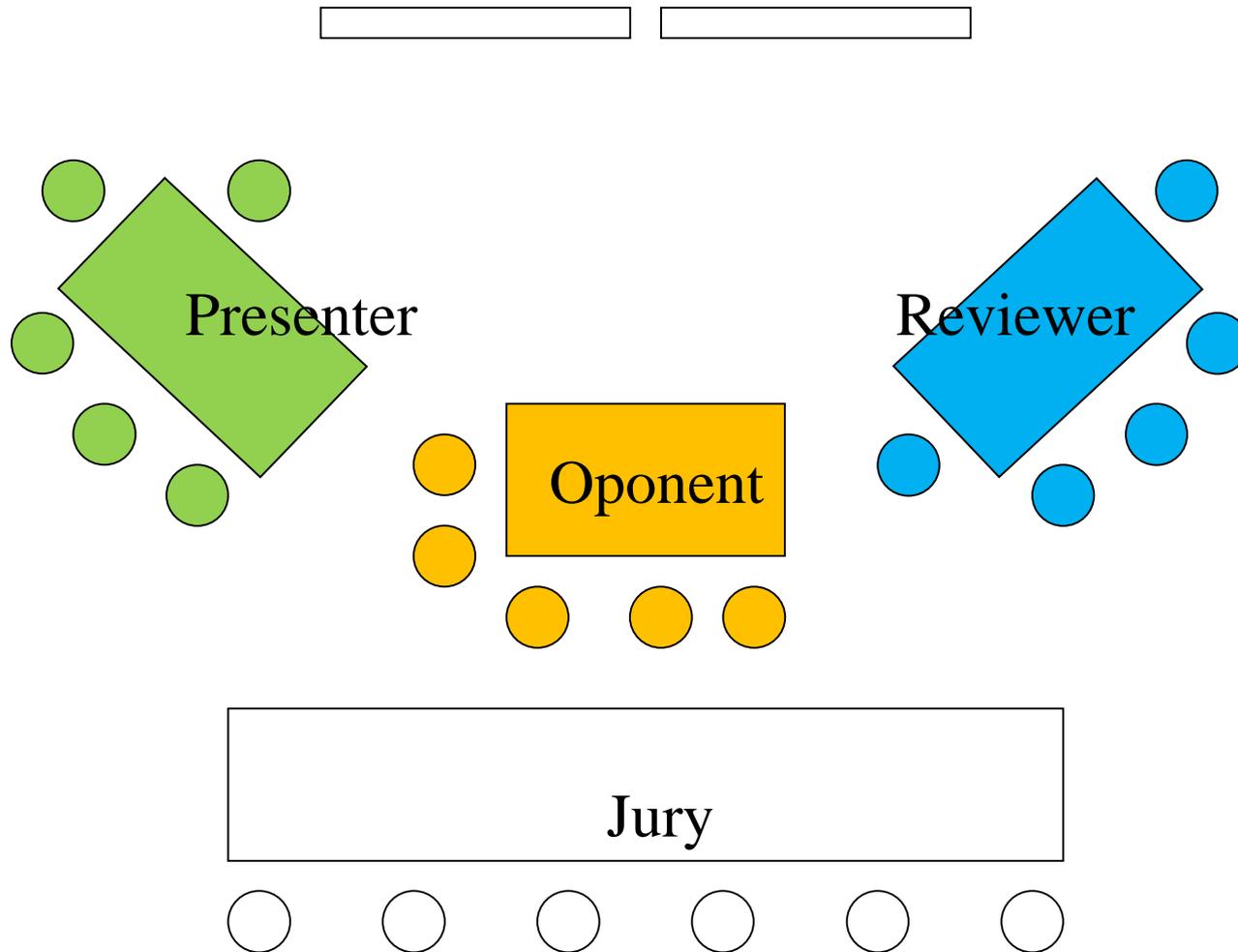


# YPT toolkit

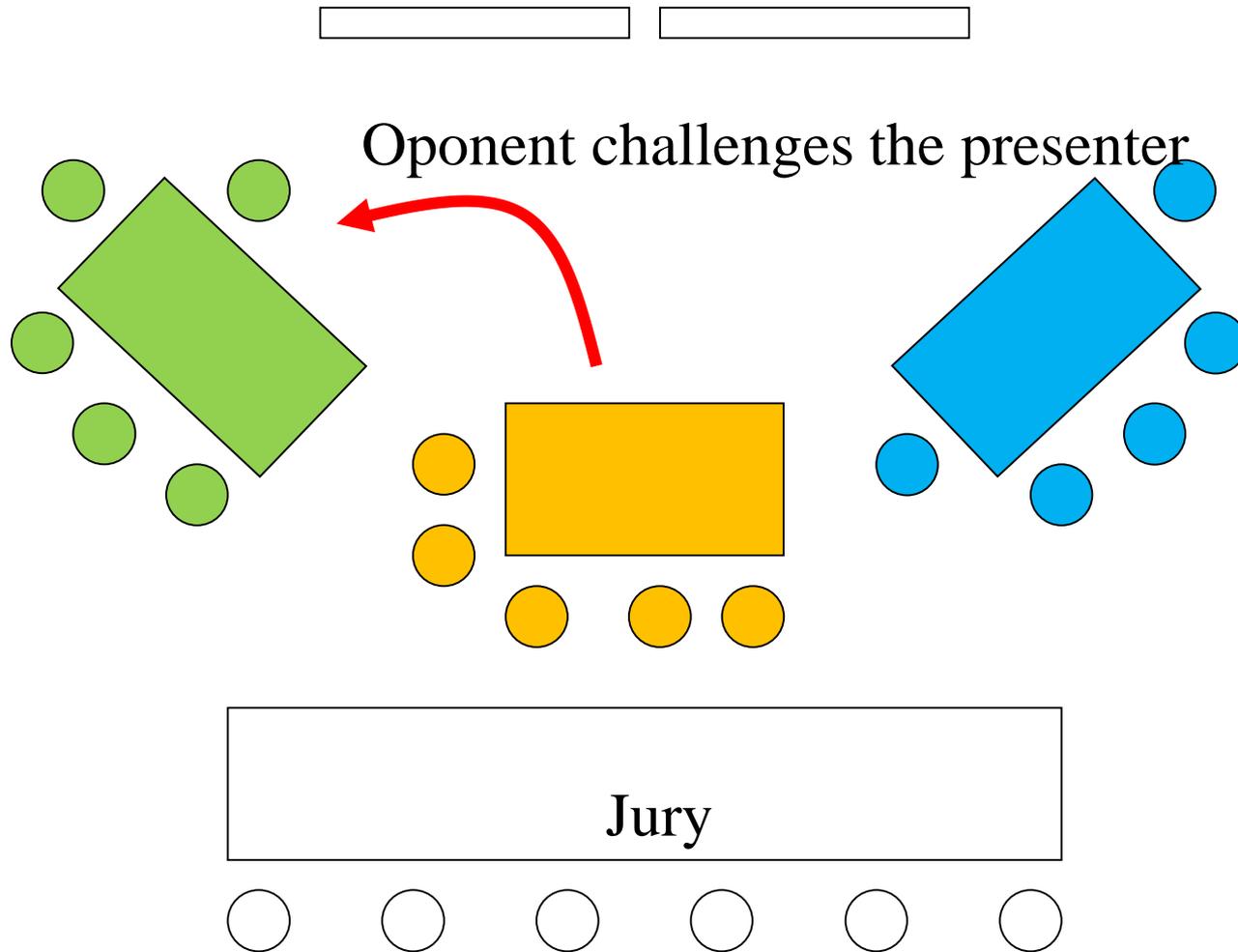
Project DIBALI

# IYPT

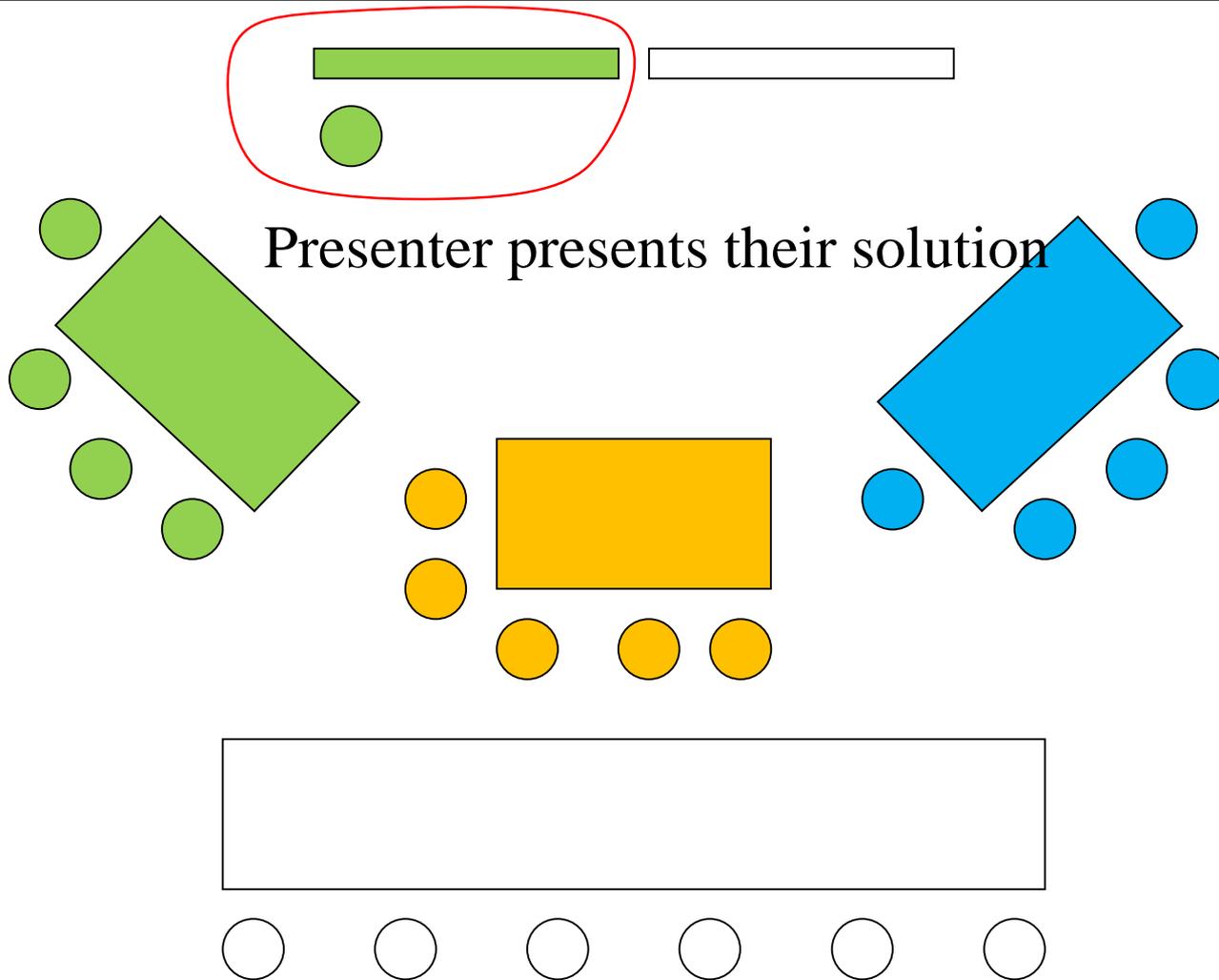
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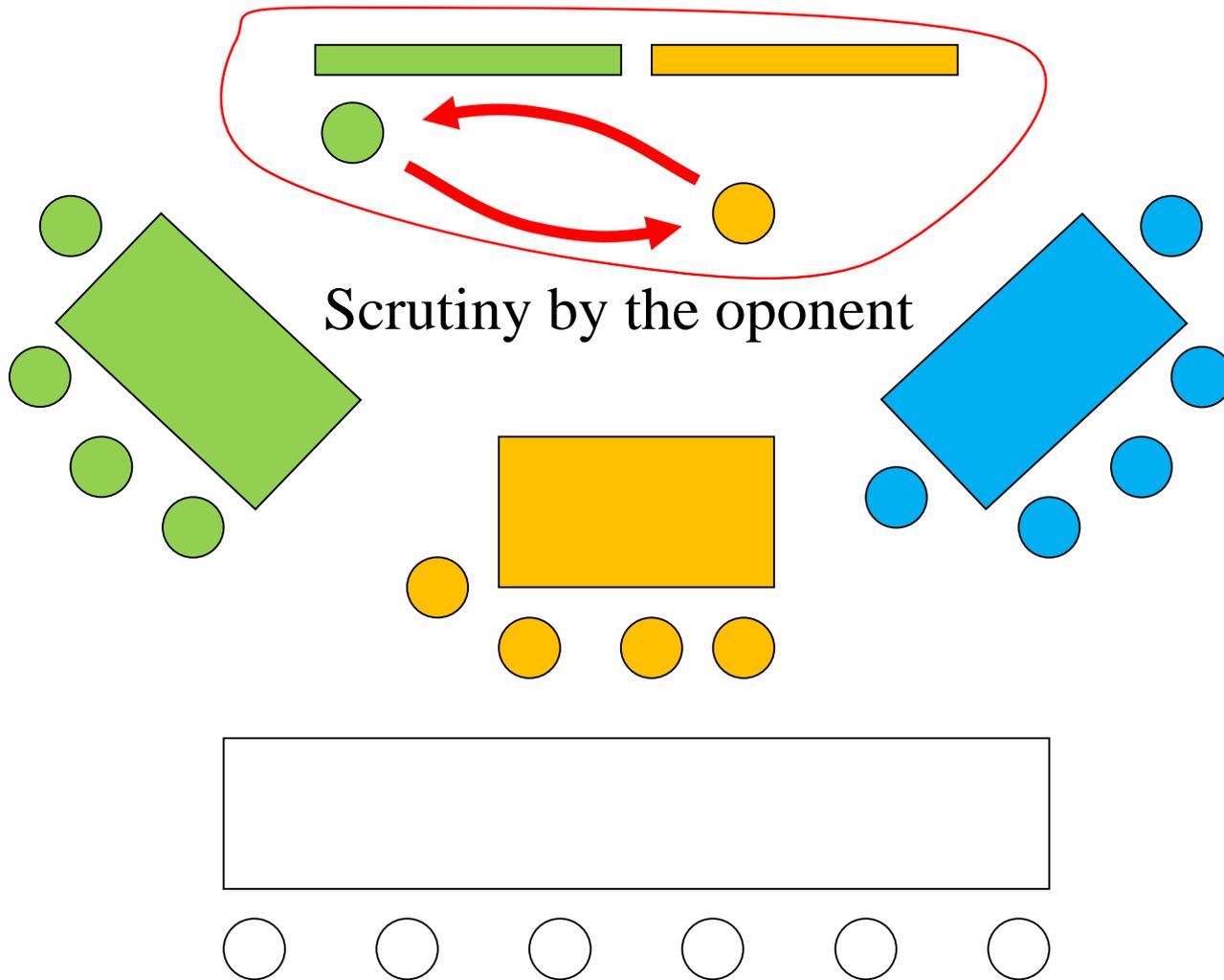


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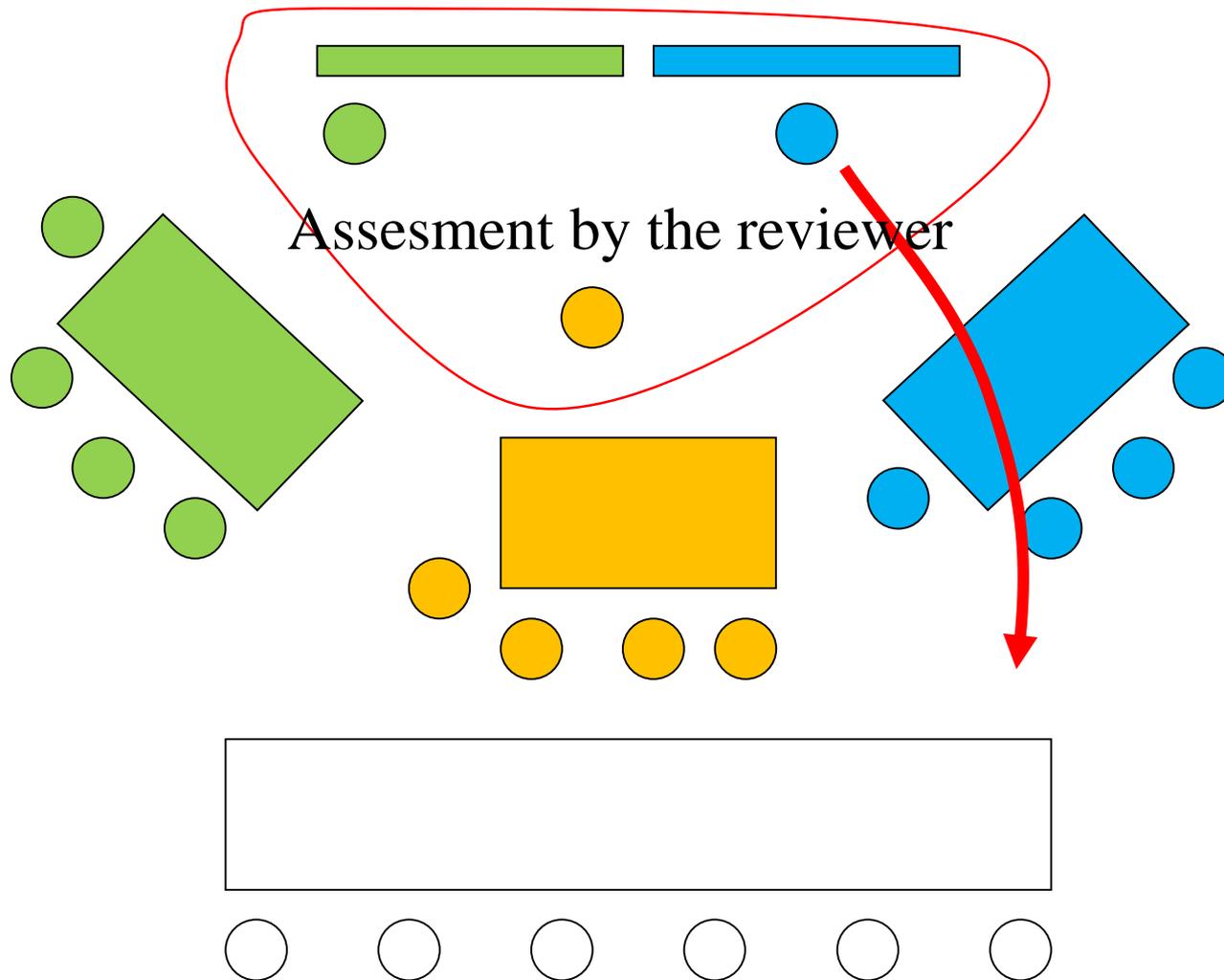


# IYPT

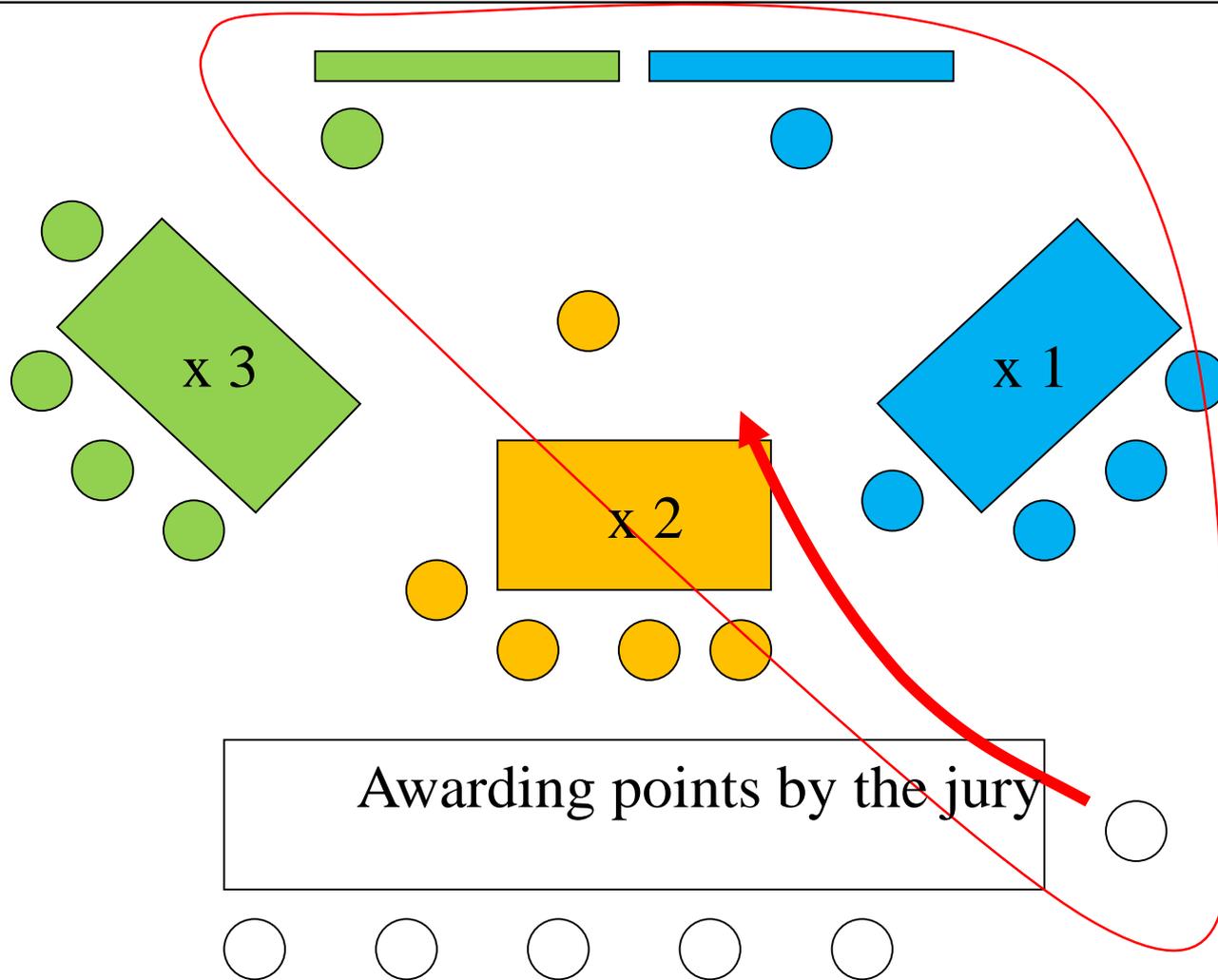




# IYPT



# IYPT



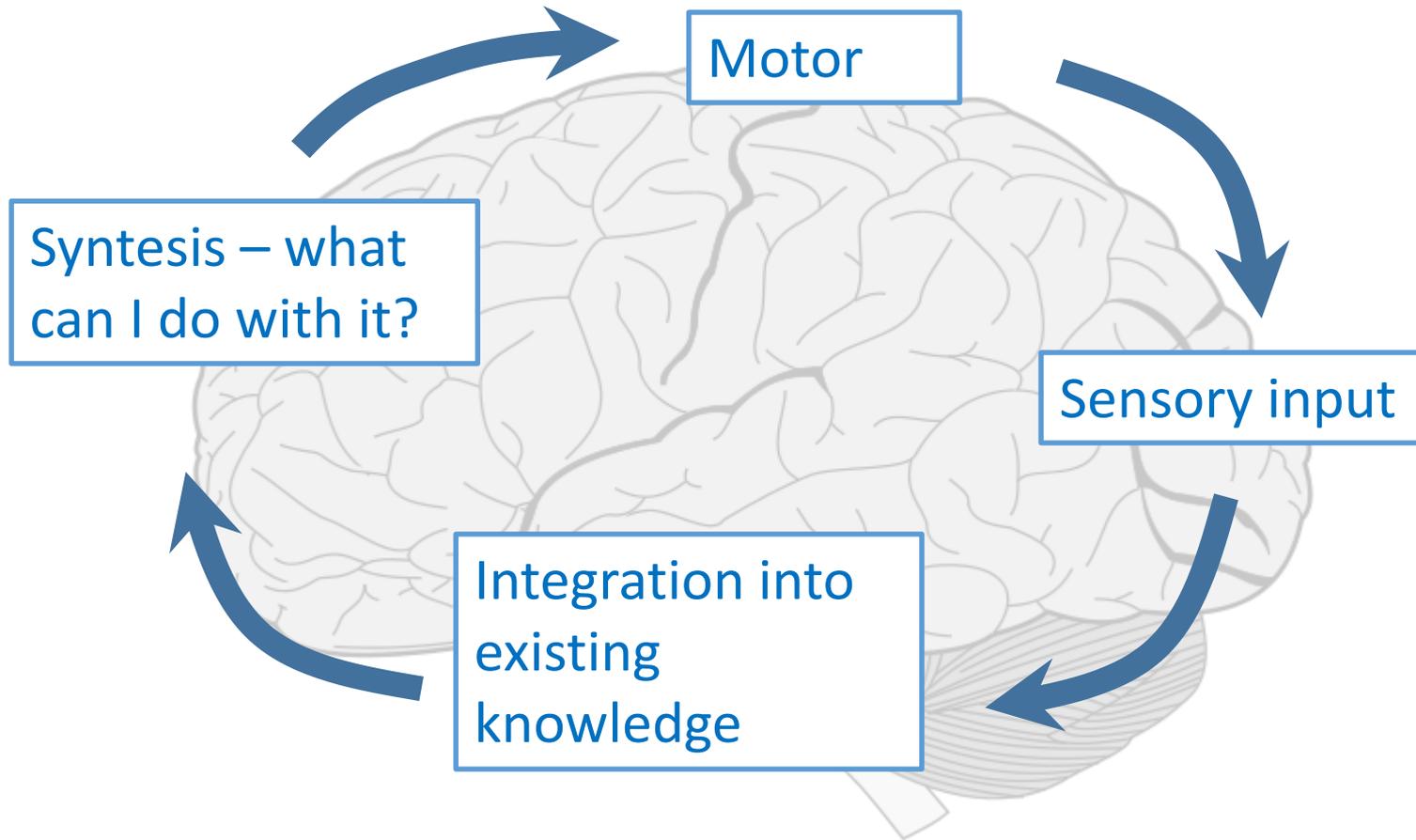
# IYPT

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## Structure of a fight

- The **oponent challenges** the reporter (more than 3 refusals have penalties)
- **Presentation** by the presenter
- **Scrutiny** by the oponent
- **Assessment** by the reviewer (See a pattern here?)
  - For both presenter and oponent
- Clarification for the **jury** and awarding points

# How we learn

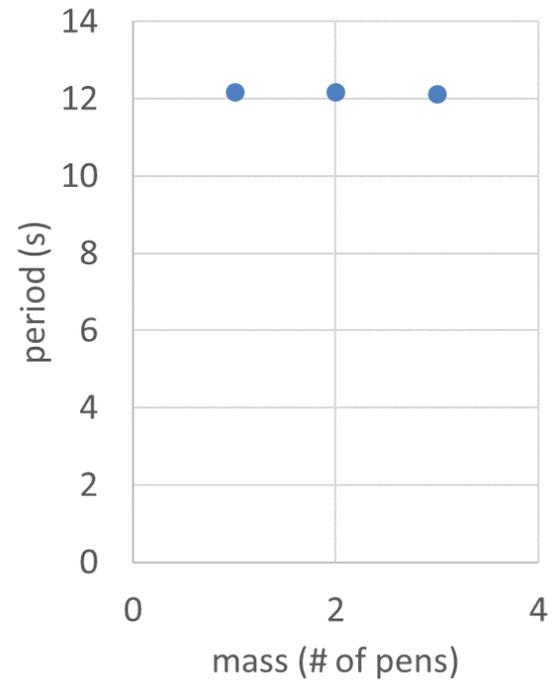
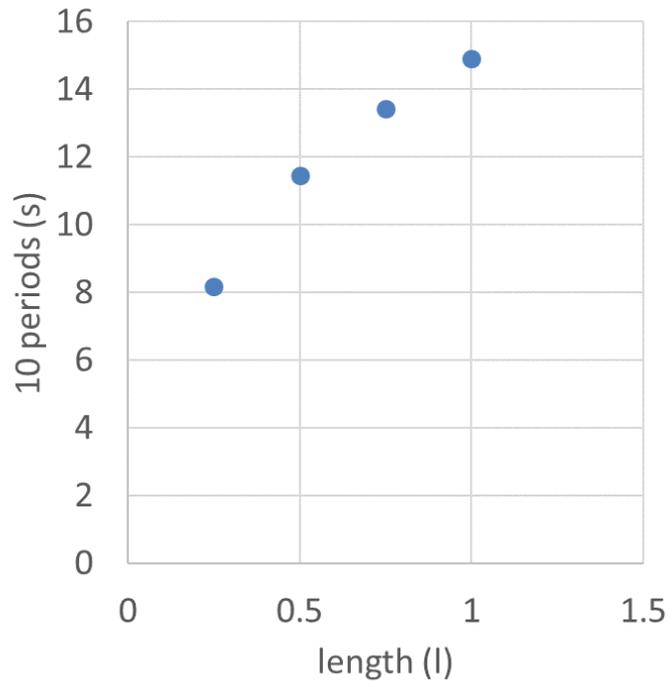


The phenomenon



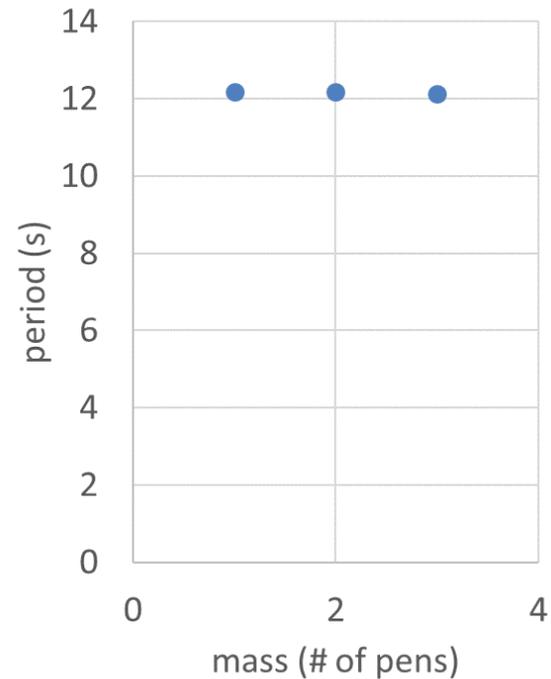
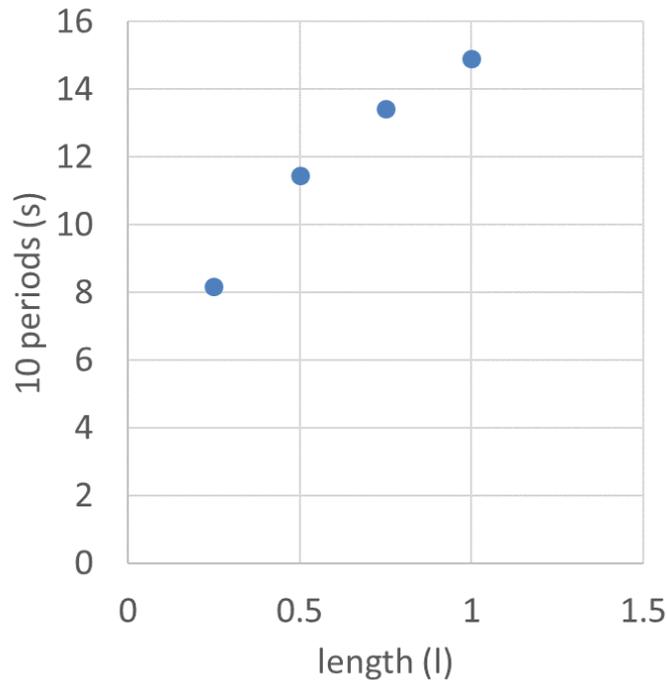
# Research questions

- How does the oscillation period depend on the length of the string?
- How does the oscillation period depend on the mass on the string?



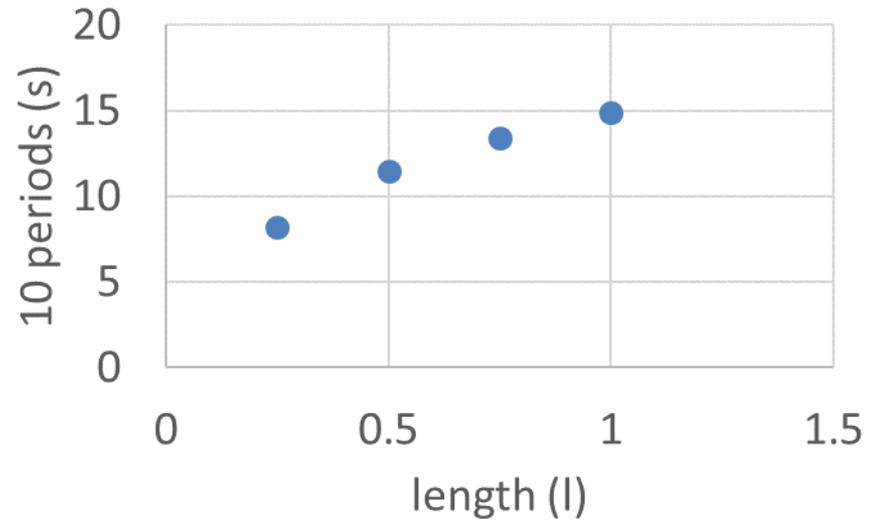
# Research questions

- How does the oscillation period depend on the length of the string?
- How does the oscillation period depend on the mass on the string?

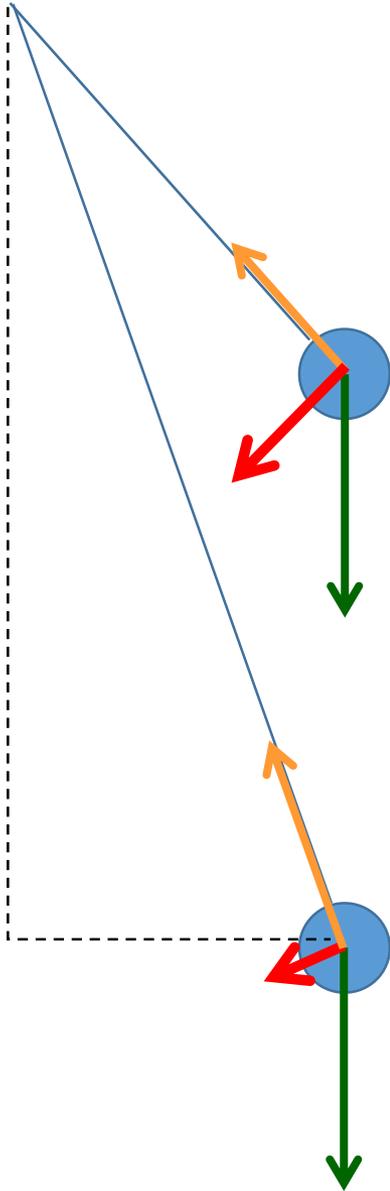


- How does the oscillation period depend on the amplitude?
- How does the oscillation period depend on the mass of the string?

We made an observation



# Search for explanations

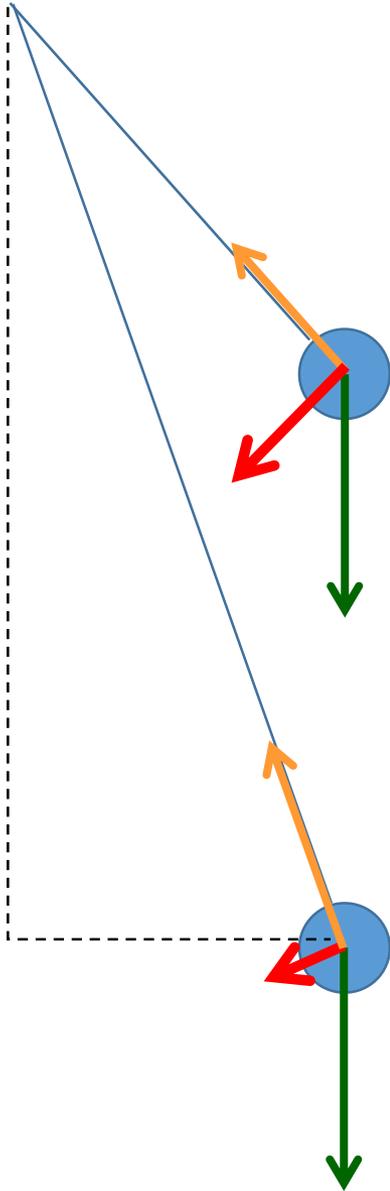


$$\frac{F}{mg} \approx \frac{x}{l}$$

$$a = \frac{F}{m}$$

$$x = at^2/2$$

# Search for explanations



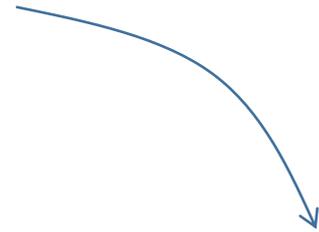
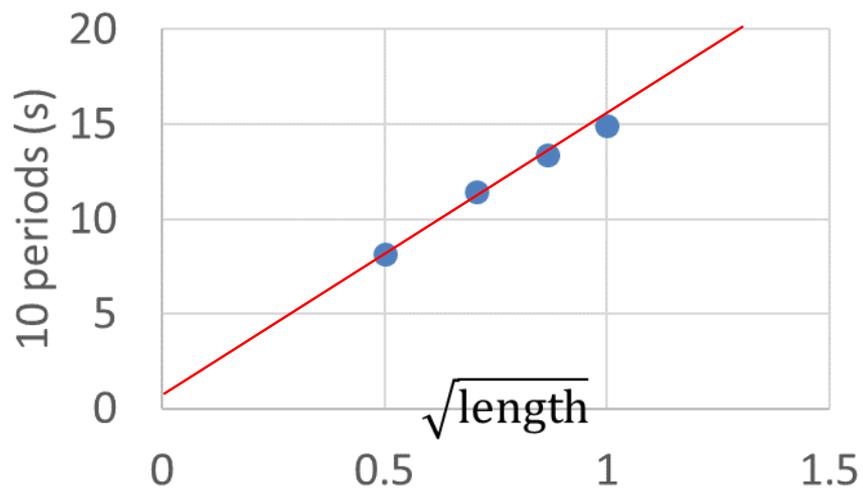
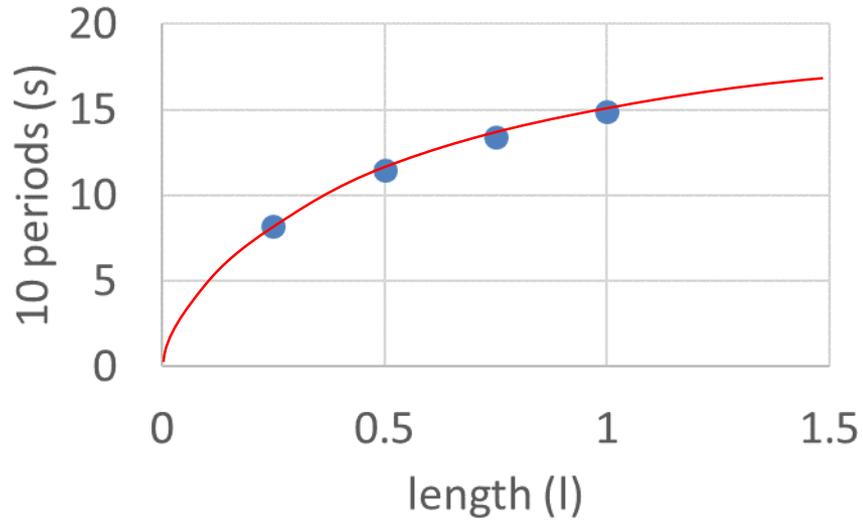
$$\frac{F}{mg} \approx \frac{x}{l}$$

$$a = \frac{F}{m}$$

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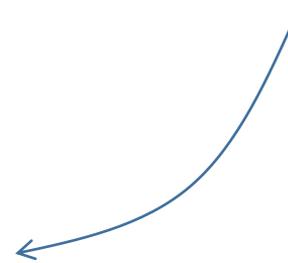
$$t_0^2 \propto l$$

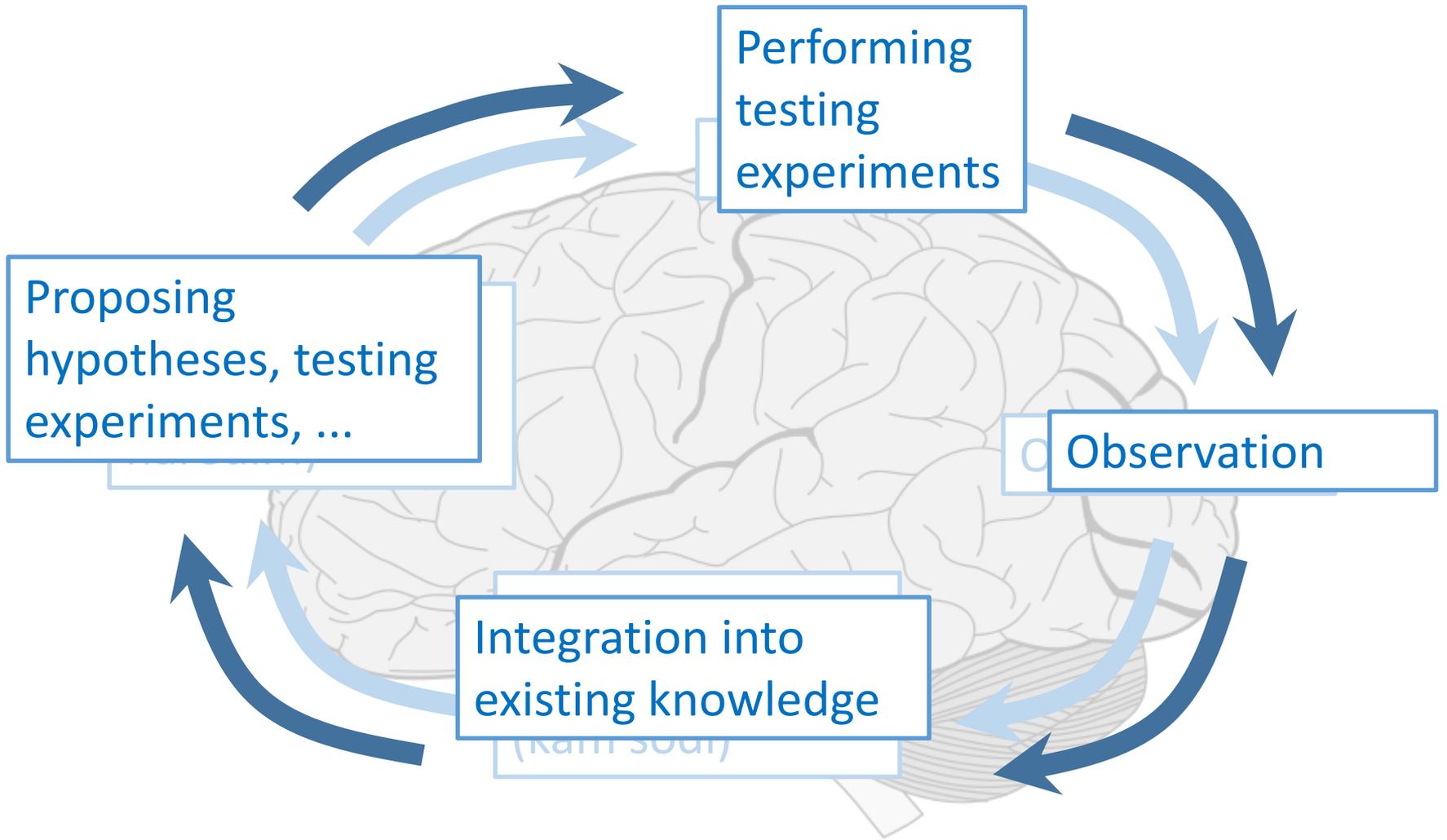
# Testing the explanation (comparison)

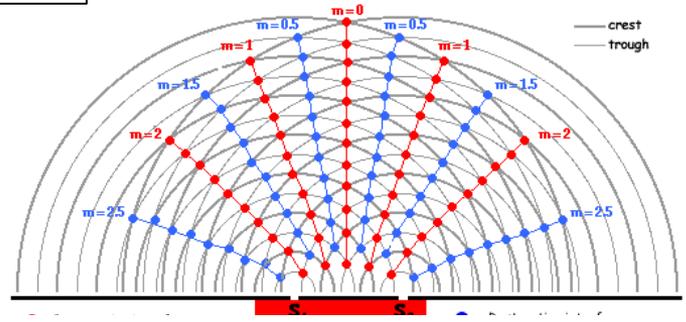
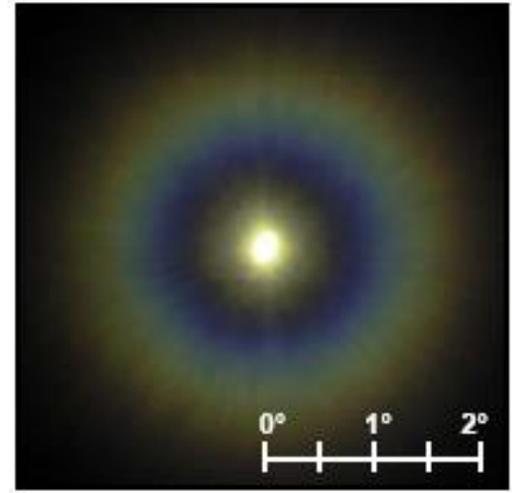
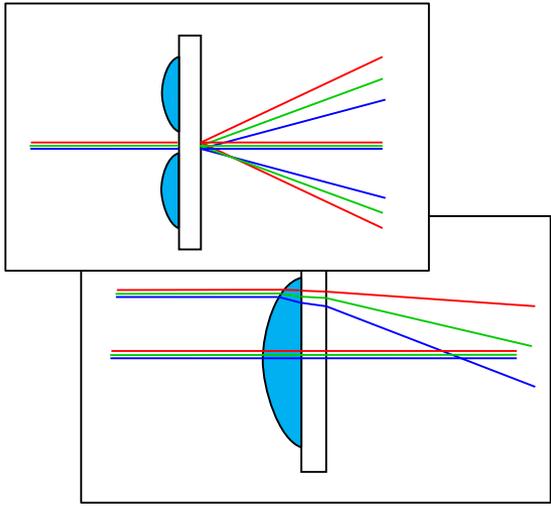
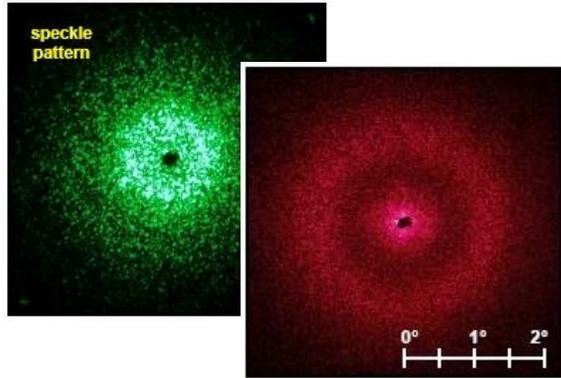


$$t_0^2 \propto l$$

$$t_0 \propto \sqrt{l}$$







Vir: Cybergraphics graphic © 2000

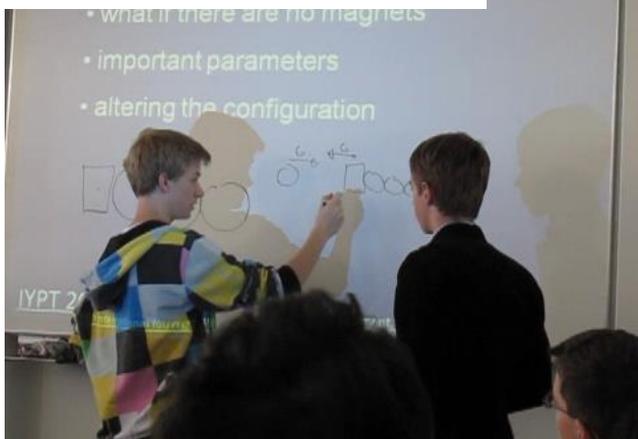
Then WHAT?

# Then WHAT?

## Discussion phase

- >10 min for the discussion.

-Why neglect ...?

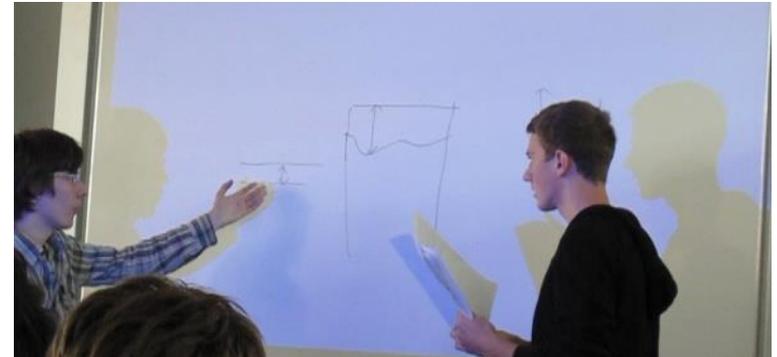
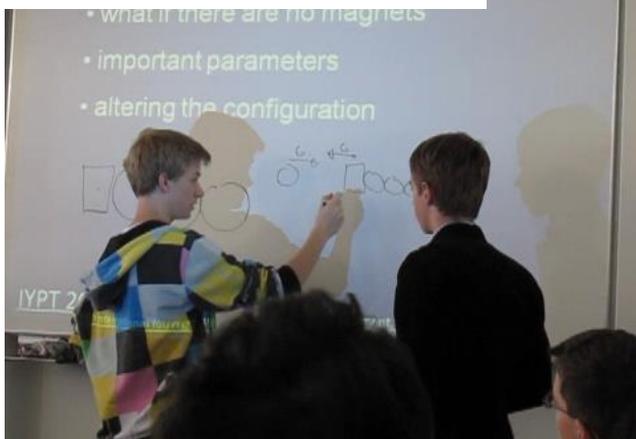


# Then WHAT?

## Discussion phase

- >10 min for the discussion.

-Why neglect ...?



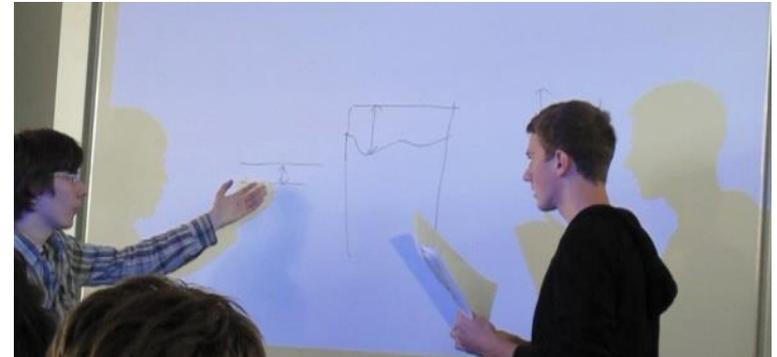
- Is the **experimental setup** appropriate?



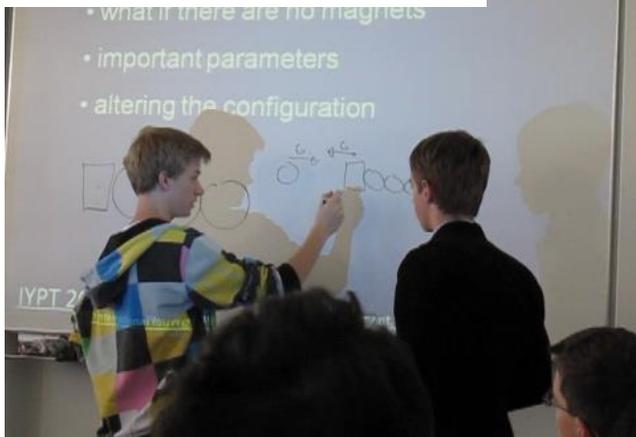
# Then WHAT?

## Discussion phase

- >10 min for the discussion.



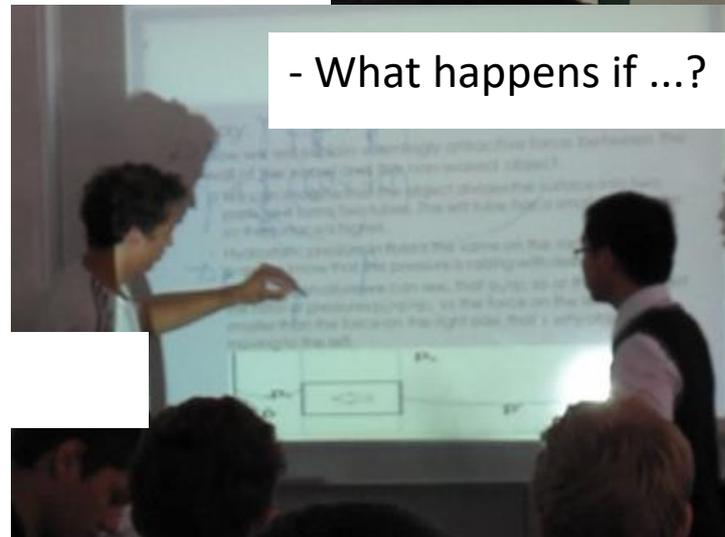
-Why neglect ...?



- Is the **experimental setup** appropriate?



- What happens if ...?



- Is the **model** appropriate?

# Structure

## Table of contents

### 1. About the toolkit

### 2. Introduction

#### 2.1. What is IYPT

#### 2.2. IYPT and inquiry-based learning

#### 2.3. IYPT = inquiry problems + discussion format + ...

### 3. Working on YPT problems in class and beyond

#### 3.1. Preparation and problem selection

#### 3.2. Tasks to perform

##### 3.2.1. Initial observation (I), initial idea (II) and what to investigate (IIIa) (first 20 min session)

##### 3.2.2. Planning the experiments (IIIb) (second 20 minutes session)

##### 3.2.3. Systematic experiments (IIIc) (third 20 minutes session)

##### 3.2.4. Model and model predictions (IV) (fourth 20 minutes session)

##### 3.2.5. Comparison model-experiment and preparing the presentation (V) (fifth 20 minutes session)

##### 3.2.6. Present (VI) and defend (VII) (sixth, and any additional 20 minutes session)

###### 3.2.6.1. Presentation

###### 3.2.6.2. Discussion

###### 3.2.6.2.1. Clarifying questions (2 minutes)

###### 3.2.6.2.2. Opponent's presentation (maximum 4 minutes)

###### 3.2.6.2.3. Discussion (10 minutes)

###### 3.2.6.2.4. Discussion Summary (1 minute):

#### 3.2.7. Review

### 4. Conclusion