Geometry Joke-
What did the acorn say to the Oak?

Gee I am a tree 😊

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Major Characteristics of van Hiele levels:

- The levels are sequential
- Each level has its own language
- What is implicit at one level becomes explicit at the next level
- Material taught to students above their level is subject to reduction of level
- Progress from one level to the next is more dependent on instructional experience than on age or maturation
- One goes through various “phases” in proceeding from one level to the next.
van Hiele **Levels of thinking in Geometry** p. 452

- **Recognition of shape**
  The student recognizes shapes holistically. Naming geometric figures according to their appearance rather than their properties.
  
  *Ex. These are triangles*

- **Analysis of single shape**
  The student analyzes figures in terms of their components and discovers properties/rules of shapes.

- **Relationships among shapes**
  The student logically interrelates properties/rules by giving informal arguments for relationships.

- **Deductive reasoning**
  The student proves theorems deductively and establishes a formal mathematical system. *Ex. Explain/Prove the angles are congruent.*

- **Geometry as an axiomatic system**
  The student uses an axiomatic system to work at an abstract level. (This is beyond our studies for this course)
Progress from One Level to the Next Involves Five Phases

1. **Information**: The student gets acquainted with the working domain (e.g., examines examples and non-examples).
Progress from One Level to the Next Involves Five Phases

2. **Guided orientation**: The student does tasks involving different relations of the network that is to be formed (e.g., folding, measuring, looking at how the number of edges faces and vertices compare).
Progress from One Level to the Next Involves Five Phases

3. **Explicitation**: The student becomes conscious of the relations, tries to express them in words, and learns technical language which accompanies the subject matter (e.g., expresses ideas about properties of figures).
Progress from One Level to the Next Involves Five Phases

4. **Free orientation**: The student learns, by doing more complex tasks, to find his/her own way in the network of relations (e.g., knowing properties of one kind of shape, investigates these properties for a new shape, such as tetrahedrons).
Progress from One Level to the Next Involves Five Phases

5. **Integration**: The student summarizes all that he/she has learned about the subject, then reflects on his/her actions and obtains an overview of the newly formed network of relations new available (e.g., properties of a figure are summarized).