Within Reason:
Using Commercial Games for Rich Math Learning

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Games for Math Class

- Meaning before abstraction (Diénès, 1971)
- Three suggested benefits: (Ernest, 1986)
  - Gaining skill-based fluency
  - Developing conceptual understanding
  - Refining problem solving approaches
- Two additional benefits: (McFeetors, 2015)
  - Improving mathematical processes
  - Experiencing math in relevant contexts

Reasoning

More than a means by which to confirm whether a solution is correct,

mathematical reasoning involves **exploring** the mathematics at hand;

generating, **implementing**, and **evaluating conjectures**;

as well as **justifying** our thinking and actions as we **engage** in mathematics.

(Thom, 2011, p. 234)

Learning through Experiences

… they are periods of **genuine reflection**
only when they follow after
times of more overt **action**
and are used to **organize**
what has been gained in **periods of activity**
in which the hands
and other parts of the body
beside the brain are used.

(Dewey, 1938/1997, p.62)

Developing Reasoning

- Exploring
- Analyzing
- Convincing

(McFeetors & Mason, 2009)

Explore a Game

Types of Reasoning

- Inductive

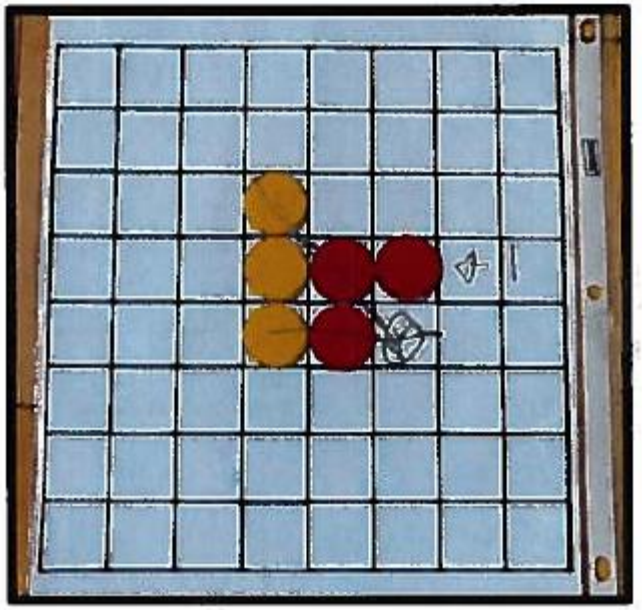
Tip 1:

you always whant to get the corners because you can get the greatest amout of peices in one turn and your opponent can't turn it over.

Tip 2:

Types of Reasoning

- Inductive
- Deductive



Great

If the yellow puts his token on the red ⌜ line he could get 2 yellows

Types of Reasoning

- Inductive
- Deductive
- Analogic & Metaphoric

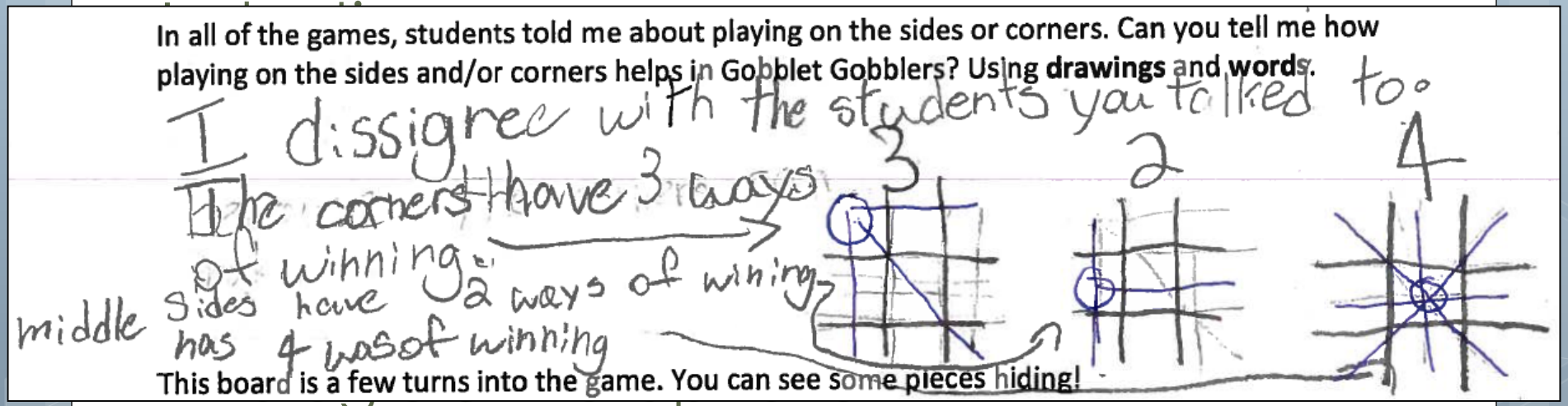
E: I have Faris in the checkmate position.

…

I: How did you come up with that?

E: Just from playing. I've seen it before in Tic Tac Toe.

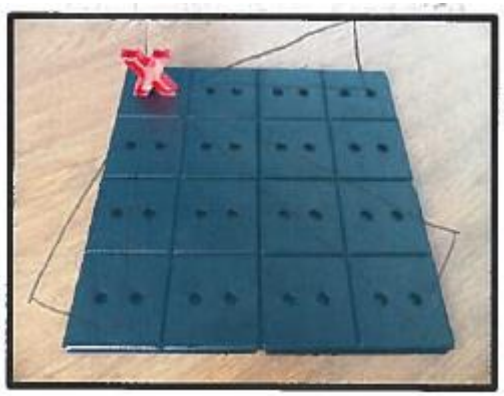
Types of Reasoning



- Imagistic

Types of Reasoning

- Inductive
- Deductive
- Analogic & Metaphoric
- Imagistic
- Informal Justifications



Because when you go in the corners you have 4 directions to go and 7 ways to win

Exploring Students' Thinking

Extending the Experience

- How might you have a conversation with your class about reasoning?
- Within a problem solving task next week, how will you elicit and notice reasoning?

References

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