

Critical Thinking in the Secondary and Post-Secondary Classroom

Before the workshop, we encourage you to

- Read the recommended readings noted below.
- Identify a course that you'd like to think about or work on.

Please bring to the workshop

- Materials that will help you think about or work on your course (e.g. a list of your program or course competencies, your syllabus, a learning activity, an assignment, an assessment tool, etc.).
- A laptop computer, if you have one.

Workshop

1:00 p.m. – 5:00 p.m., Wednesday, August 30, 2017

1:00 p.m. Opening Discussion

- What are your experiences in the classroom?
- What would you like to get out of this workshop?

1:30 p.m. Critical Thinking

- What Critical Thinking is
- Why Critical Thinking can be Hard
- What makes Critical Thinking Easier
- *Recommended Reading*: Facione, P. (2015). "Critical Thinking What It Is and Why It Counts." from <http://www.insightassessment.com/Resources/Critical-Thinking-What-It-Is-and-Why-It-Counts>

2:00 p.m. Visual Thinking

- Concept Maps
- Reasoning Maps
- *Recommended Reading*: Davies, M. (2011). "Concept mapping, mind mapping, and argument mapping: What are the differences and do they matter?" *Higher Education*, 62(3), 279-301.

3:00 p.m. What this Means for You

- Learning Outcomes in your Classroom
- Assessment Tools in your Classroom
- Learning Activities in your Classroom
- *Recommended Reading*: McTighe, J. and G. Wiggins (2012). "Understanding by Design Framework." 2016, from http://www.ascd.org/ASCD/pdf/siteASCD/publications/UbD_WhitePaper0312.pdf.

3:30 p.m. Some Assembly Required

- Working on your courses.

4:30 p.m. Reporting Back

Critical Thinking in the Secondary and Post-Secondary Classroom

Vera Klekovkina, Wade Mahon, Jodi Olmsted, Dona Warren
The University of Wisconsin-Stevens Point

Opening Discussion

Critical Thinking

Visual Thinking

What this Means for You

Some Assembly Required

Opening Discussion

What are your experiences in the classroom?

What would you like to get out of this workshop?

Critical Thinking

What it is

Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Facione, Peter, 2015, "Title: Critical Thinking What It Is and Why It Counts,"
<http://www.insightassessment.com/Resources/Critical-Thinking-What-It-Is-and-Why-It-Counts>

Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Cognitive Processes

Applying knowledge

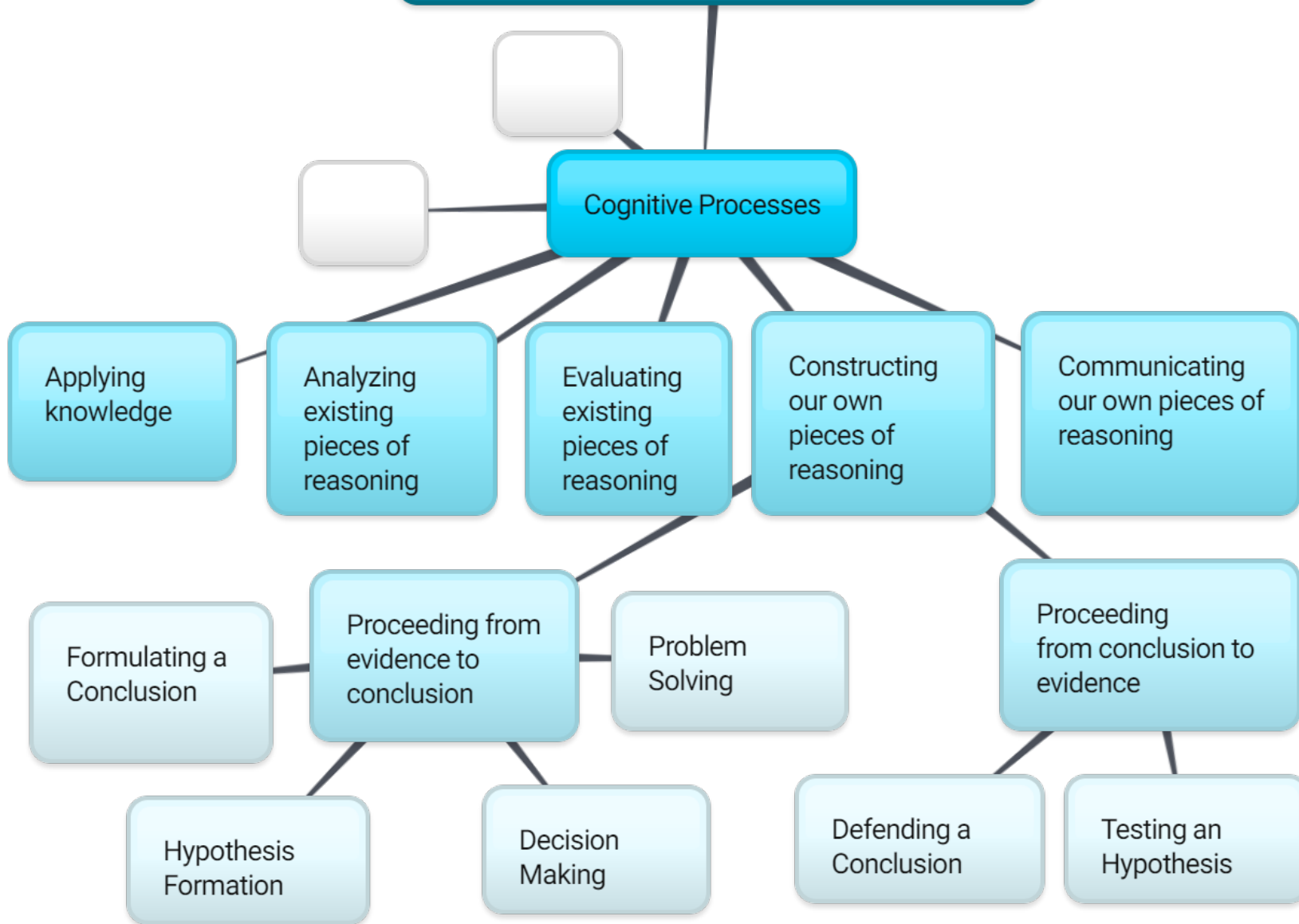
Analyzing existing pieces of reasoning

Evaluating existing pieces of reasoning

Constructing our own pieces of reasoning

Communicating our own pieces of reasoning

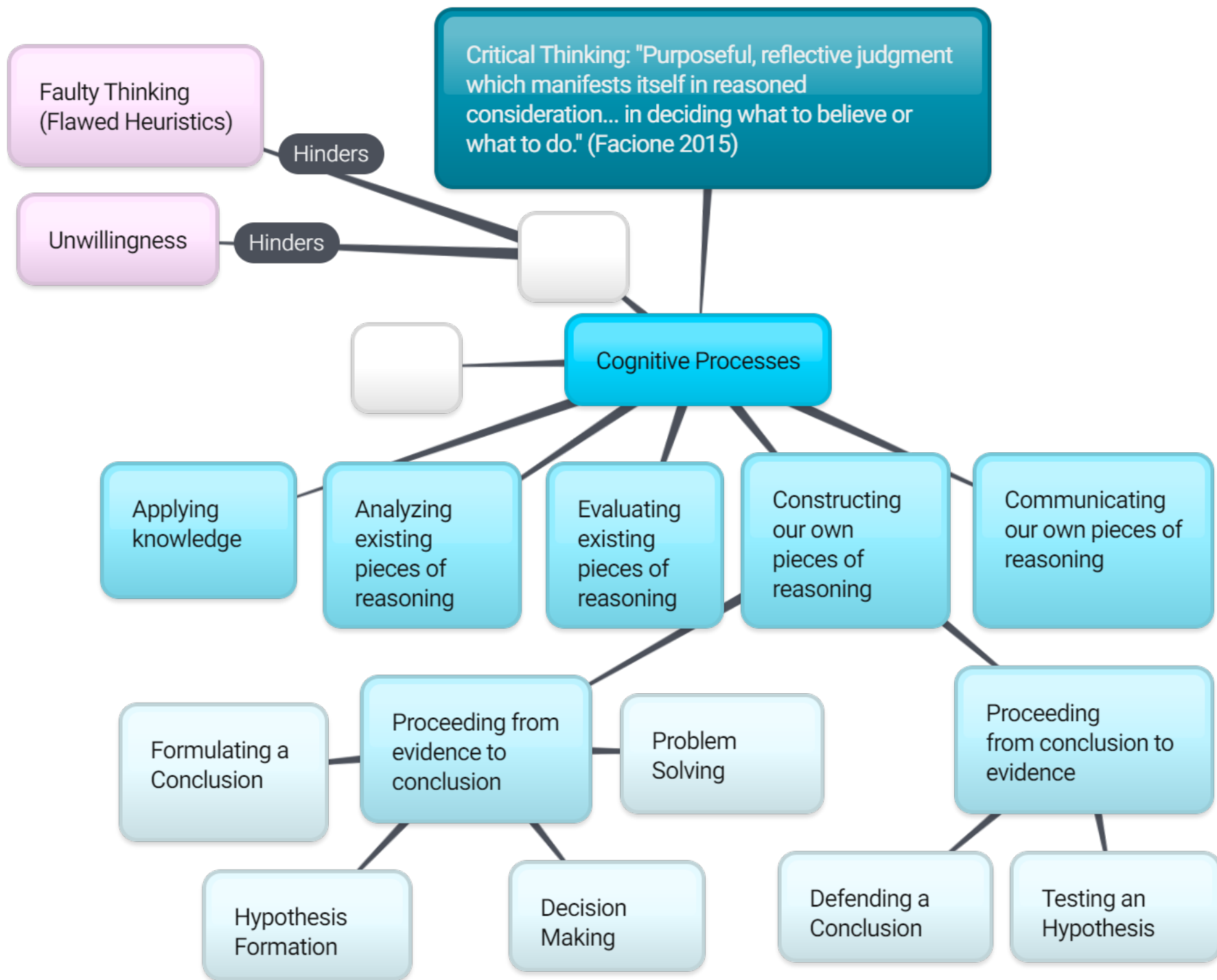
Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

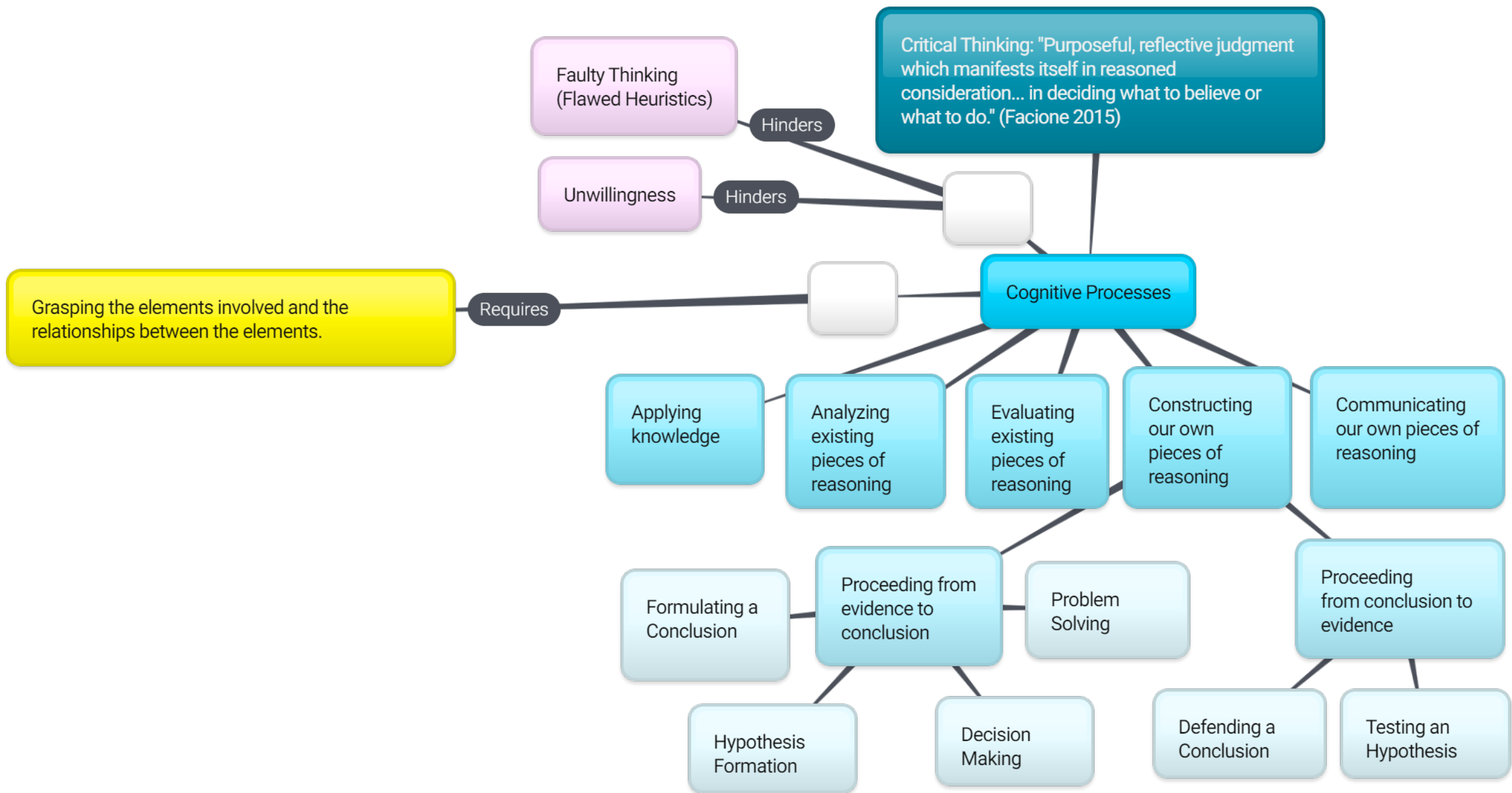


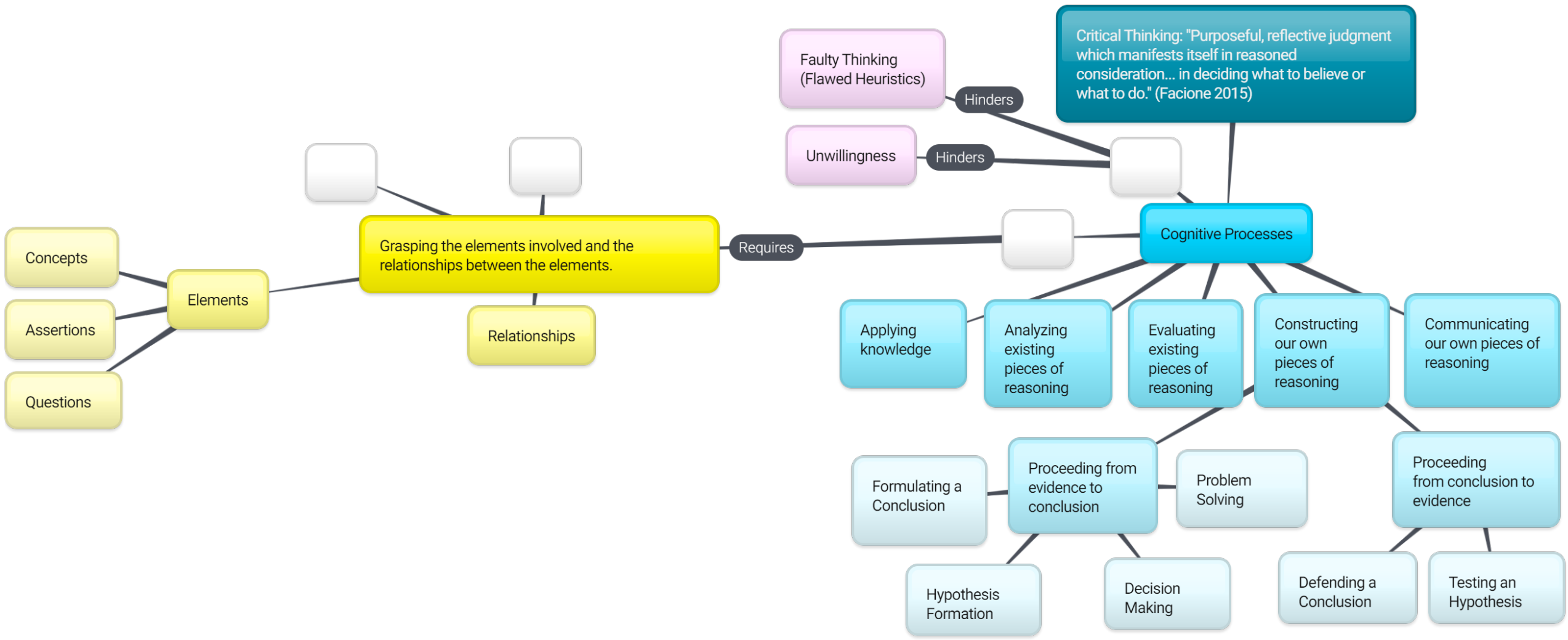
Critical Thinking

What it is

Why it can be hard







Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Cognitive Processes

- Applying knowledge
- Analyzing existing pieces of reasoning
- Evaluating existing pieces of reasoning
 - Proceeding from evidence to conclusion
 - Formulating a Conclusion
 - Hypothesis Formation
 - Decision Making
 - Problem Solving
 - Proceeding from conclusion to evidence
 - Defending a Conclusion
 - Testing an Hypothesis
- Constructing our own pieces of reasoning
- Communicating our own pieces of reasoning

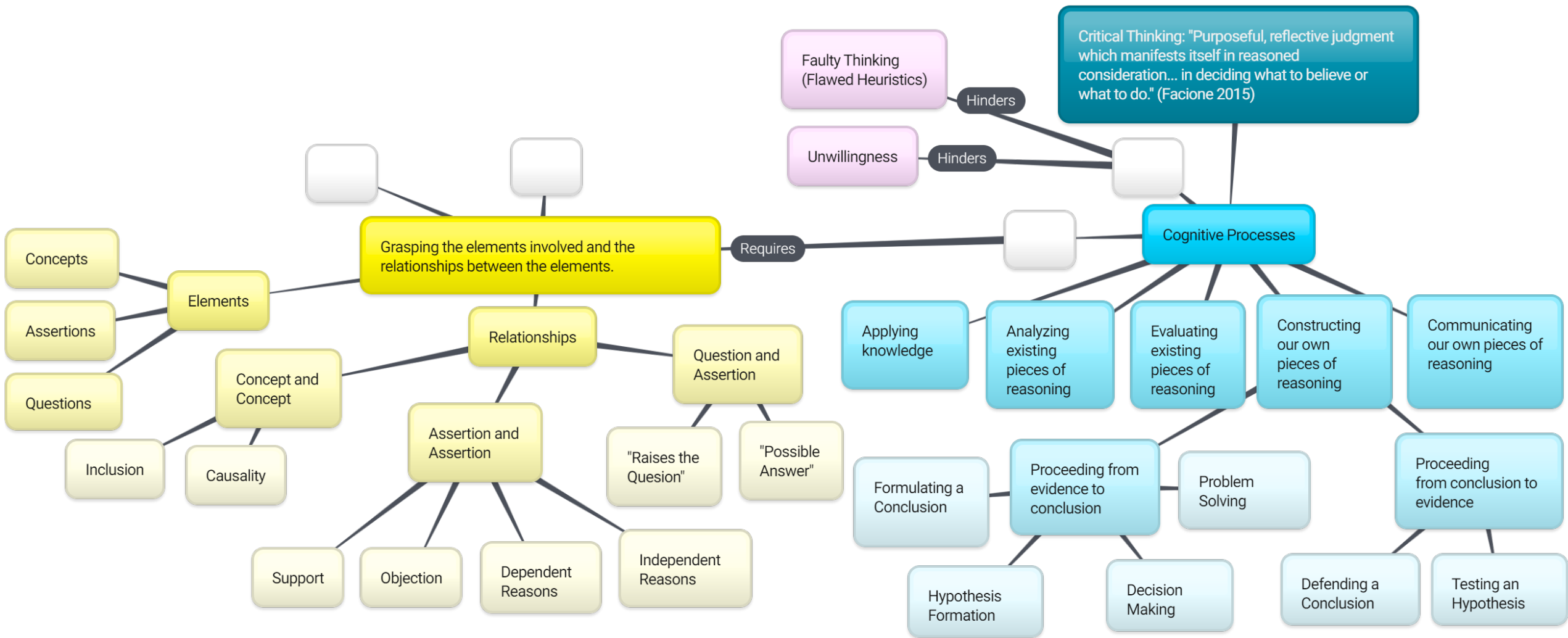
Requires

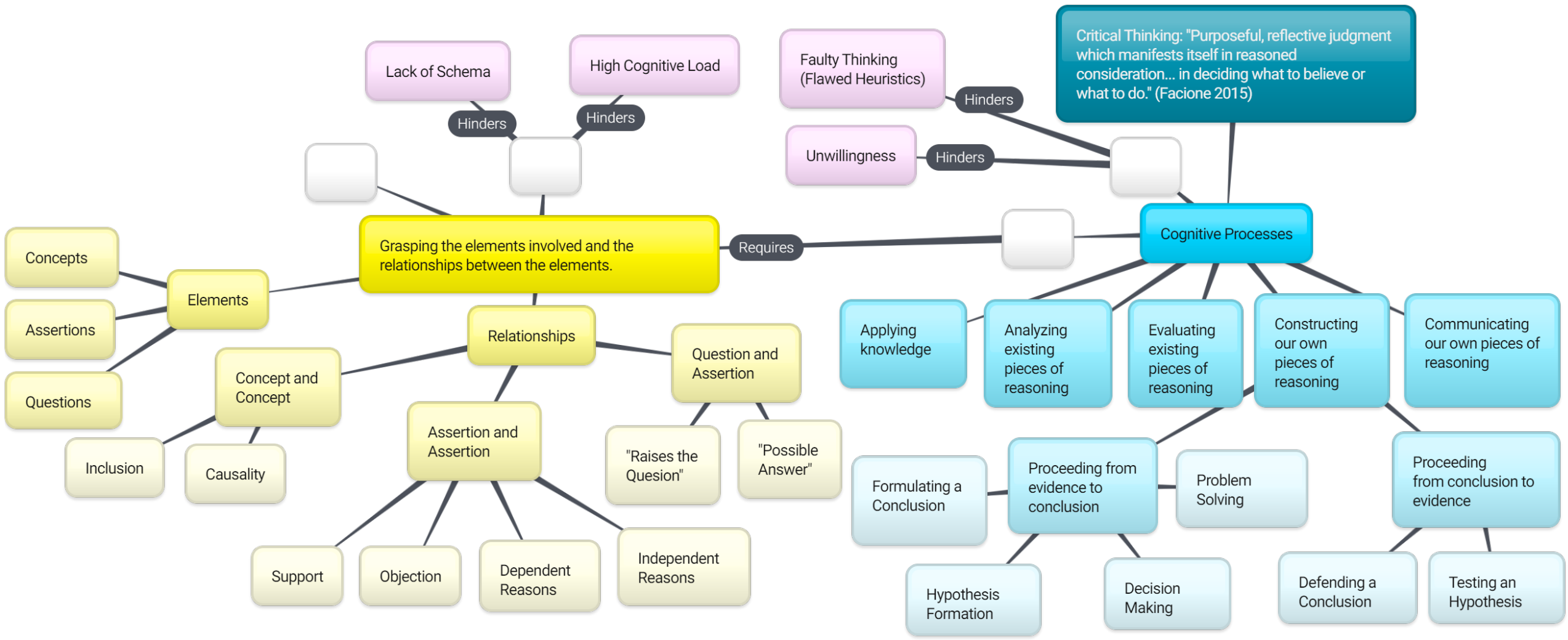
Grasping the elements involved and the relationships between the elements.

Elements

- Concepts
- Assertions
- Questions

Relationships



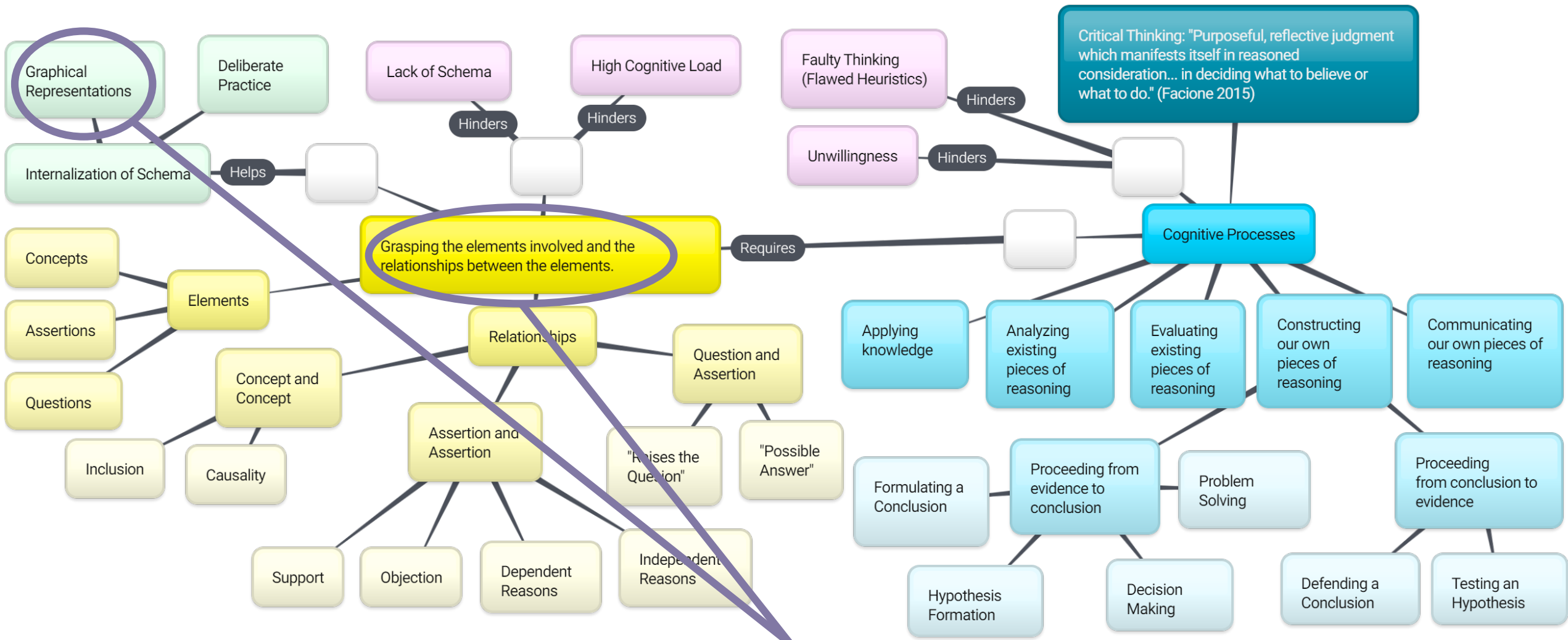


Critical Thinking

What it is

Why it can be hard

What can make it easier

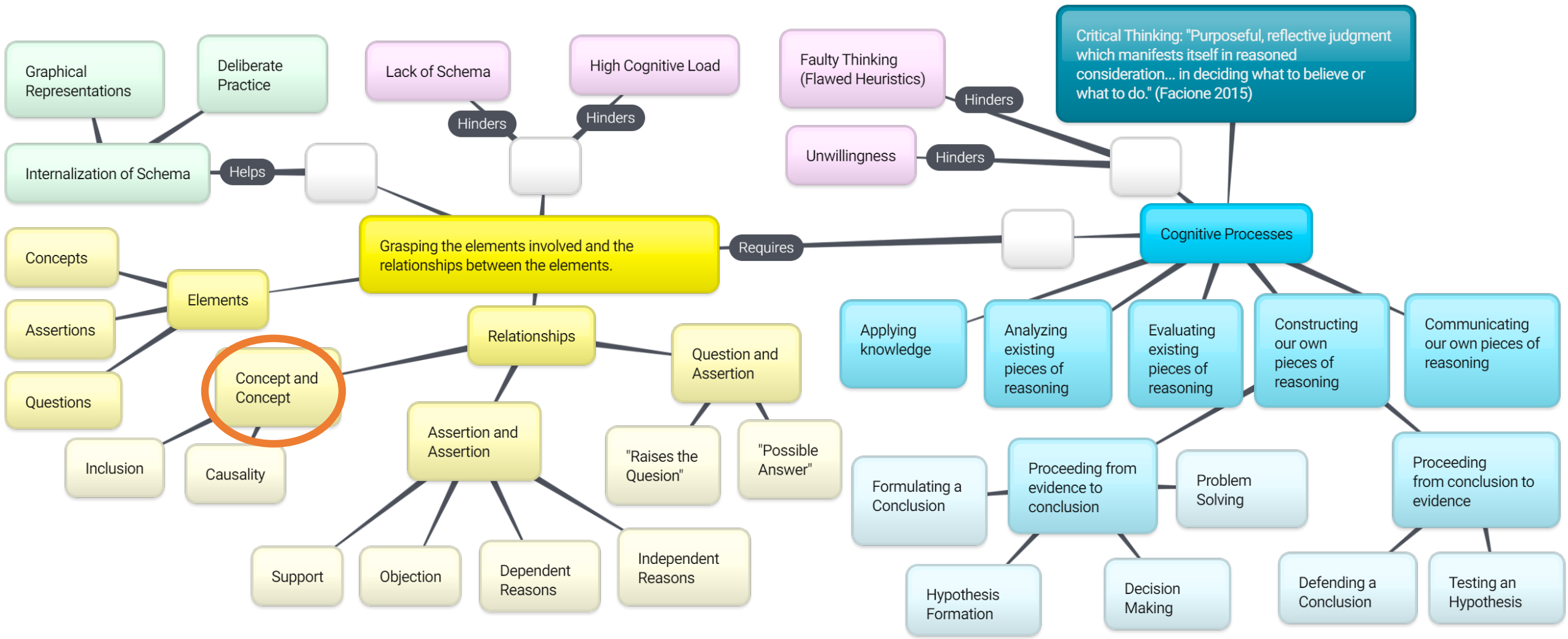


Graphical representations make

- the elements easier to see
- the relationships between the elements easier to track
- the reasoning easier to evaluate

Visual Thinking

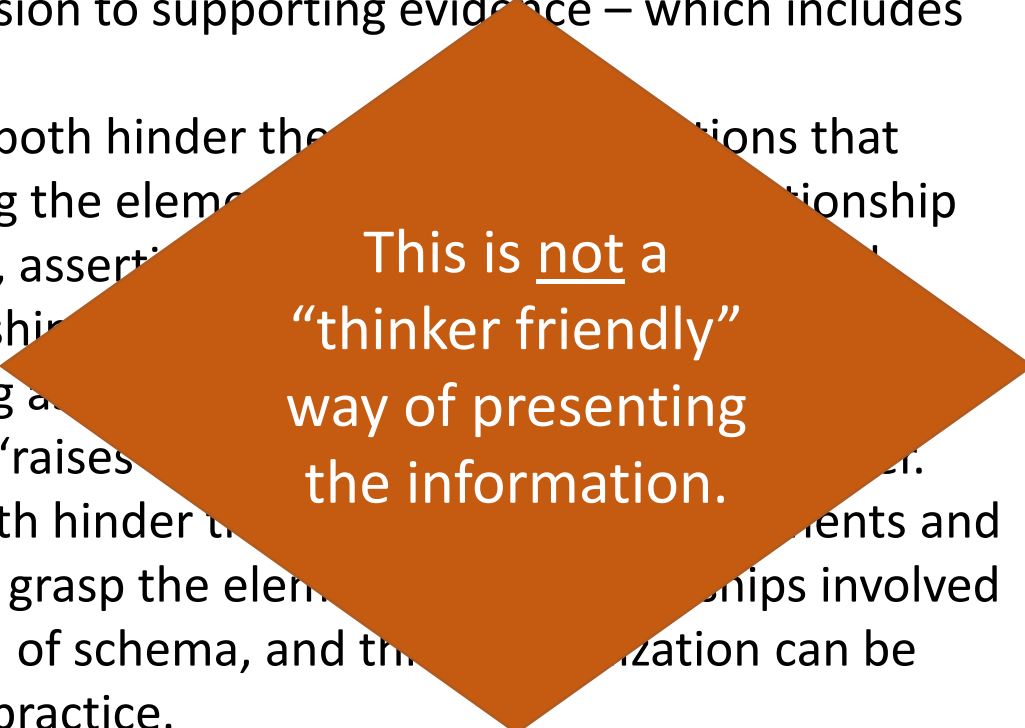
Concept Maps



We can understand critical thinking as the “purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or do. (Facione 2015). This purposeful reflective judgment can take the form of a variety of psychological actions, including applying knowledge, analyzing existing pieces of reasoning, evaluating existing pieces of reasoning, constructing our own pieces of reasoning, and communicating our own pieces of reasoning. Constructing our own reasoning can, in turn, be conceptualized as proceeding from the evidence to a conclusion– which includes formulating a conclusion, formulating an hypothesis, making a decision, and solving a problem – or proceeding from the conclusion to supporting evidence – which includes defending a conclusion and testing an hypothesis.

Faulty thinking and general unwillingness can both hinder the actions that constitute critical thinking, actions that require grasping the elements and relationships between the elements. The elements include concepts, assertions, and questions. Relationships between the elements include causality, causality are relationships between concepts. Relationships between questions and assertions include objection, standing as dependent reasons, and standing as reasons. Relationships between question and assertion include “raises the question” and “answers the question”.

The lack of schema and high cognitive load both hinder the actions and relationships involved in critical thinking. The ability to grasp the elements and relationships involved in critical thinking can be assisted by the internalization of schema, and the internalization can be facilitated by graphical representations and deliberate practice.

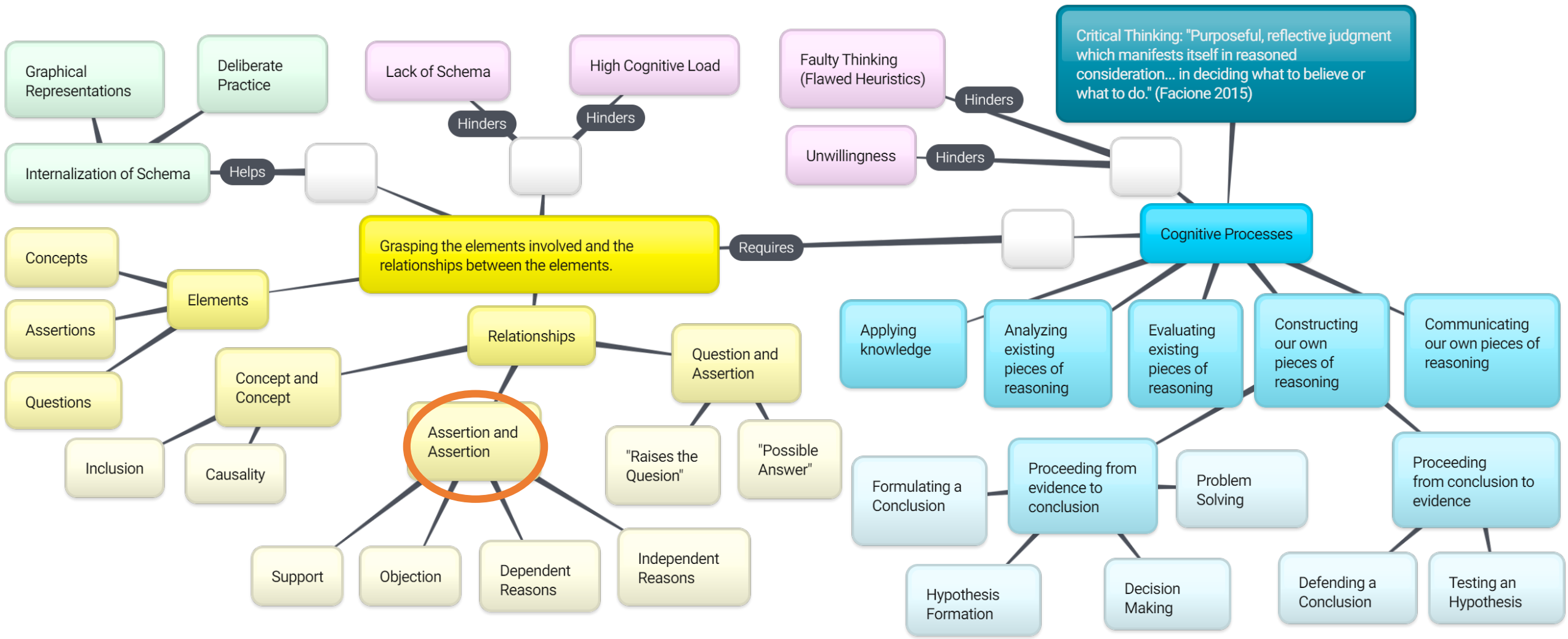


This is not a
“thinker friendly”
way of presenting
the information.

Visual Thinking

Concept Maps

Argument Maps



Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Cognitive Processes

Grasping the elements involved and the relationships between the elements.

Elements

- Concepts
- Assertions
- Questions

Relationships

Concept and Concept

- Inclusion
- Causality

Question and Assertion

- "Raises the Qestion"
- "Possible Answer"

Assertion and Assertion

- Support
- Objection
- Dependent Reasons
- Independent Reasons

- Applying knowledge
- Analyzing existing pieces of reasoning
- Evaluating existing pieces of reasoning
- Constructing our own pieces of reasoning
- Communicating our own pieces of reasoning
- Proceeding from evidence to conclusion
 - Formulating a Conclusion
 - Problem Solving
 - Hypothesis Formation
 - Decision Making
- Proceeding from conclusion to evidence
 - Defending a Conclusion
 - Testing an Hypothesis

“I think my house will sell within six months. After all, it’s on a river. Of course, lots of people are worried about flooding. My nasty neighbor thinks that my house is priced twice as high as comparable houses, but I think it’s priced reasonably, and reasonably priced houses always sell quickly. My husband claims that our house needs a new roof, and of course houses that need new roofs stay on the market longer, but as far as I can see, our roof is structurally sound.”



- What are the main elements (assertions) in this piece of reasoning, and how are they related to each other?
- Try to represent this argument visually.

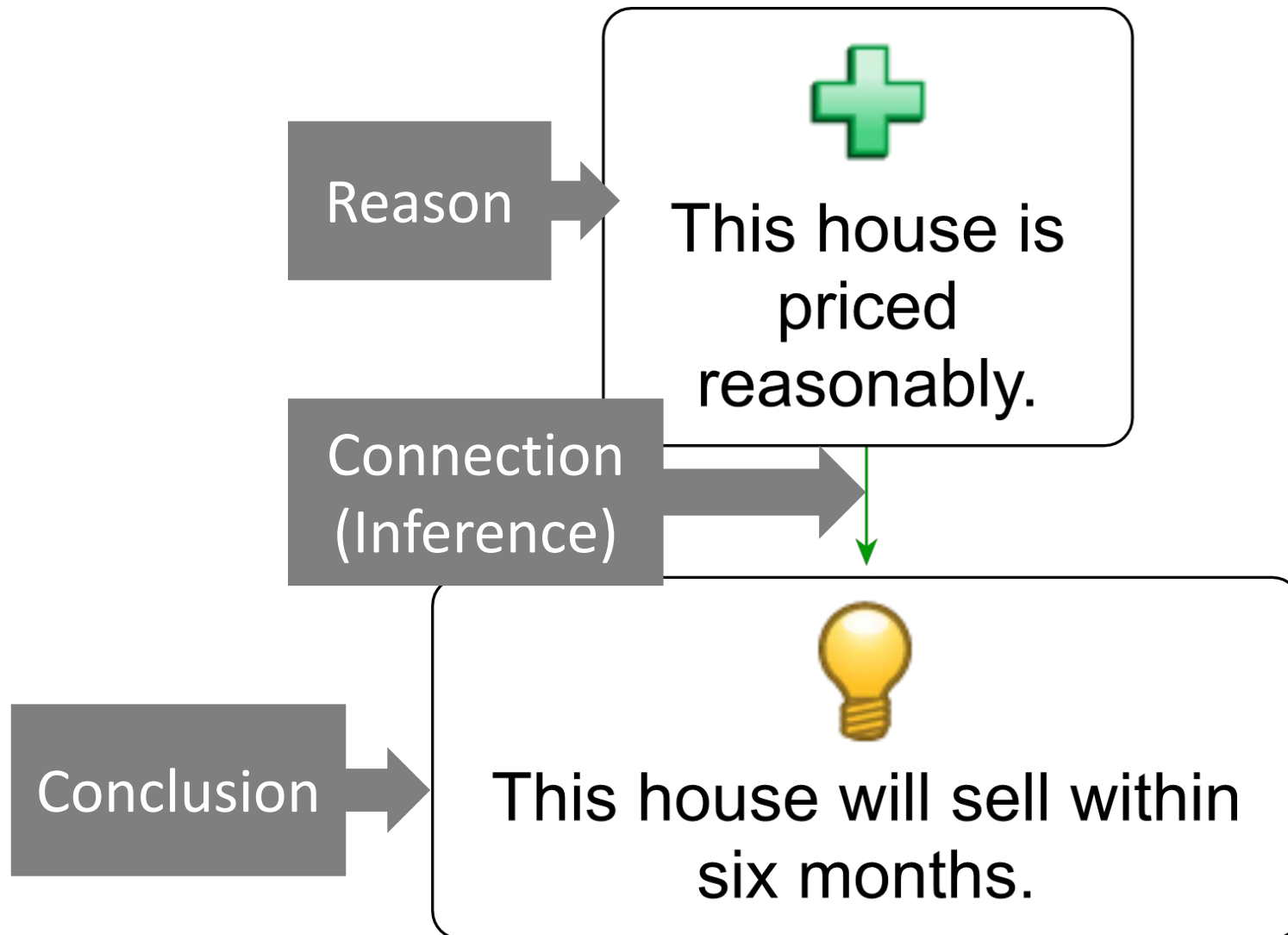
Visual Thinking

Concept Maps

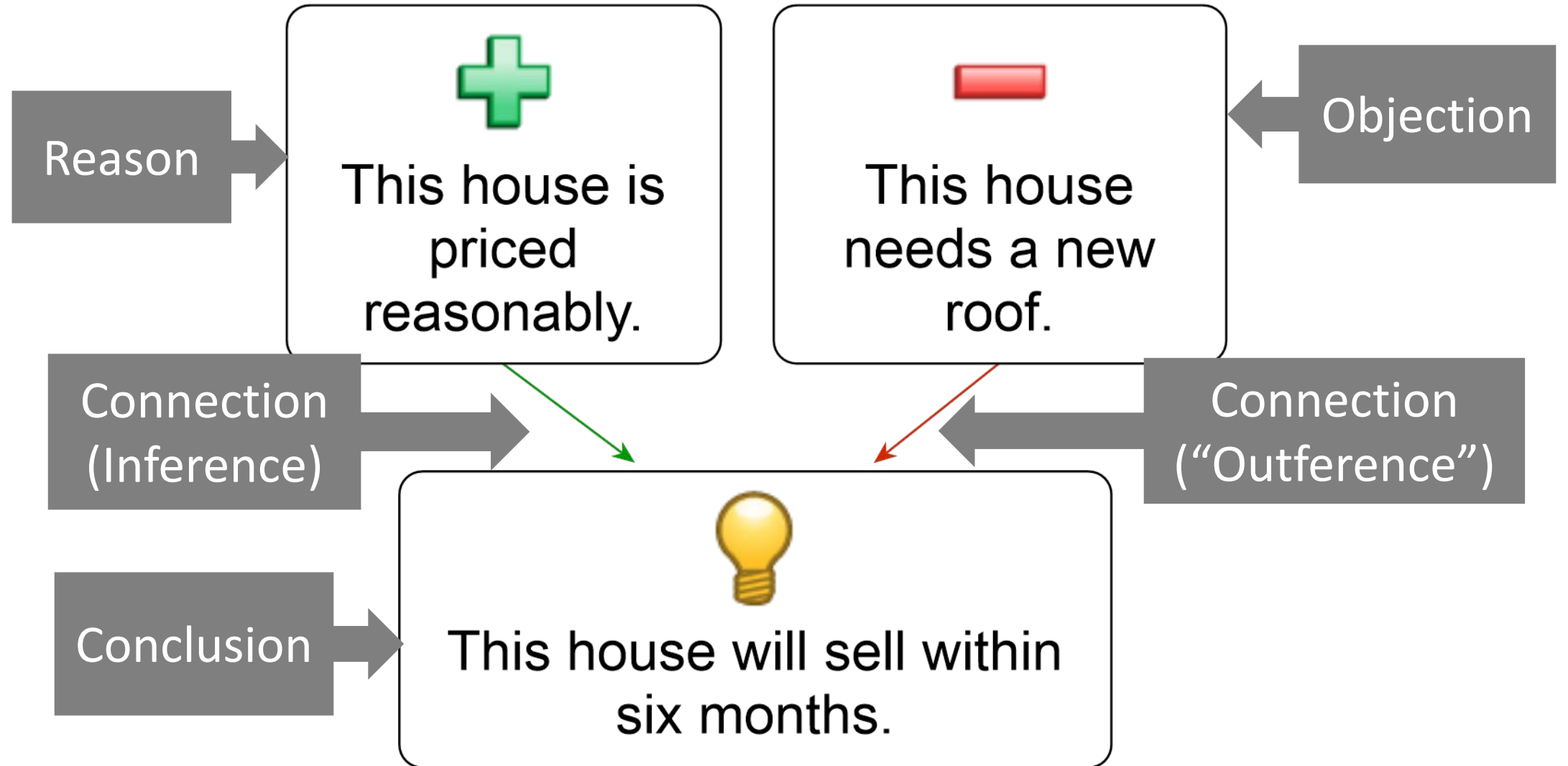
Argument Maps

Logical Structure of Reasoning

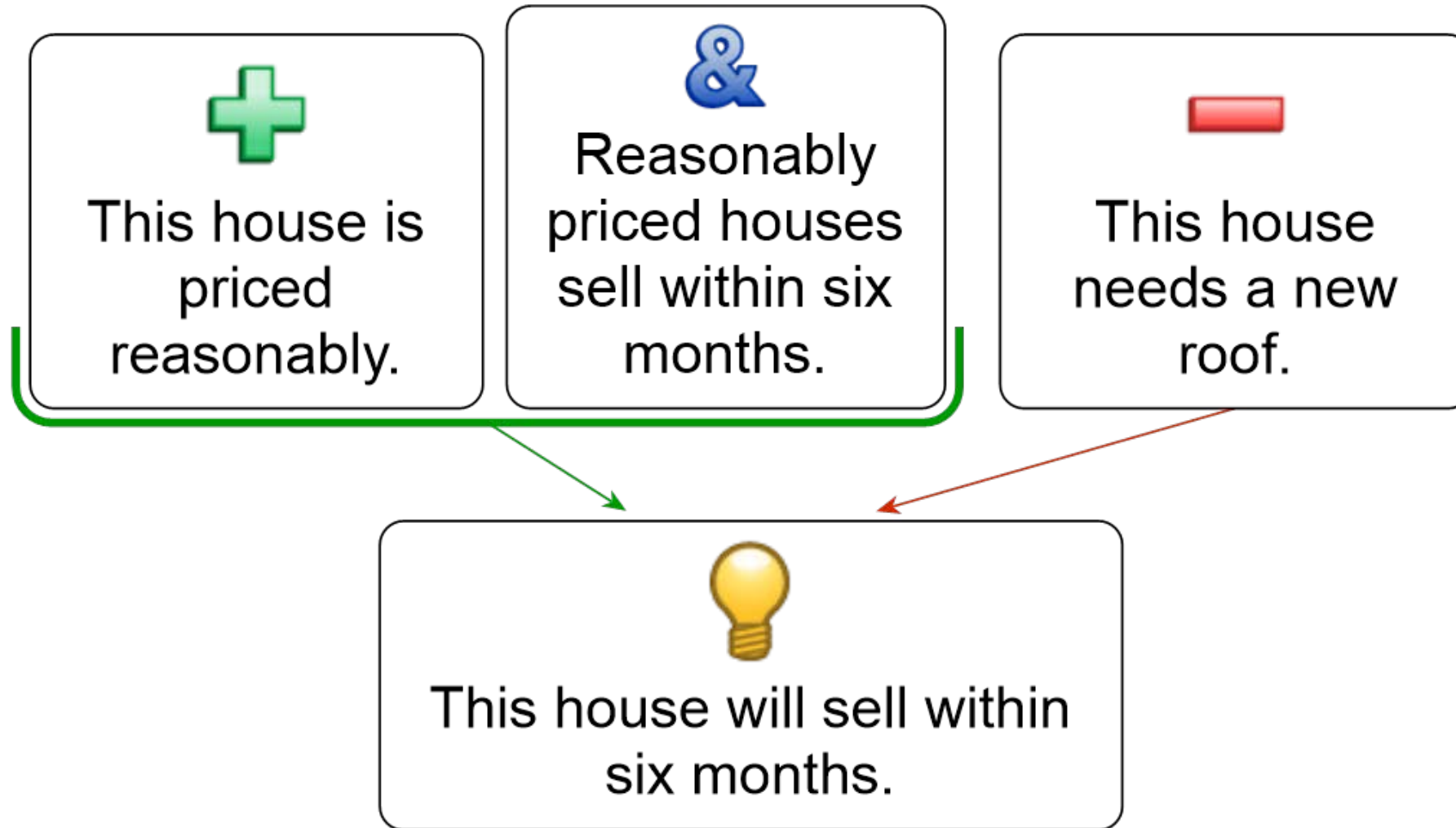
Support



Objection



Dependent Reasons



Dependent Reasons



This house is priced reasonably.



Reasonably priced houses sell within six months.



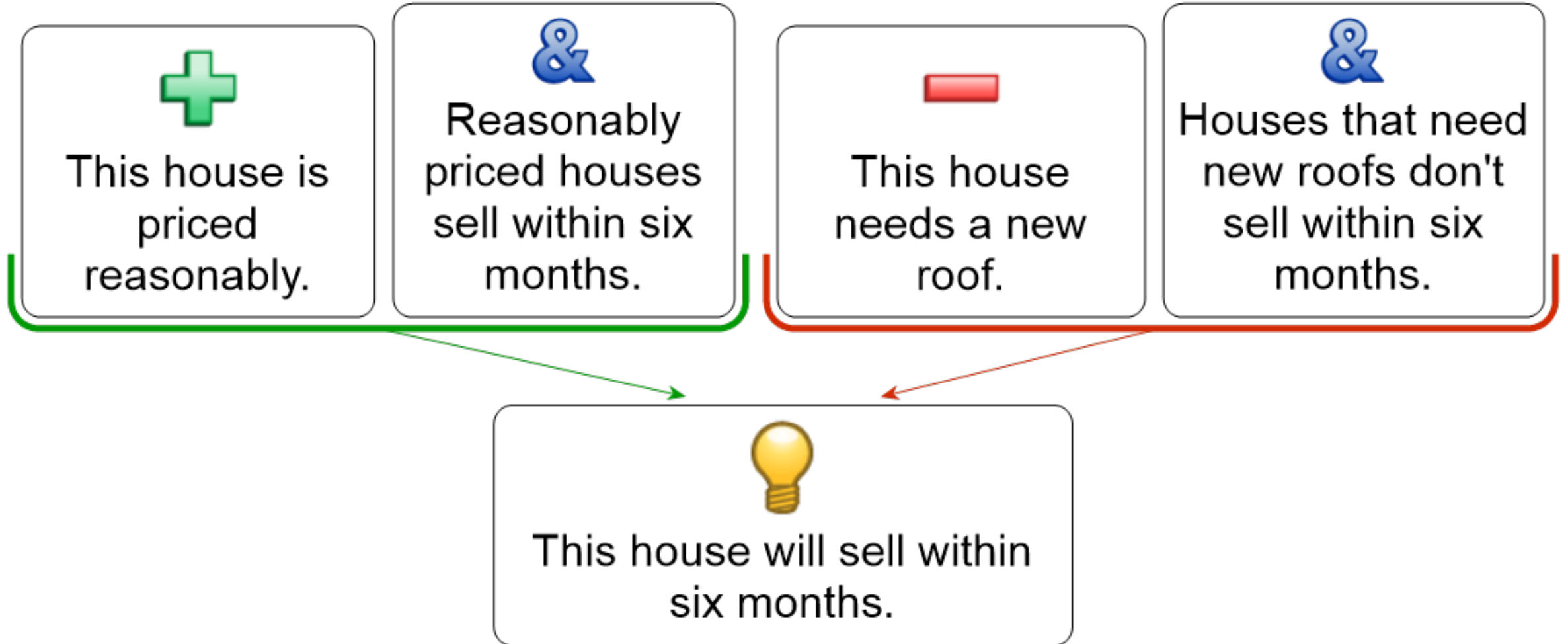
This house needs a new roof.



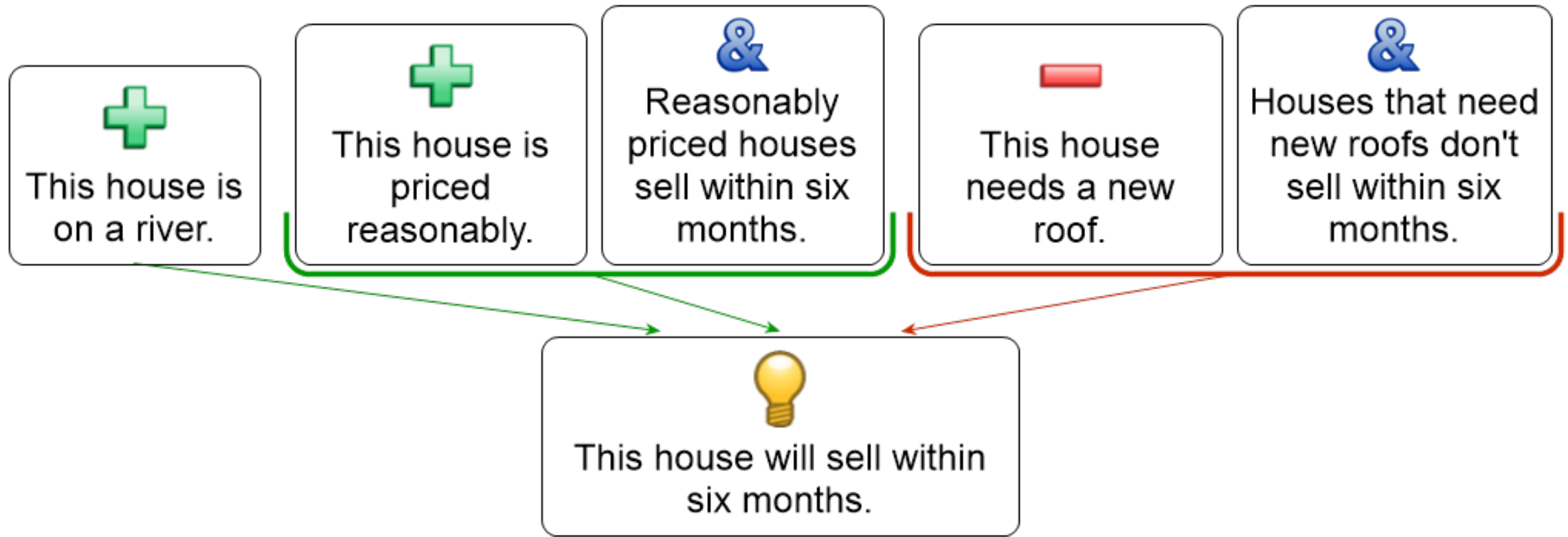
Houses that need new roofs don't sell within six months.



This house will sell within six months.



Independent Reasons



- The structure of the reasoning can be more complex.
- The content of the reasoning can be more difficult to comprehend.
- It can be difficult to track other people's reasoning.
- It can be difficult to track our own reasoning.



It's hard to find a black chicken in the dark.

But it's even harder if you don't know what a chicken looks like.

Visual Thinking

Concept Maps

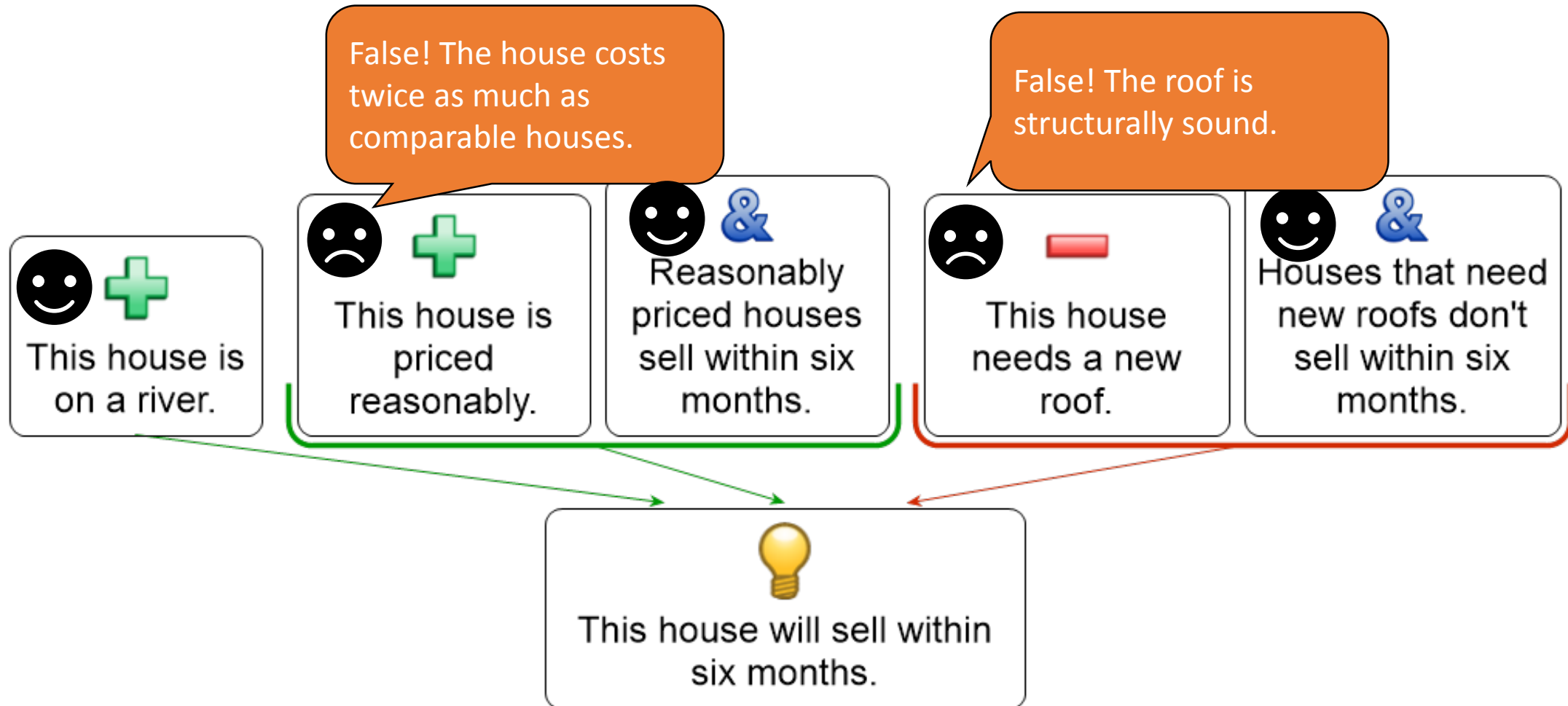
Argument Maps

Logical Structure of Reasoning

Evaluation of Reasoning

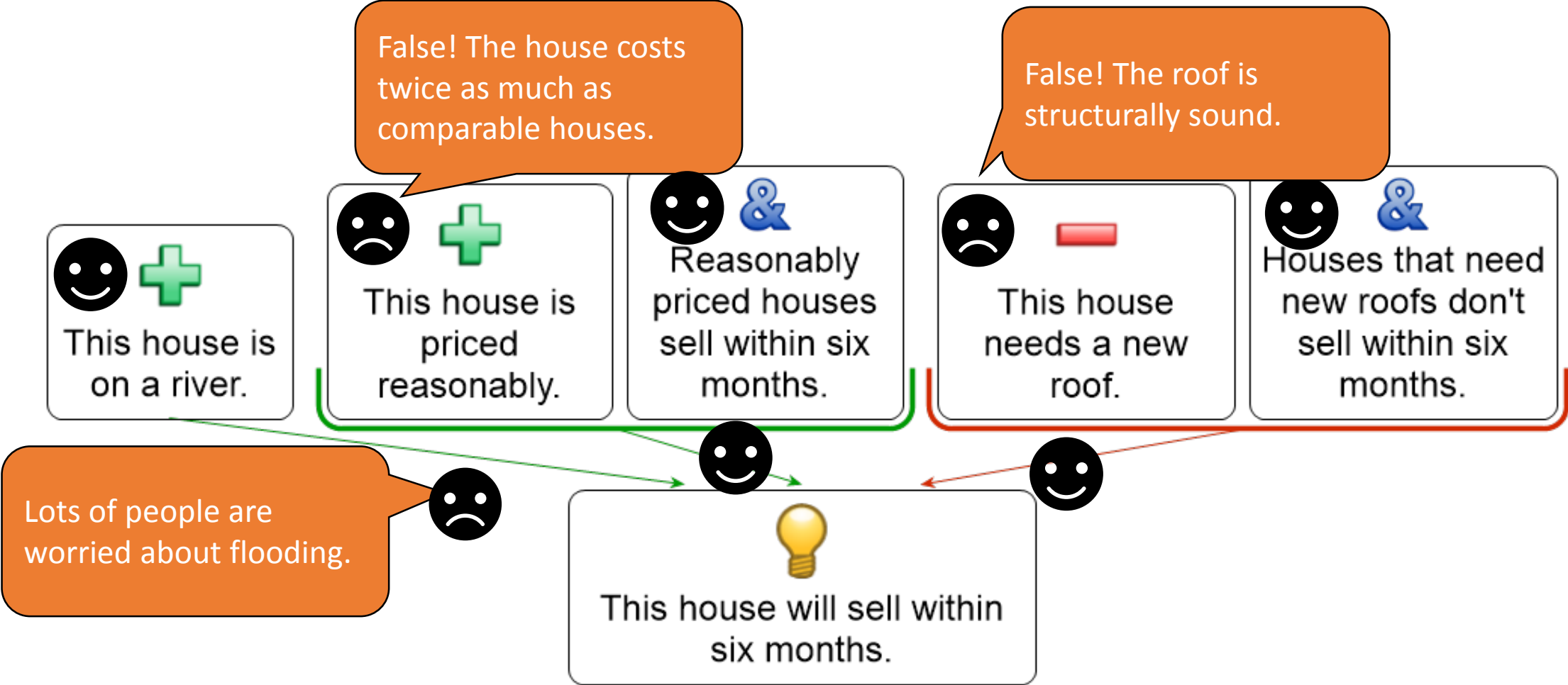
Assessing Reasons

Are the reasons true?

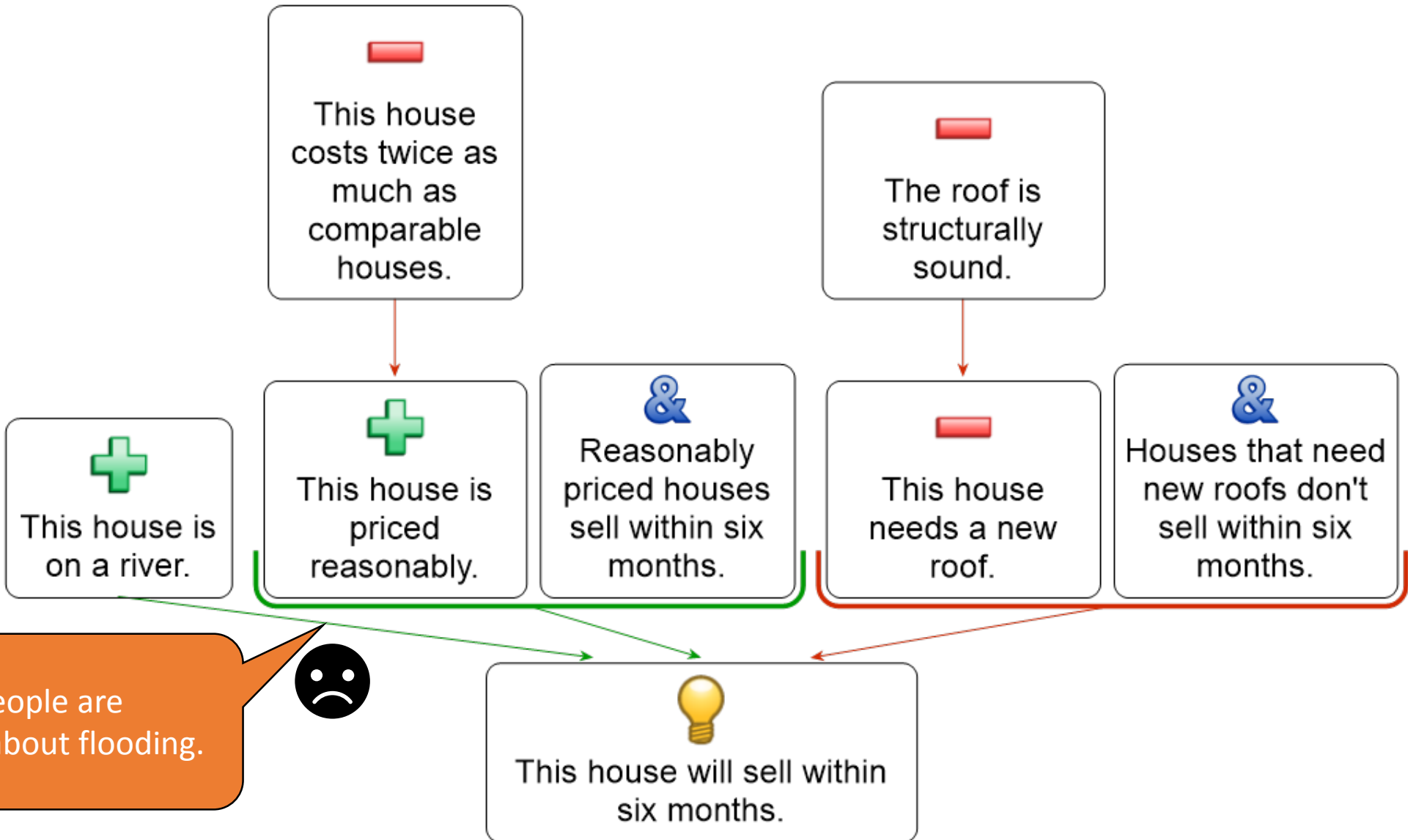


Assessing Connections

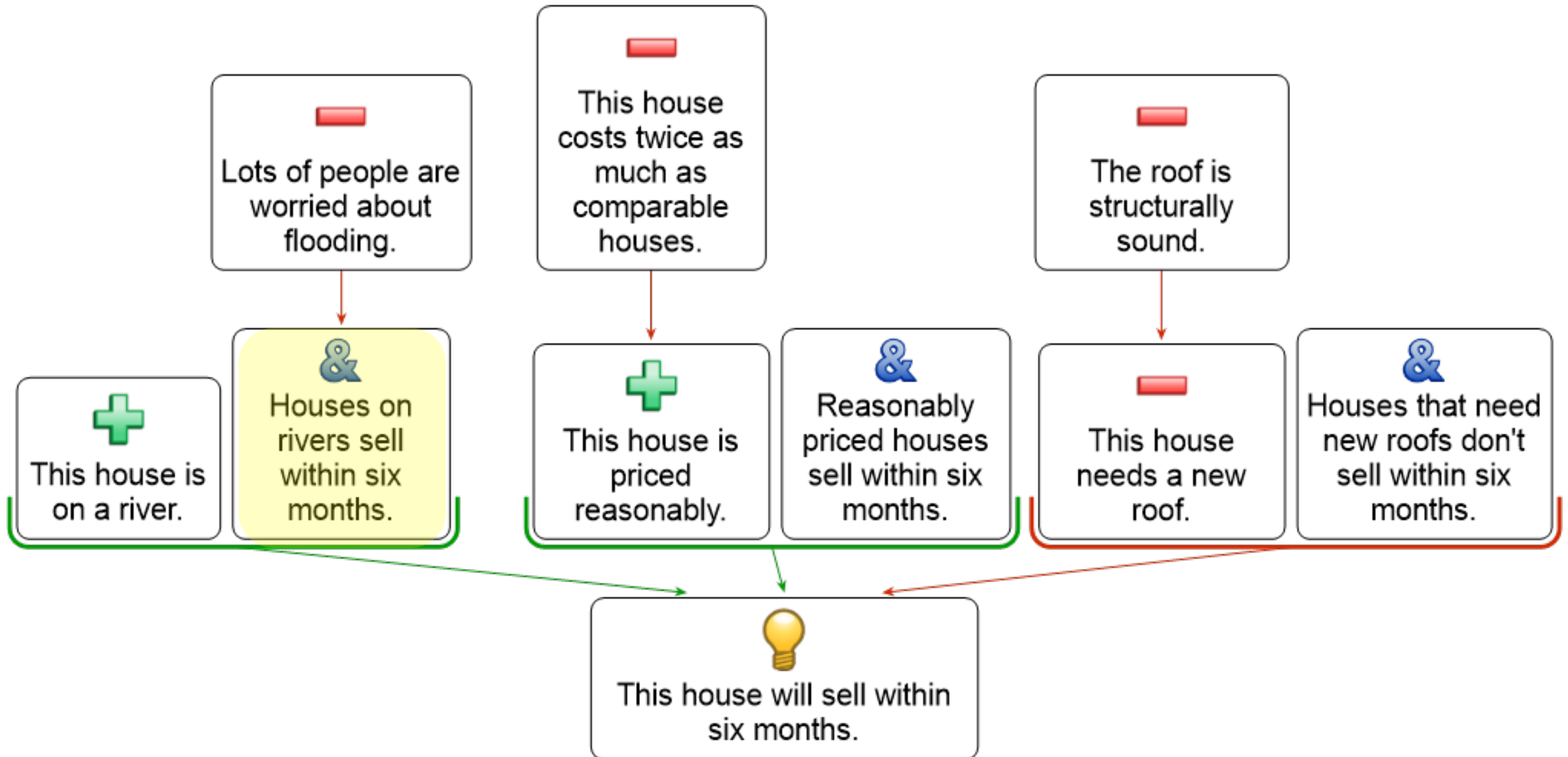
If the reasons were true, would they show that the conclusion is probably true (or false)?



Mapping Objections to Reasons



Mapping Objections to Connections



Visual Thinking

Concept Maps

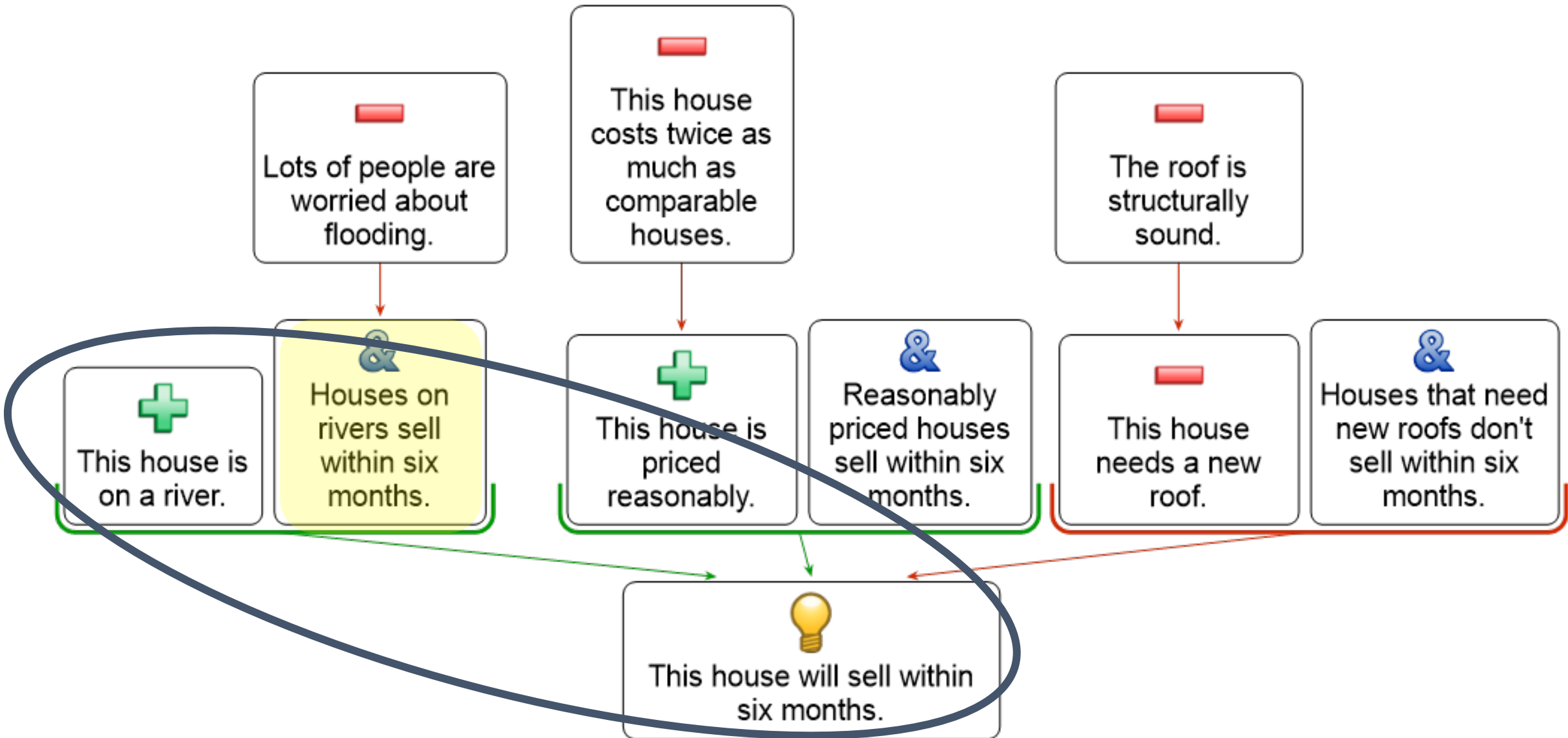
Argument Maps

Logical Structure of Reasoning

Evaluation of Reasoning

Uncovering Hidden Assumptions

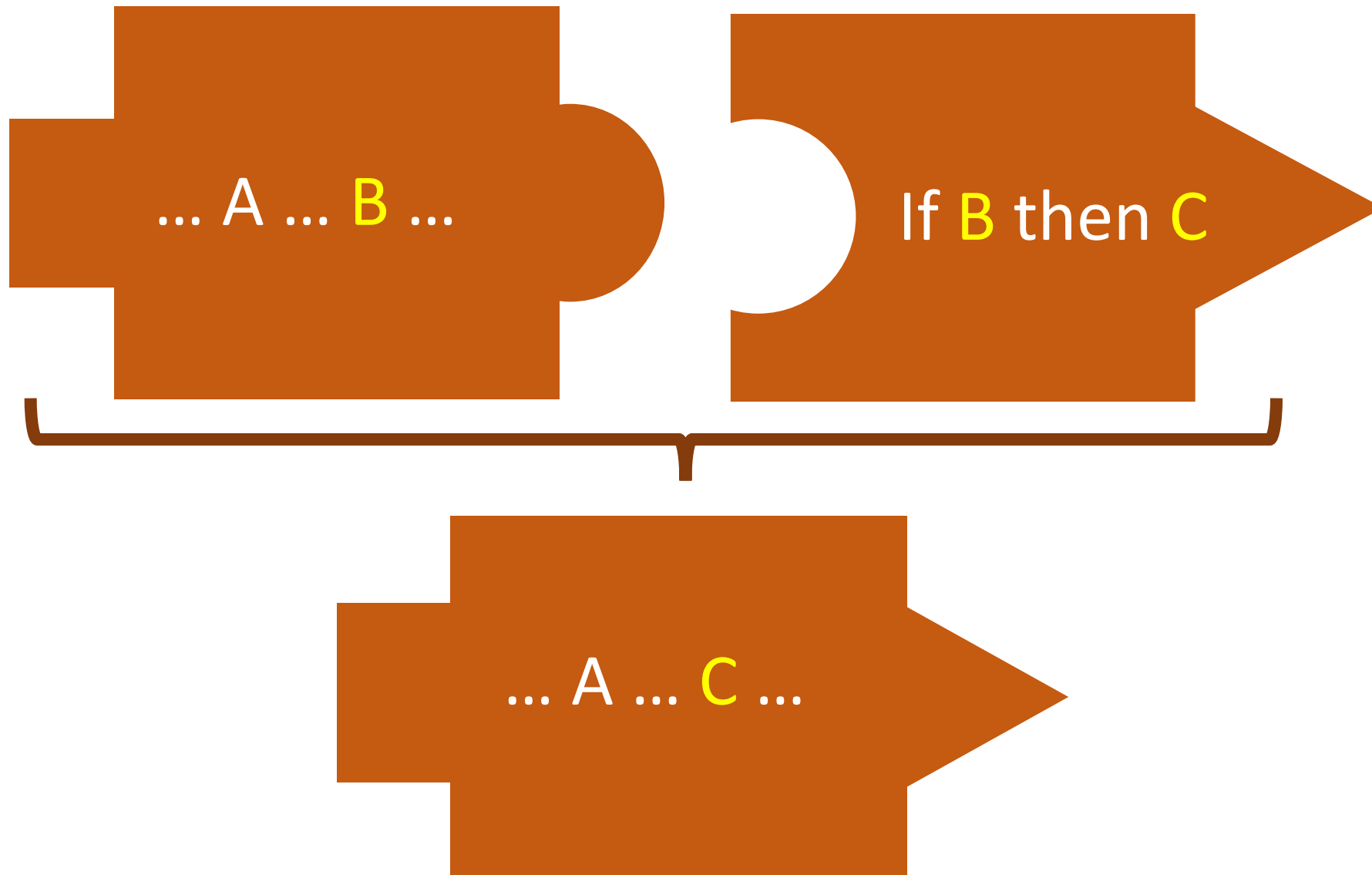
Mapping Objections to Connections



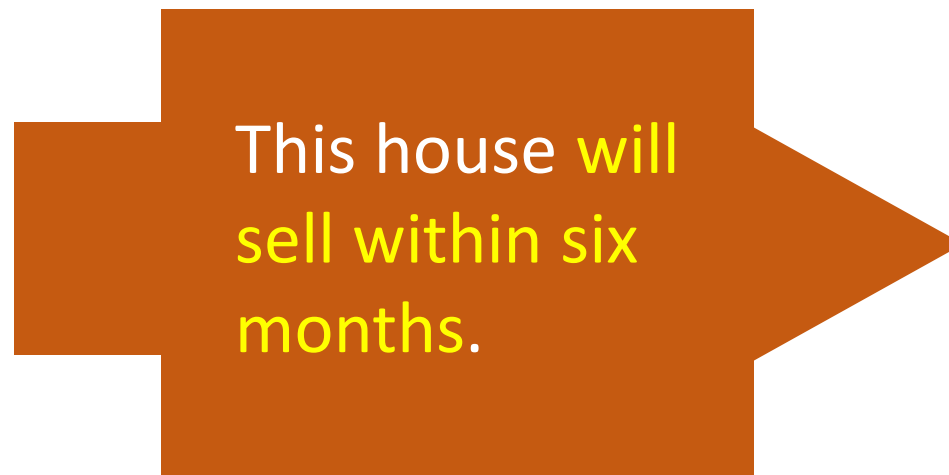
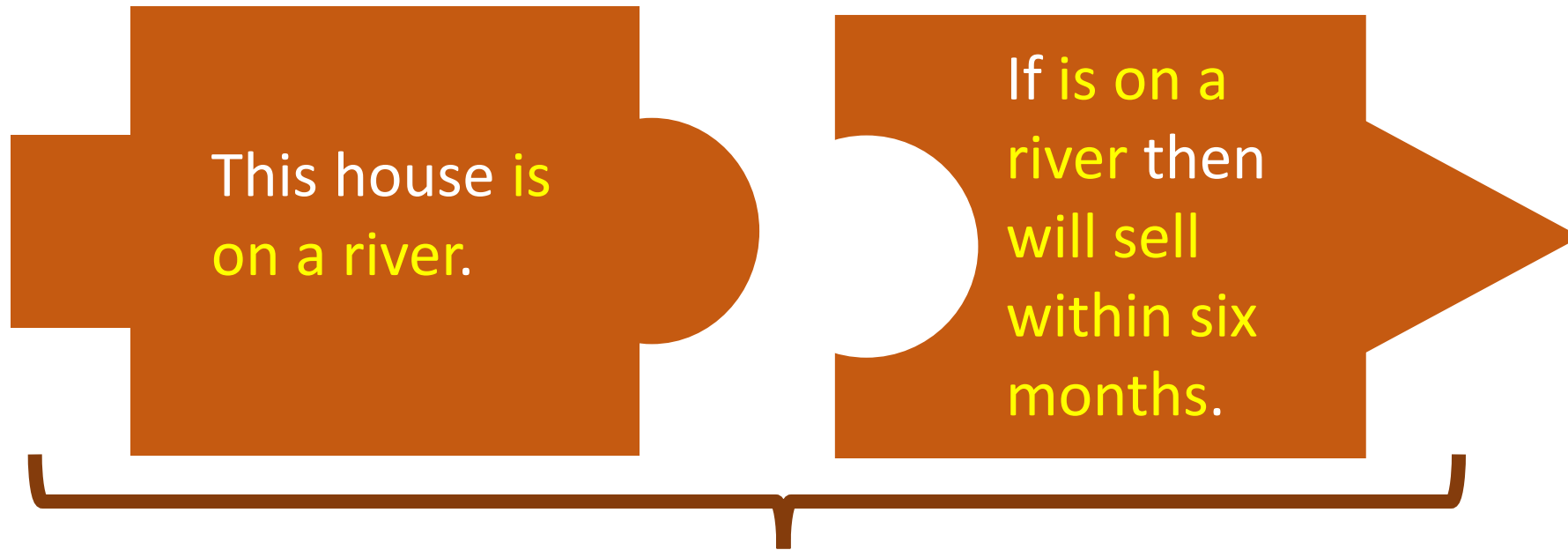
Uncovering Hidden Assumptions



Uncovering Hidden Assumptions



Uncovering Hidden Assumptions



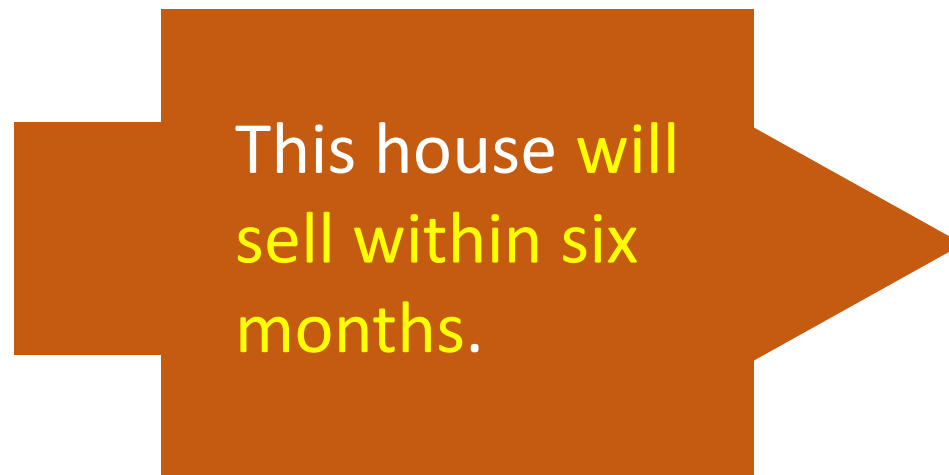
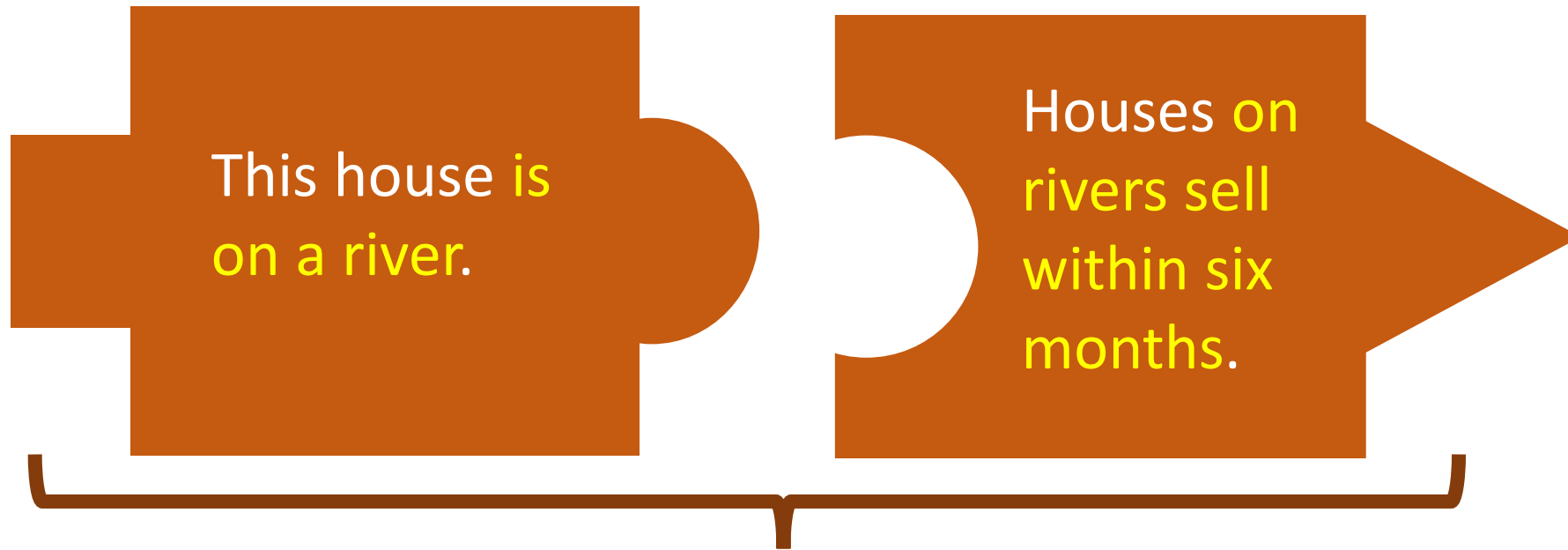
Uncovering Hidden Assumptions

This house is
on a river.

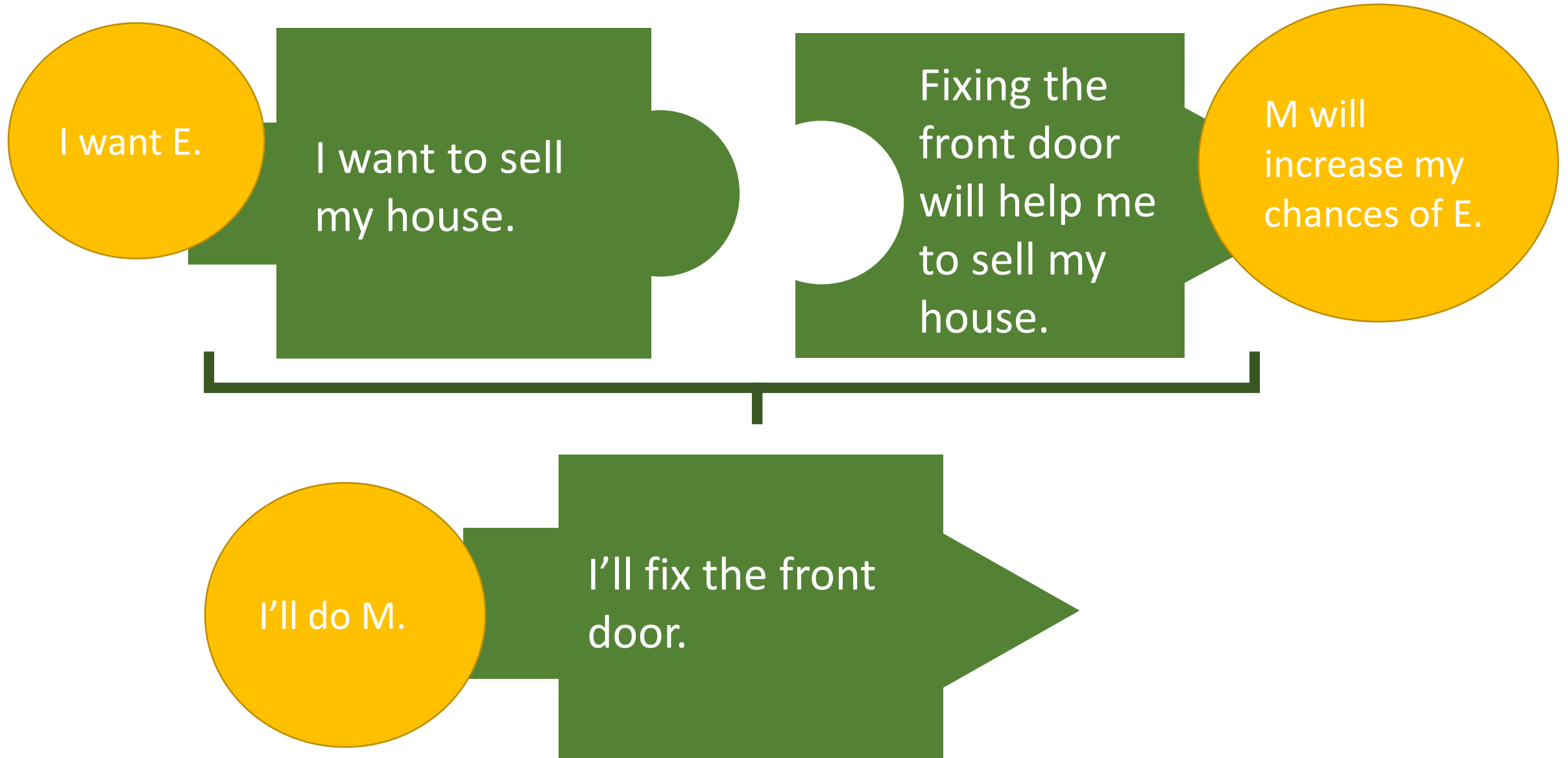
If a house is
on a river
then it will
sell within
six months.

This house will
sell within six
months.

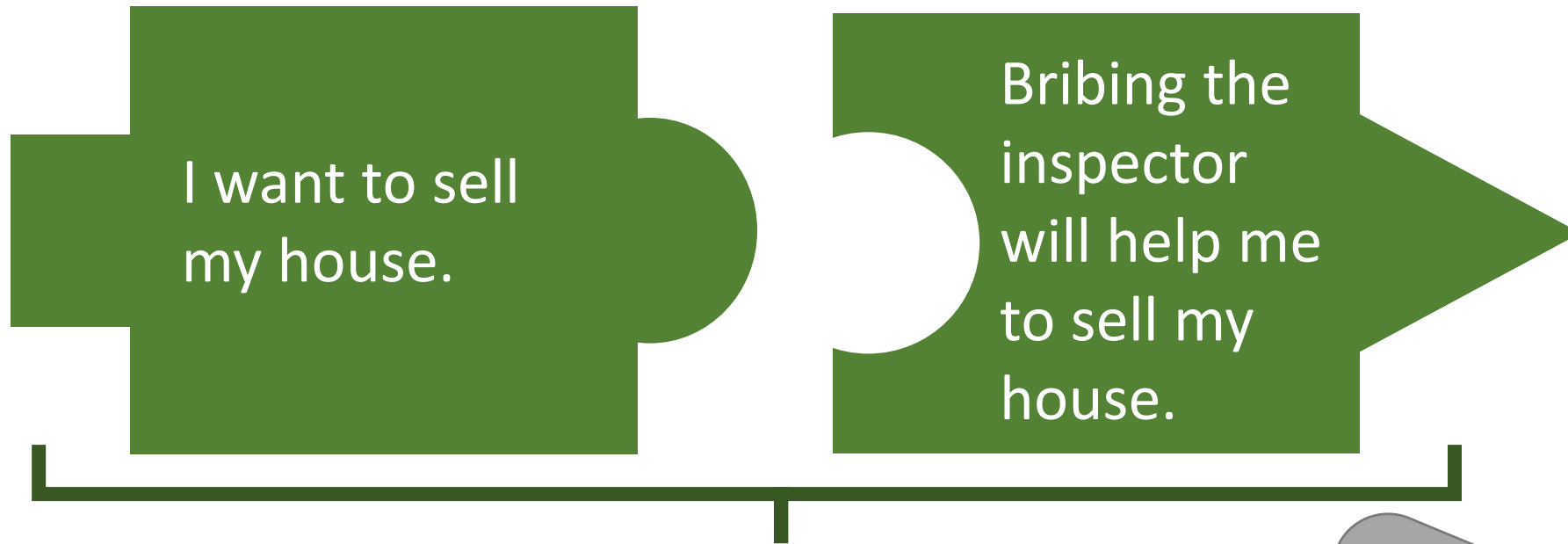
Uncovering Hidden Assumptions



Means / Ends Reasoning



Means / Ends Reasoning



Watch out!
There is more than
one means to an
end.

Means / Ends Reasoning

I want to eliminate my clutter.

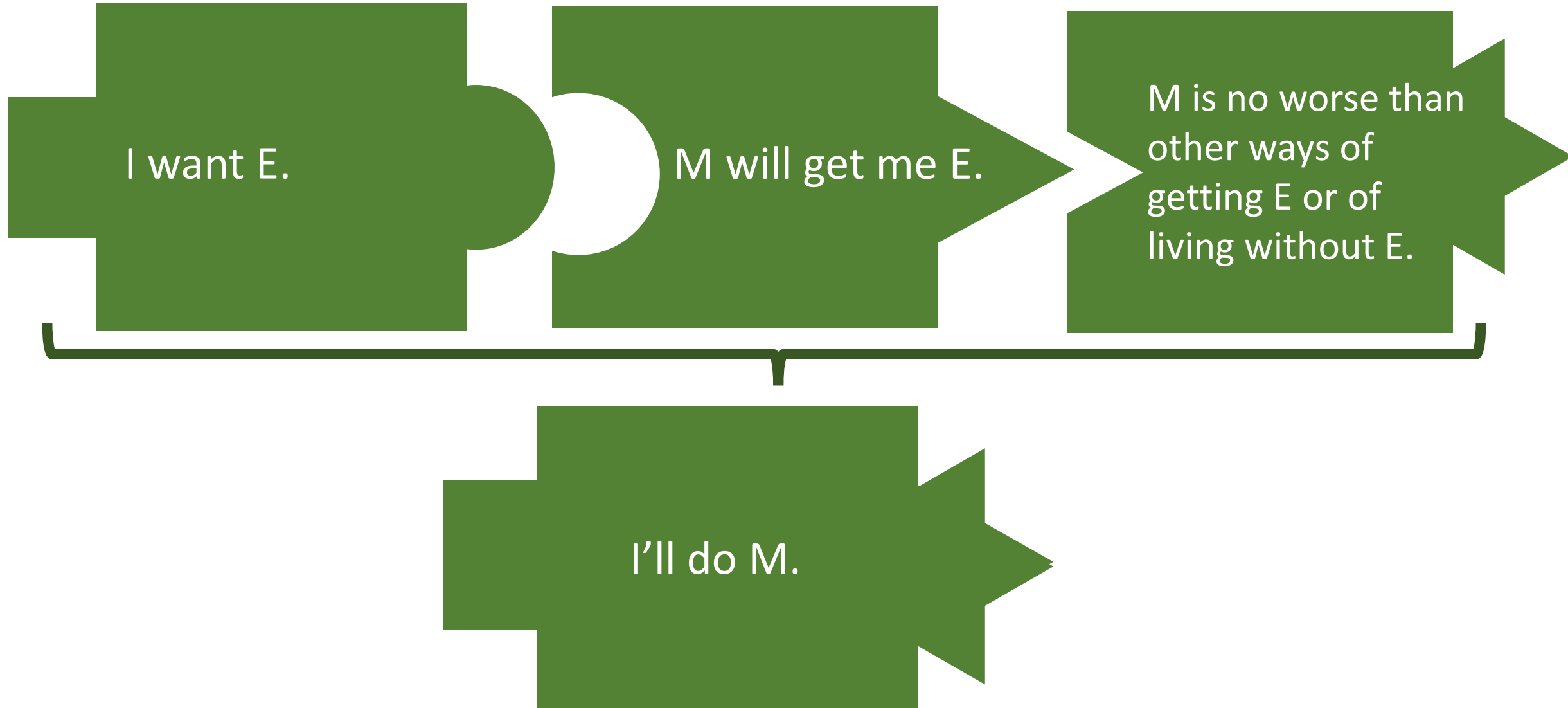
Burning down my house will eliminate my clutter.



I'll burn down my house.

Watch out!
Sometimes the cure is worse than the disease.

Means / Ends Reasoning

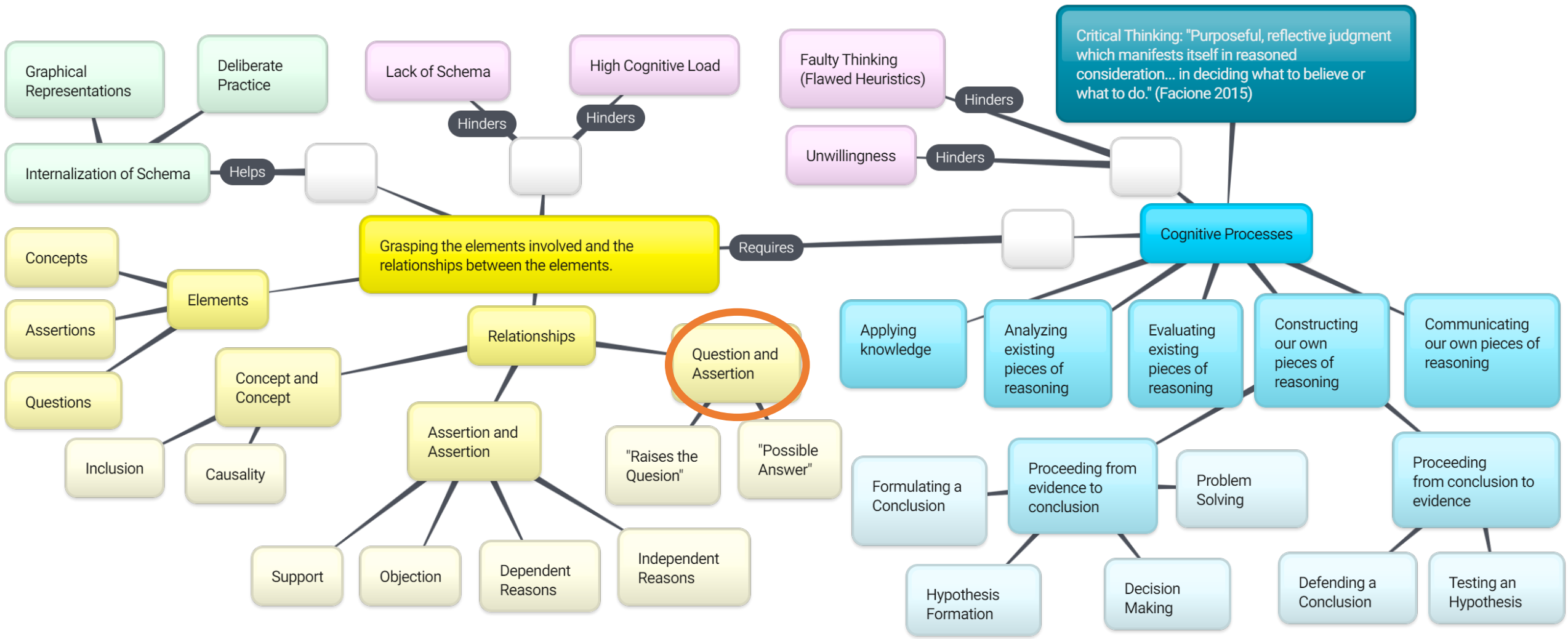


Visual Thinking

Concept Maps

Argument Maps

Dialogue Maps



Critical Thinking: "Purposeful, reflective judgment which manifests itself in reasoned consideration... in deciding what to believe or what to do." (Facione 2015)

Grasping the elements involved and the relationships between the elements.

Cognitive Processes

Elements

Relationships

Question and Assertion

Graphical Representations
Deliberate Practice

Internalization of Schema

Lack of Schema

High Cognitive Load

Faulty Thinking (Flawed Heuristics)

Unwillingness

Concepts

Assertions

Questions

Concept and Concept

Assertion and Assertion

Inclusion

Causality

Support

Objection

Dependent Reasons

Independent Reasons

"Raises the Qestion"

"Possible Answer"

Applying knowledge

Analyzing existing pieces of reasoning

Evaluating existing pieces of reasoning

Constructing our own pieces of reasoning

Communicating our own pieces of reasoning

Formulating a Conclusion

Proceeding from evidence to conclusion

Problem Solving

Proceeding from conclusion to evidence

Hypothesis Formation

Decision Making

Defending a Conclusion

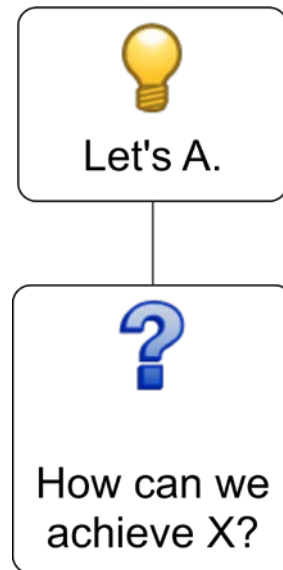
Testing an Hypothesis

Mapping a Dialogue

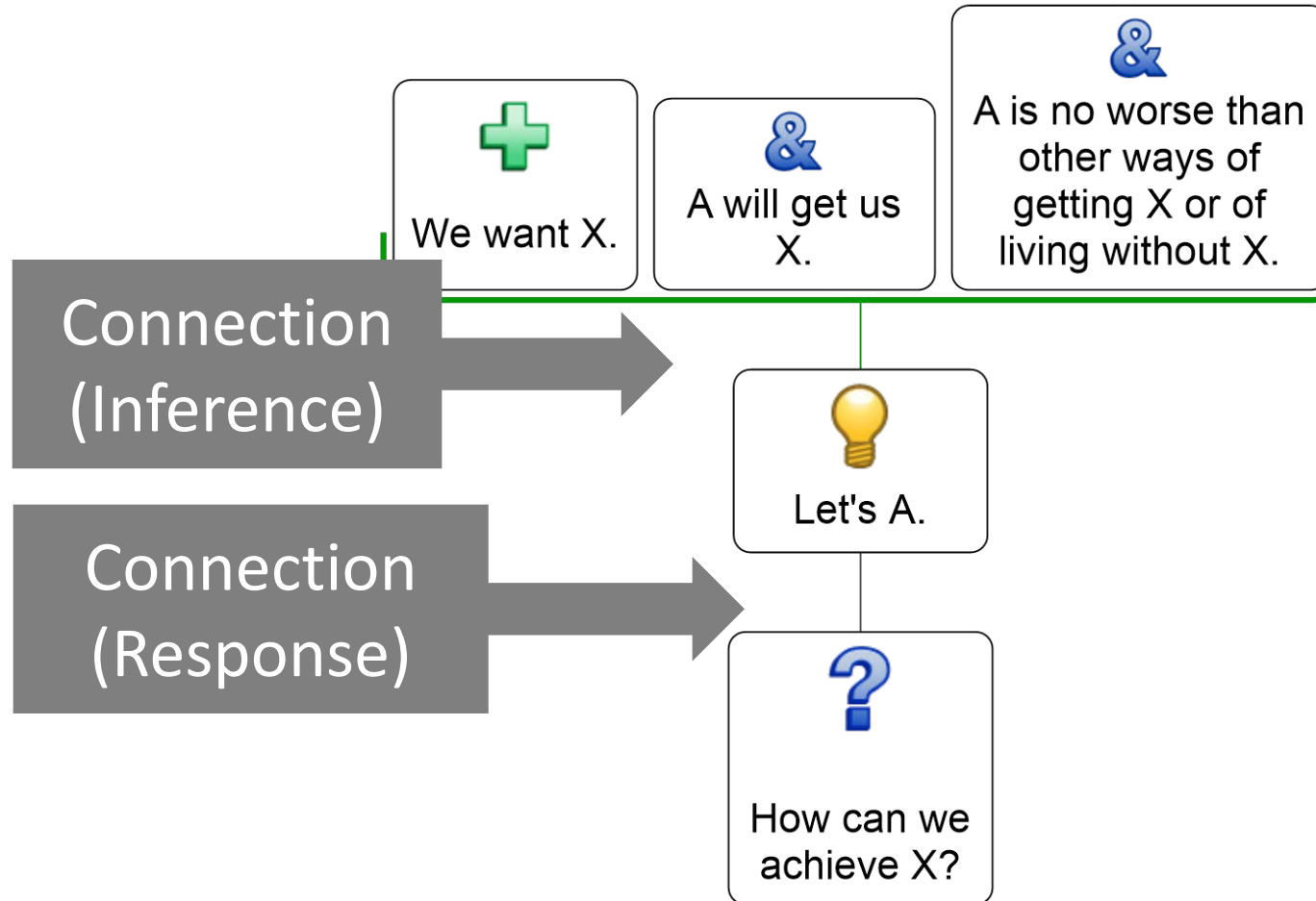


How can we
achieve X?

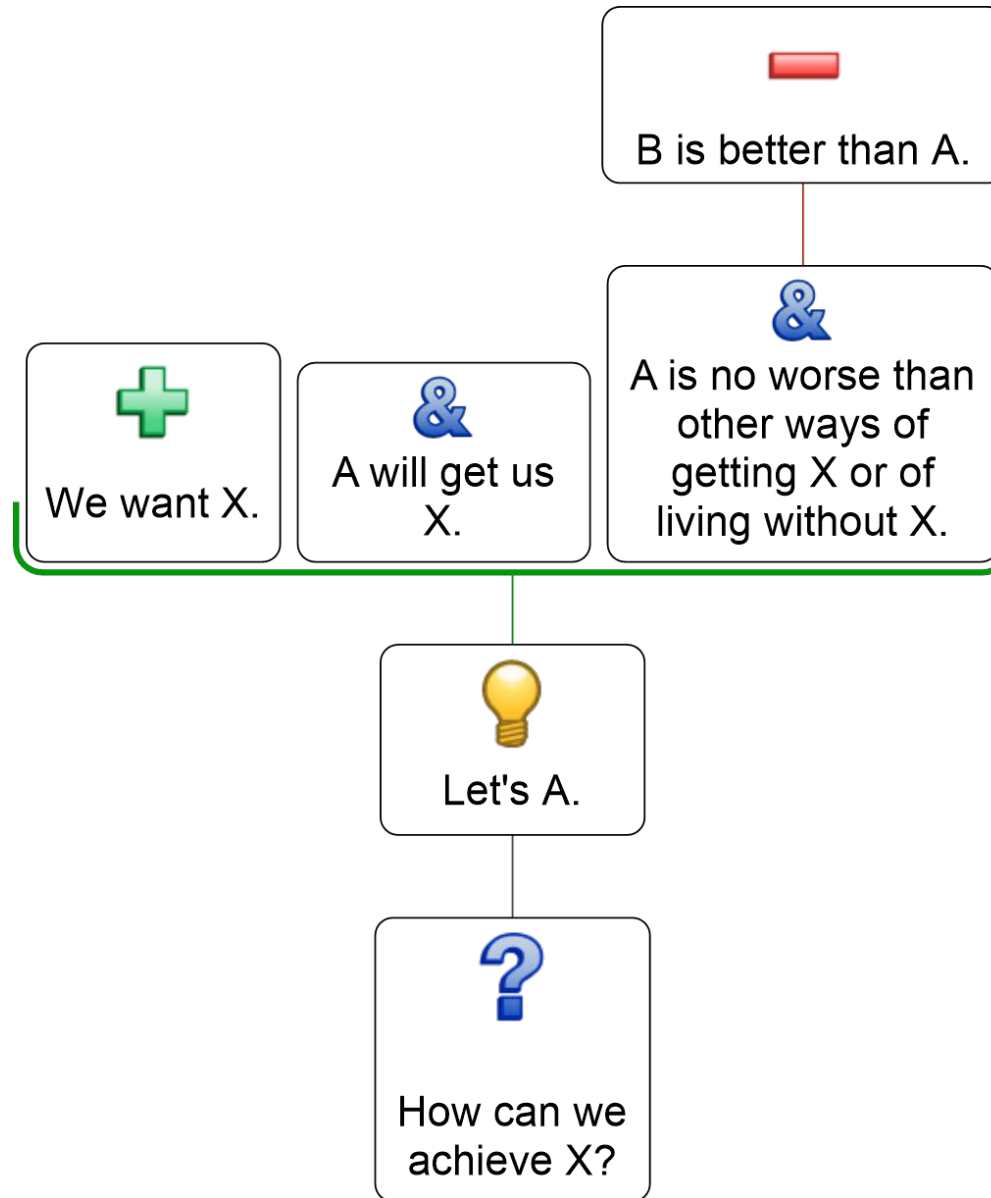
Mapping a Dialogue



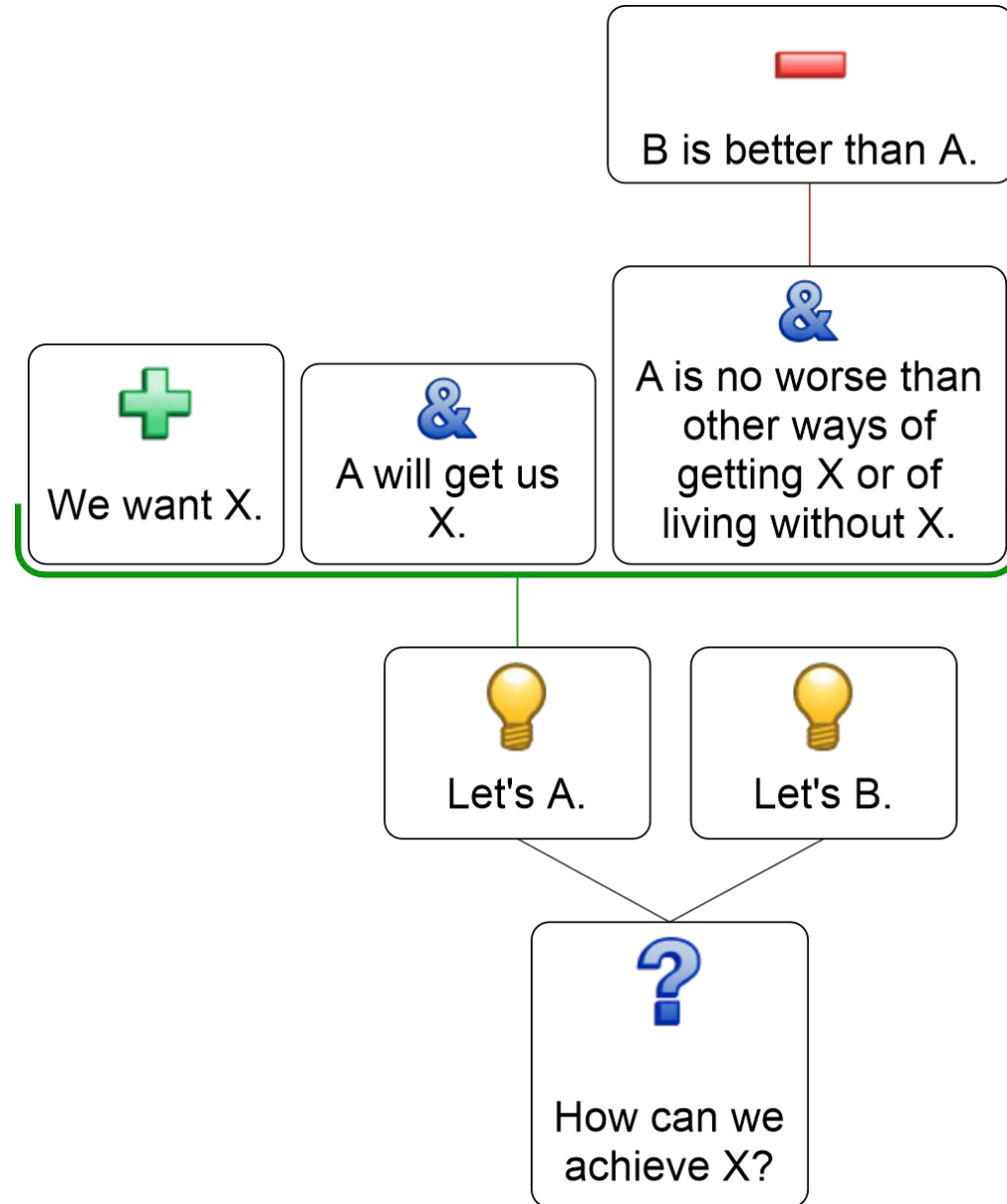
Mapping a Dialogue



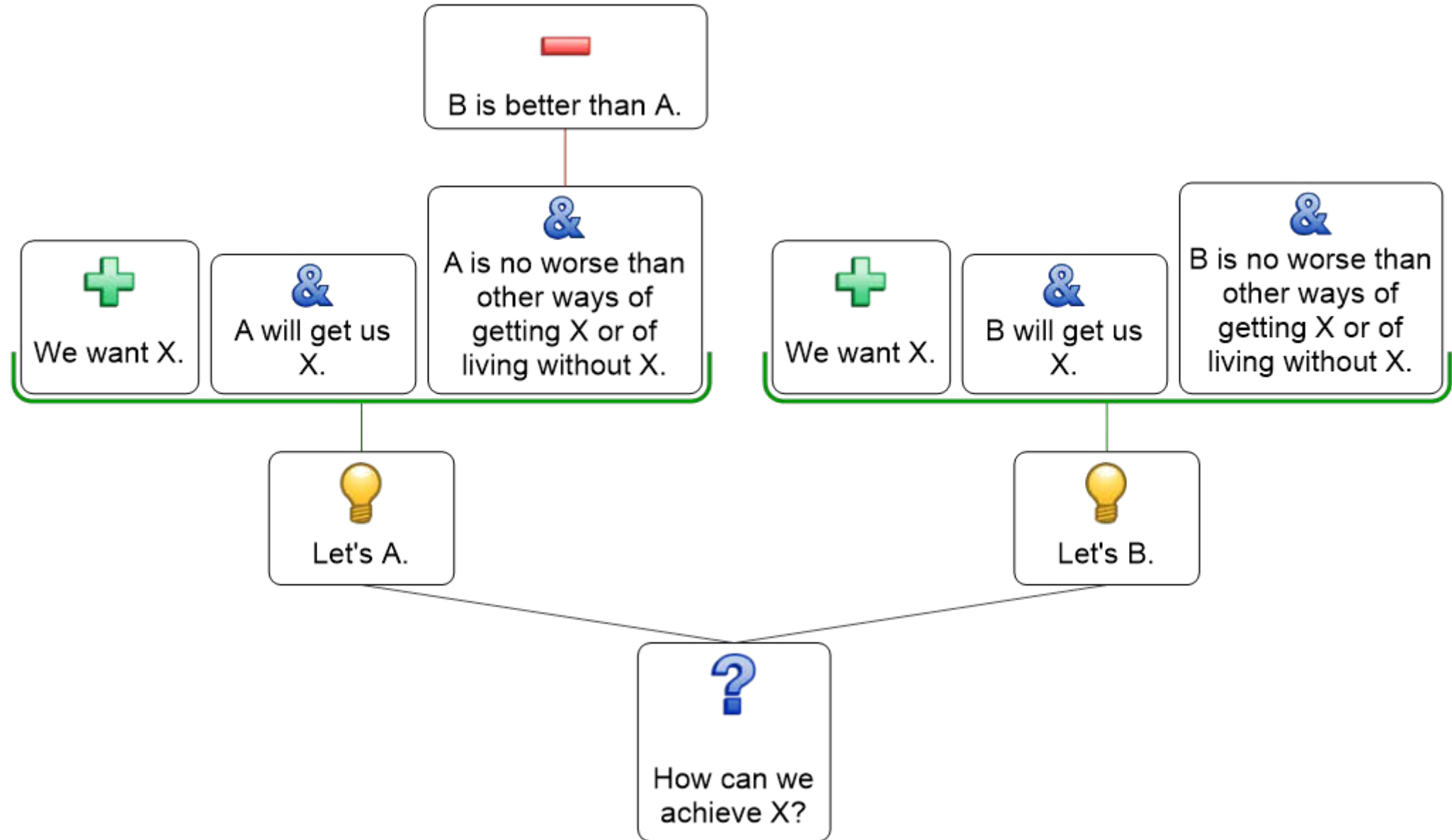
Mapping a Dialogue



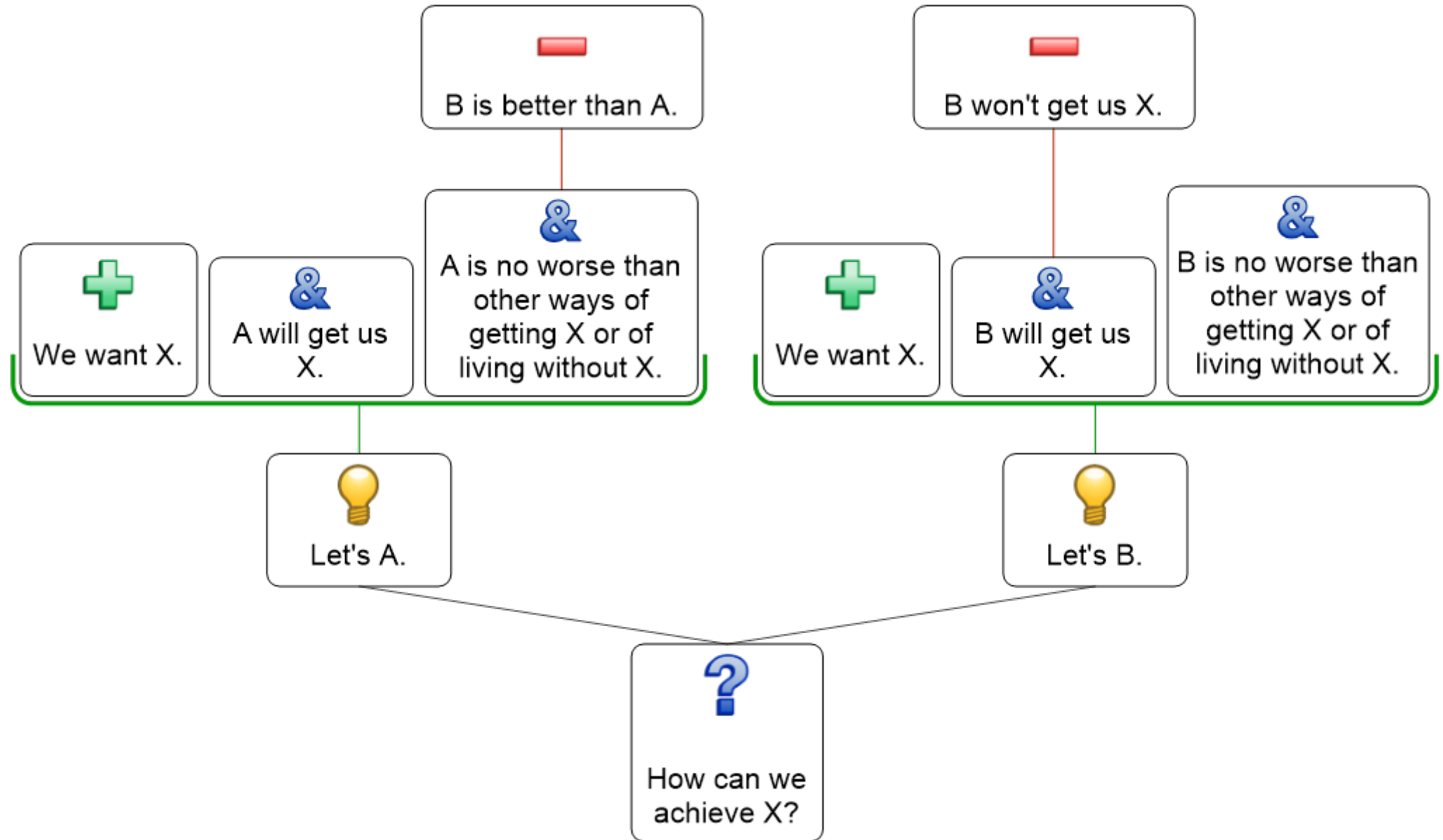
Mapping a Dialogue



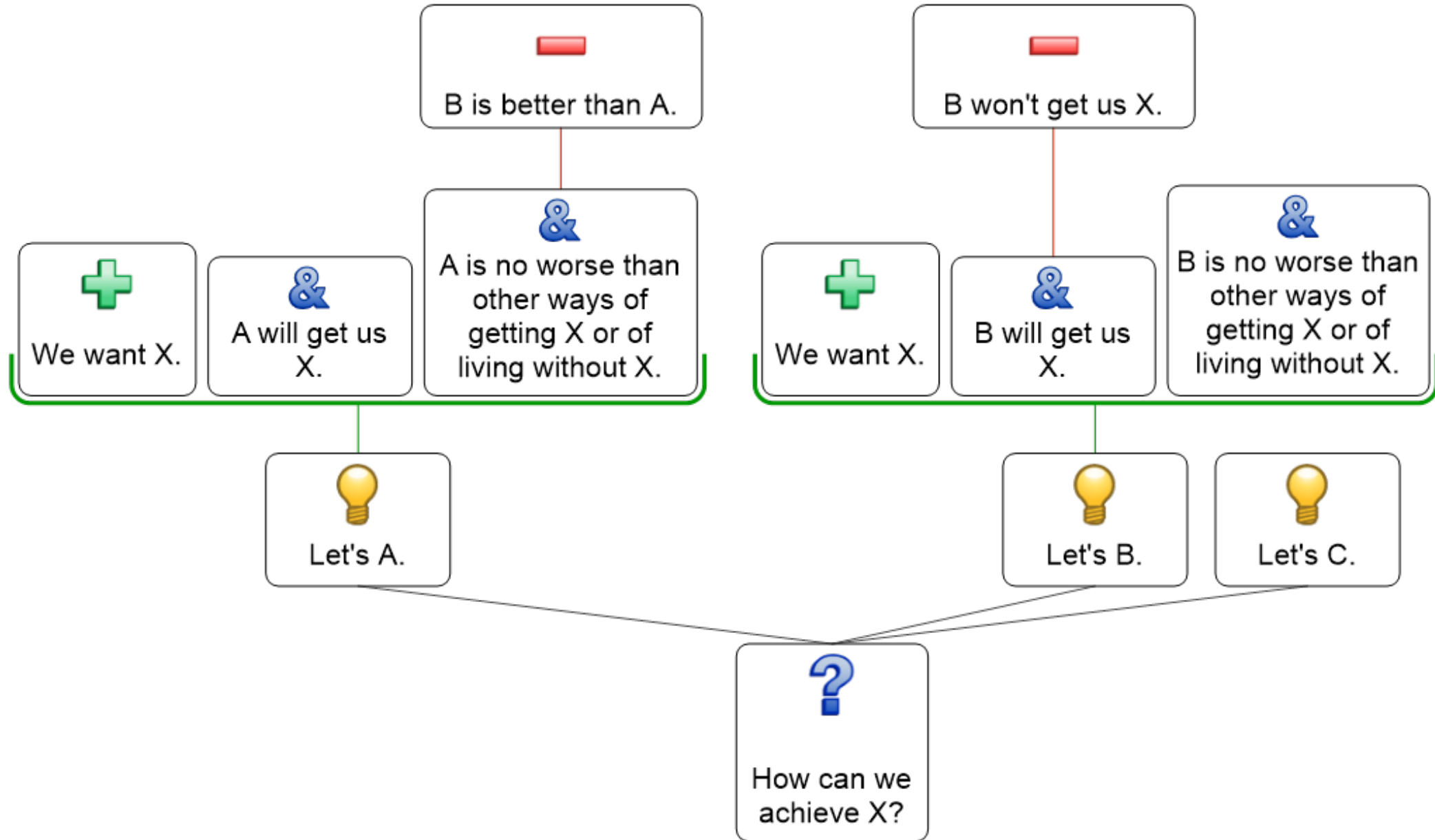
Mapping a Dialogue



Mapping a Dialogue



Mapping a Dialogue



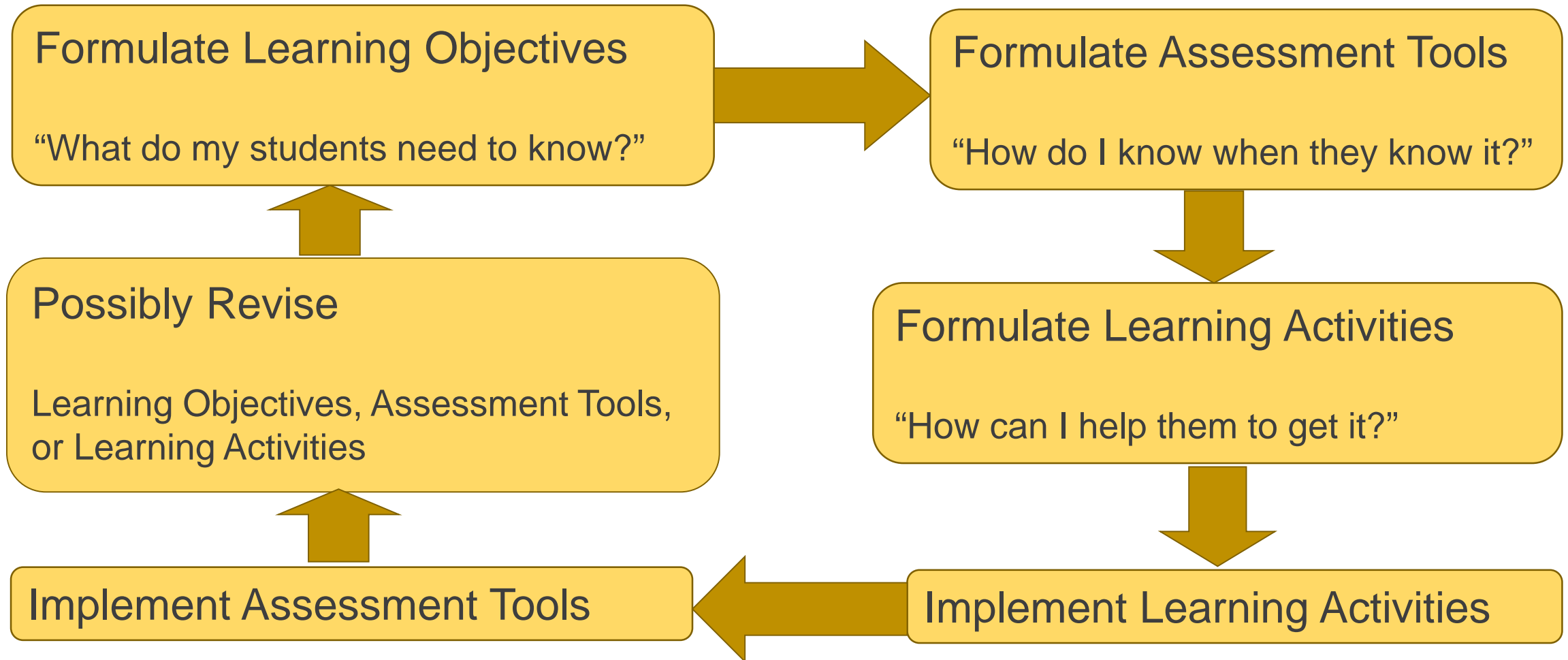
What this Means for You

Learning Outcomes in your Classroom

Assessment Tools in your Classroom

Learning Activities in your Classroom

The Backward Design Cycle



- Bubbl.us <https://bubbl.us/>
- MindMup <https://www.mindmup.com/>
- bCisive <https://www.bcisiveonline.com/>
- Rationale <https://www.rationaleonline.com/>
- TruthMapping <https://www.truthmapping.com/#cat=3>

Some Assembly Required

Working on your Courses

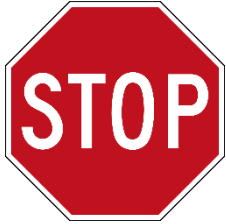
Reporting Back

What challenges might you face?

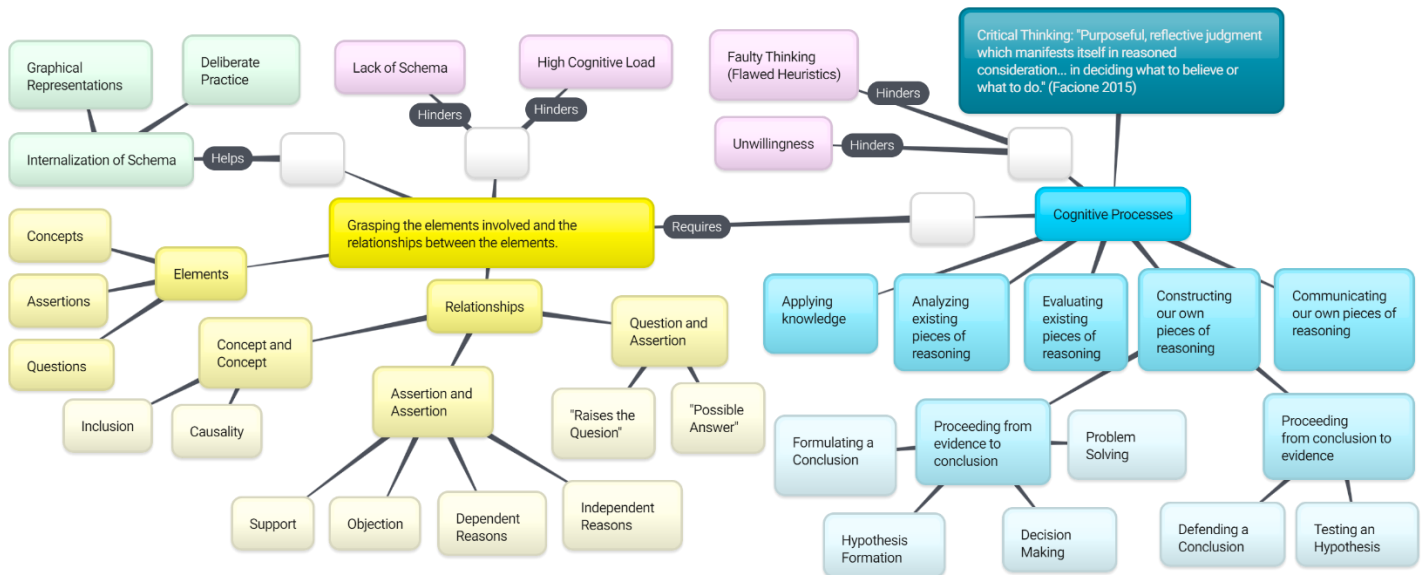
How can you use this methodology in your classes?

Critical Thinking in the Secondary and Post-Secondary Classroom

Vera Klekovkina, Wade Mahon, Jodi Olmsted, Dona Warren
The University of Wisconsin-Stevens Point



Please Do Not Turn over Page Until Instructed. 😊

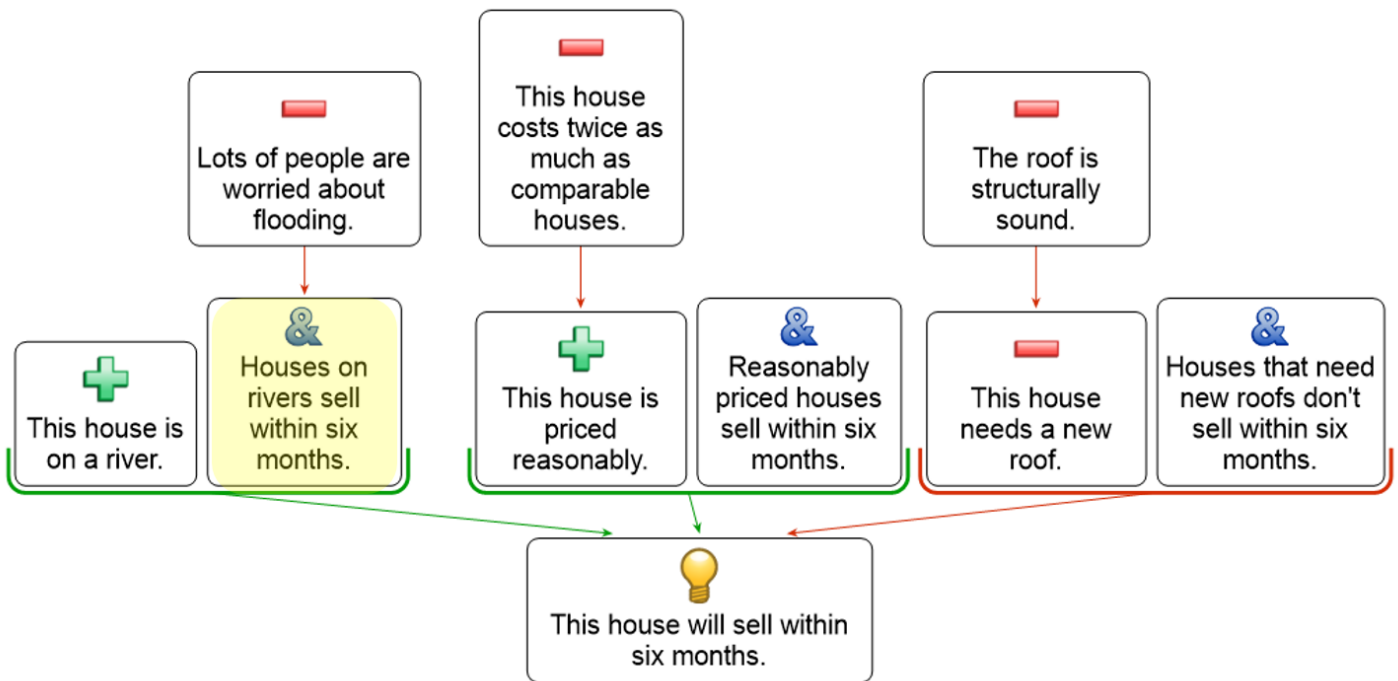


“I think my house will sell within six months. After all, it’s on a river. Of course, lots of people are worried about flooding. My nasty neighbor thinks that my house is priced twice as high as comparable houses, but I think it’s priced reasonably, and reasonably priced houses always sell quickly. My husband claims that our house needs a new roof, and of course houses that need new roofs stay on the market longer, but as far as I can see, our roof is structurally sound.”



Please Do Not Turn over Page Until Instructed. 😊

“I think my house will sell within six months. After all, it’s on a river. Of course, lots of people are worried about flooding. My nasty neighbor thinks that my house is priced twice as high as comparable houses, but I think it’s priced reasonably, and reasonably priced houses always sell quickly. My husband claims that our house needs a new roof, and of course houses that need new roofs stay on the market longer, but as far as I can see, our roof is structurally sound.”



- Bubbl.us <https://bubbl.us/>
- MindMup <https://www.mindmup.com/>
- bCisive <https://www.bcisiveonline.com/>
- Rationale <https://www.rationaleonline.com/>
- TruthMapping <https://www.truthmapping.com/#cat=3>