

# Concept Maps

## International Teacher Weeks Programme 2023

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# Concept Maps

- Graphic Organiser
- Needs to answer the focus question
- Consists of **Key Concepts** and **Linking words**

Hierarchy of CERNre!!!

The diagram illustrates the components of a concept map. Two orange ovals, labeled 'Key Concepts' and 'Linking words', are positioned above the text 'Hierarchy of CERNre!!!'. Four orange arrows originate from the bottom of these ovals and point towards the text, indicating that both key concepts and linking words are used to define the hierarchy.

# Constructing Concept Maps

1. Focus question  What do you know about Hogwarts?
2. Stop and think  Chose a starting concept and  
2 – 5 key concepts

School for magic

Hogwarts

Students



- 1. What do you know about Hogwarts?
- 2. 2-5 key concepts
- 3. Link and use ARROWS



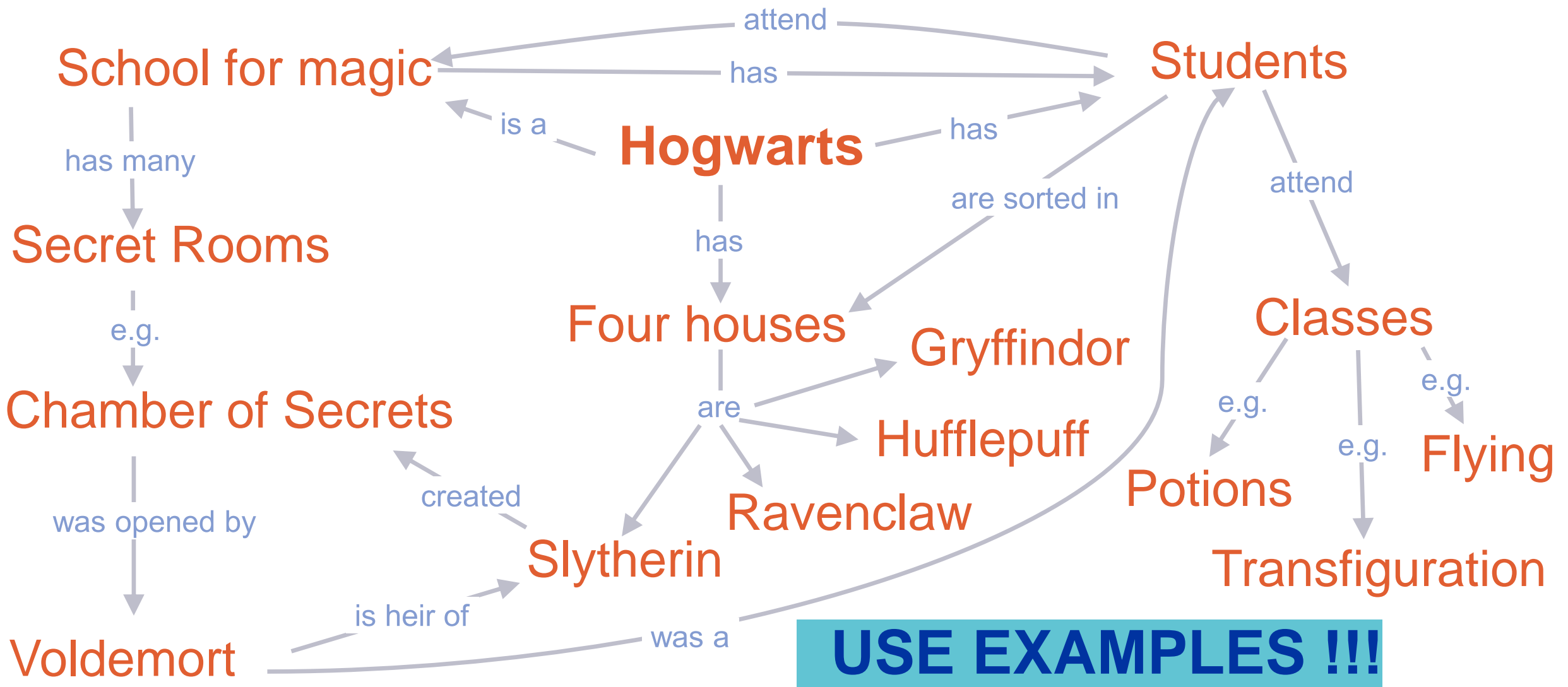
- 1. What do you know about Hogwarts?
- 2. 2-5 key concepts
- 3. Link and use ARROWS and LINKING WORDS !!!



**VERY IMPORTANT!**

1. What do you know about Hogwarts?
2. 2-5 key concepts
3. Link and use ARROWS and LINKING WORDS !!!

**SECRET TIP !!!**



**USE EXAMPLES !!!**

# Now, it is your turn!



1. PERSONAL CODE	
First letter of your first name	(e.g. Colin = C)
Second letter of your mother's name	(e.g. Kathy = A)
Third letter of your mother's name	(e.g. Kathy = T)
Last digit of your year of birth	(e.g. 1963 = 3)

# What would you like your students to know about PARTICLE PHYSICS and CERN?

## What would you like your students to know about PARTICLE PHYSICS and CERN?

Antimatter

CERN

Computing facilities

Cosmology

Engineering

Experimental particle physics

Fundamental questions

General public

Human knowledge and curiosity

Intergovernmental organisation

Matter

International collaboration

Observations

Particle accelerators

Particle detectors

Particle physics

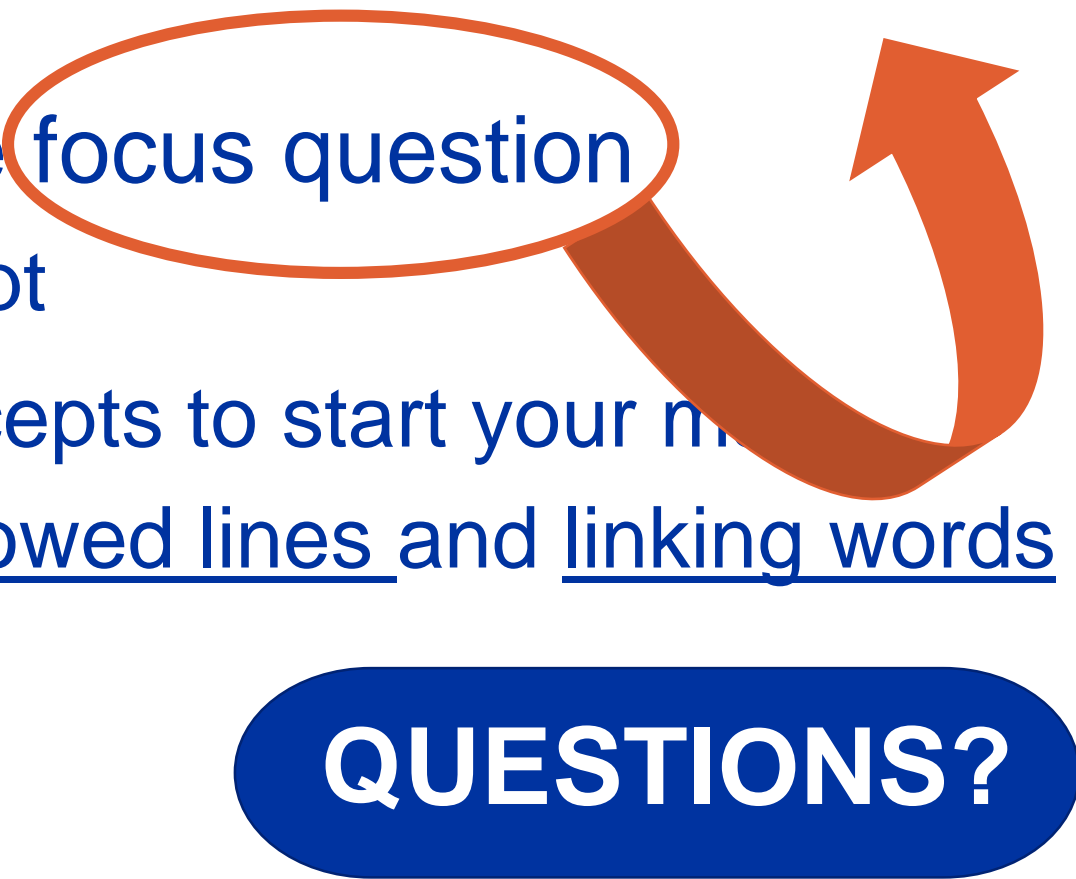
Personnel

Predictions

Standard model of particle physics

Theoretical particle physics

# What would you like your students to know about PARTICLE PHYSICS and CERN?

1. Stop and think about the **focus question**
  2. Chose your starting concept
  3. Then chose 2 – 5 key concepts to start your m
  4. Connect concepts with arrowed lines and linking words
  5. Expand
- 

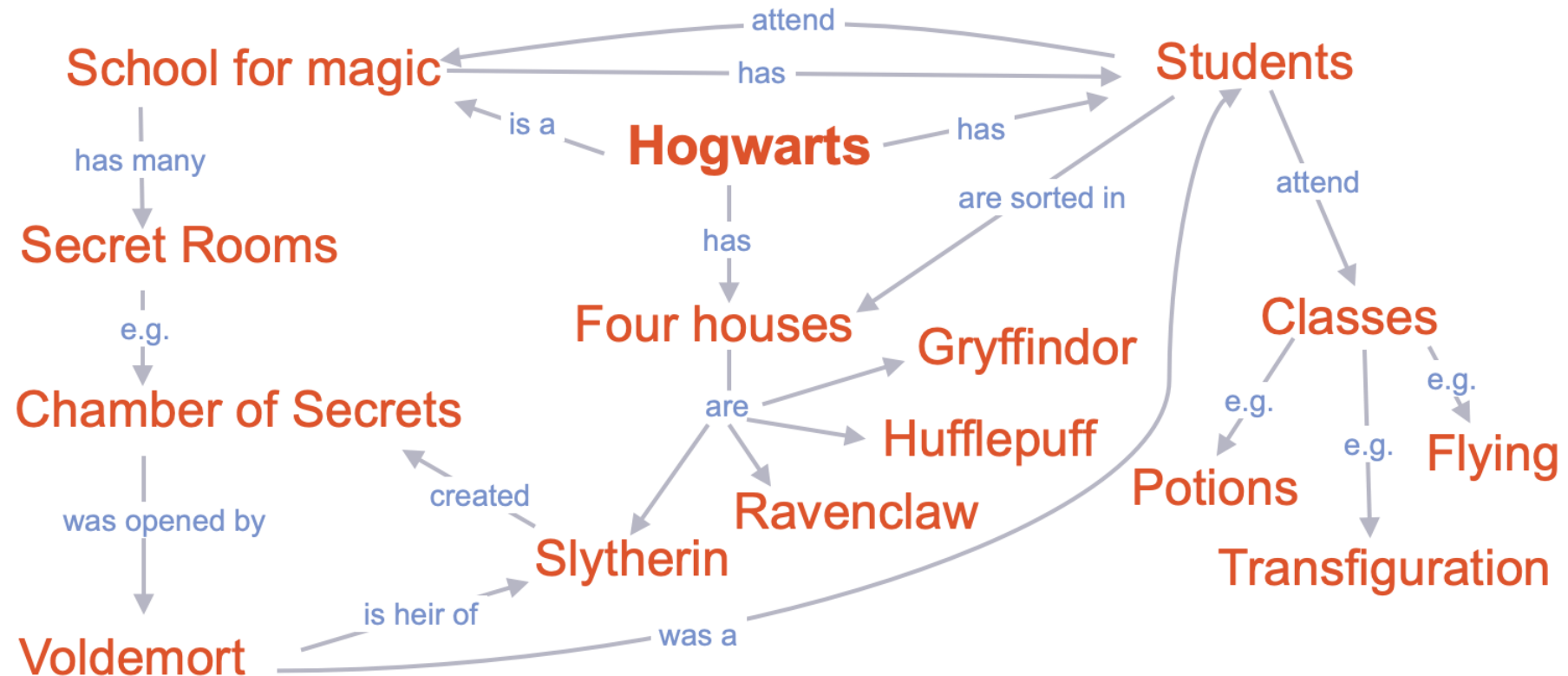
➤ 15 minutes

**QUESTIONS?**

# Time to write the code!

# What would you like your students to know about PARTICLE PHYSICS and CERN?

1. Stop and think about the focus question
2. Chose your starting concept
3. Then chose 2 – 5 key concepts to start your map
4. Connect concepts with arrowed lines and linking words
5. Expand



**Pens down!**  
**Let's talk! 😊**

# Using concept maps in the classroom

Teaching new  
concepts/topics

Assessment of your  
students' understanding



# Teaching new concepts/topic

1. Teacher creates a map and shares with class  
with students' help

➤ 2. Individual students create all groups

➤ Analog or Digital



## What would you like your students to know about PARTICLE PHYSICS and CERN?

- Antimatter
- CERN
- Computing facilities
- Cosmology
- Engineering
- Experimental particle physics
- Fundamental questions
- General public
- Human knowledge and curiosity
- Intergovernmental organisation
- Matter
- International collaboration
- Observations
- Particle accelerators
- Particle detectors
- Particle physics
- Personnel
- Predictions
- Standard model of particle physics
- Theoretical particle physics

**Parking Lot Method**

**Blank Paper Method**

**Fill-In Method**

# Using concept maps in the classroom

Teaching new  
concepts/topics

Assessment of your  
students' understanding

# Assessment of your students' understanding

Valid

ceptions

Concept Map-Based Assessment in Science:  
Two Exploratory Studies

CSE Technical Report 436

Maria Araceli Ruiz-Primo, Susan Elise Schultz,  
and Richard J. Shavelson  
CRESST/Stanford University



<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=4810a24b81a178c57b0f8b766a4ff97f1f2d064c>

# Assessment of your students' understanding

Concept Mapping Technique 1 Instructions—Hierarchical Structure is Imposed

Name \_\_\_\_\_ Period \_\_\_\_\_

Examine the concepts listed below. They were selected from the chapter on Atomic Structure that you recently studied. Construct a hierarchical concept map using the terms provided below. Organize more general terms above the more specific ones. Draw a line between the terms you think are related. Label the line using phrases or only one or two words.

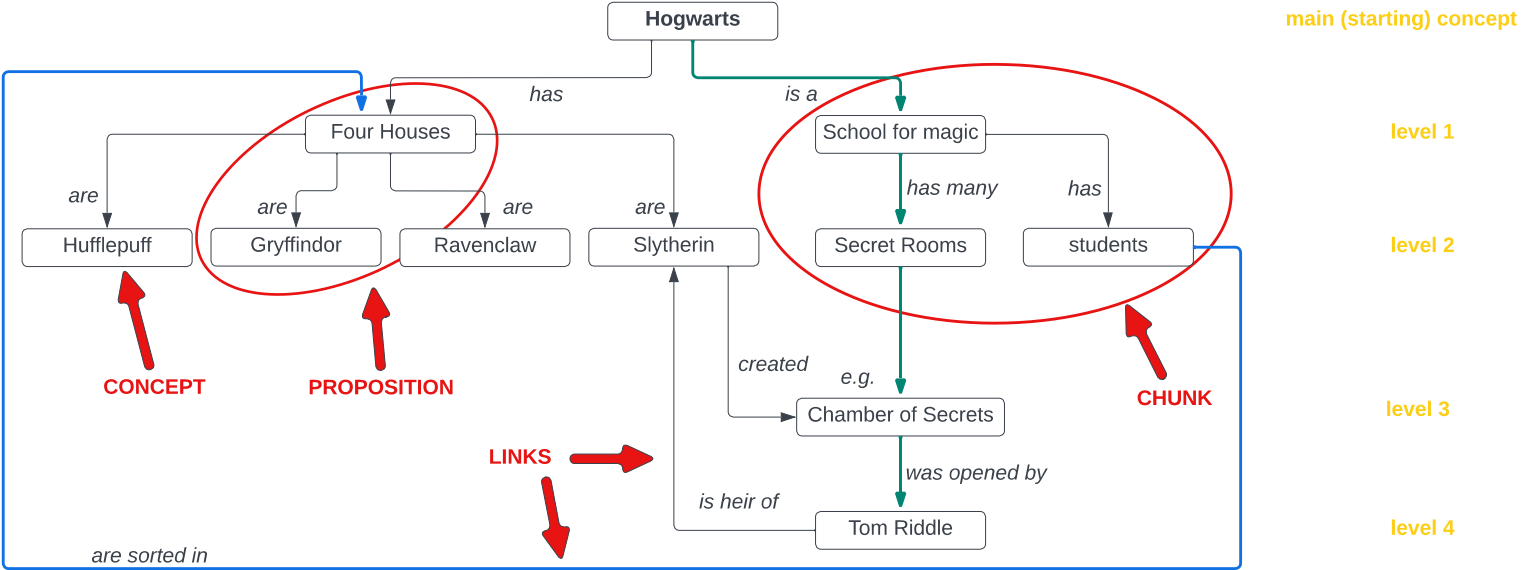
You can construct your map on the blank pages attached. When you finish your map check that: (1) you have all the concepts on the list in your map; (2) all the lines have labels; (3) your map is explaining atomic structure. After checking your map, redraw it so someone else can read it.

Staple your final map to this page.

## LIST OF CONCEPTS

atoms  
atomic mass  
atomic number  
atomic orbitals  
electrons  
elements  
energy levels  
isotopes  
mass number  
negative charge  
neutral charge  
neutrons  
nucleus  
*p* orbitals  
positive charge  
protons  
*s* orbitals

# How does Milena evaluate your concept map?



# How does Milena evaluate your concept map?

## Concepts (and Chunks)

### ➤ Concept knowledge

$$\text{Density} = (L / T) * C$$

### ➤ Integration of knowledge

$$\text{Complexity} = W * H$$

### ➤ Depth of knowledge

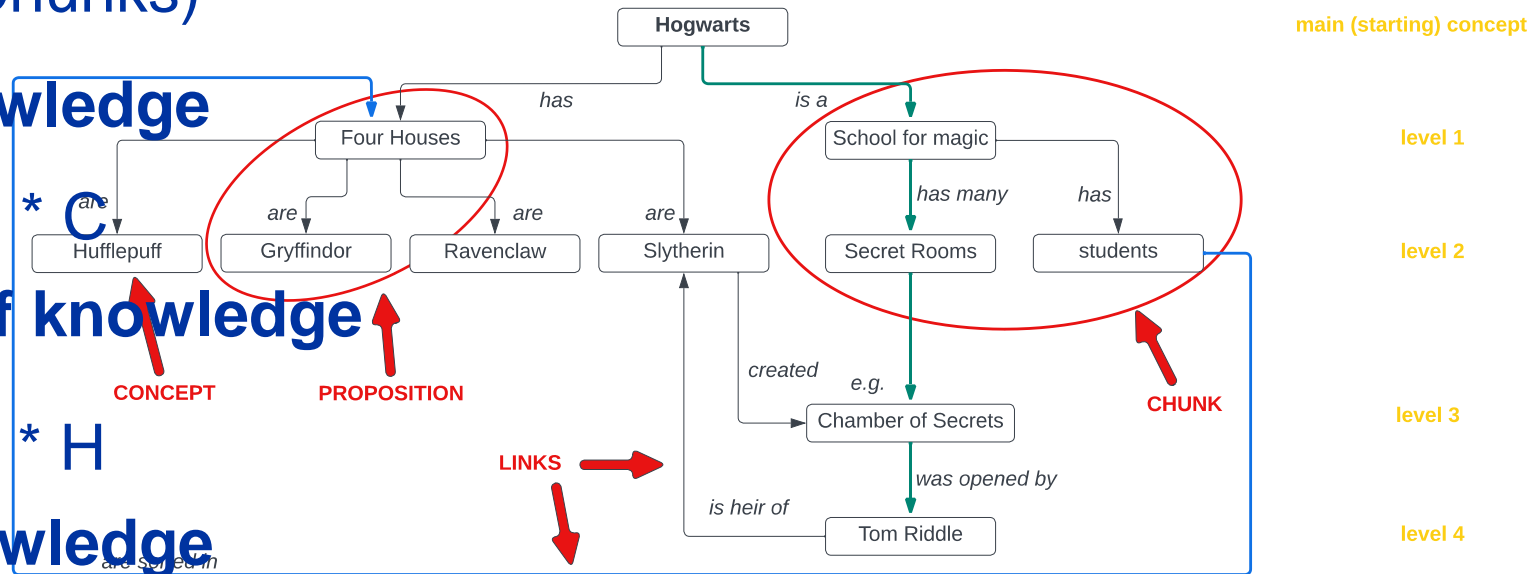
Propositions



Higher number = higher accuracy

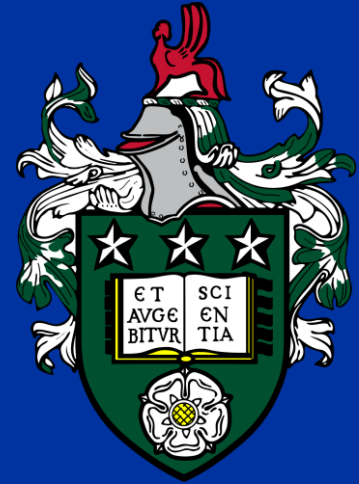
### ➤ Accuracy of knowledge

L – links; T – total number of concepts; C = T-1; W – width; H – length/height



# Expert Concept Map





**Thank you for your participation!**