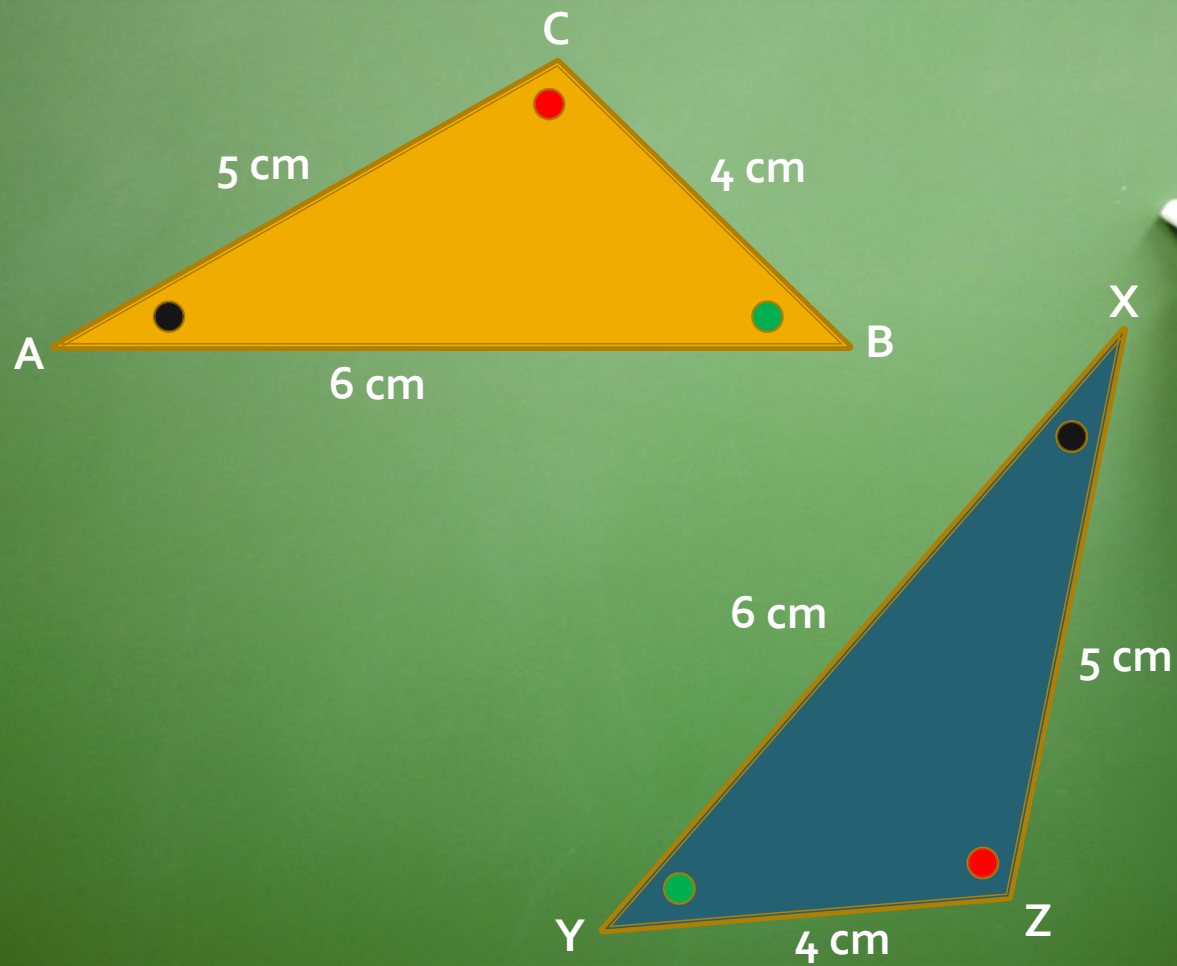


Learning During Different Phases

- **Phase 1**
Information
- **Phase 2**
Guided Orientation
- **Phase 3**
Explicitation
- **Phase 4**
Free Orientation
- **Phase 5**
Integration



Board Work



Draw the following four triangles, put the numbers **1**, **2**, **3**, and **4** in the centre of the triangle and cut them out.

1

$|AB| = 4 \text{ cm}$, $|BC| = 5 \text{ cm}$, $|AC| = 6 \text{ cm}$

2

$|AB| = 6 \text{ cm}$, $|\angle BAC| = 40^\circ$, $|BC| = 7 \text{ cm}$

3

$|\angle ABC| = 20^\circ$, $|BC| = 8 \text{ cm}$, $|\angle BCA| = 40^\circ$

4

$|\angle ABC| = 60^\circ$, $|\angle BAC| = 50^\circ$, $|\angle ACB| = 70^\circ$