Materials & Prep:	**Research:**
- Computer with internet access - Projector	- http://www.youtube.com/watch?v=CAkMUdeB06o - "What do students know about geometry?" by Marilyn E. Strutchens & Glendon W. Blume - Pythagorean theorem is probably the most universally addressed theorem in geometry - Yet, students cannot apply it and probably do not understand it well. - Only 30% of 8th grade students could find the length of the hypotenuse given lengths of the legs, despite all lengths being relatively small integers - 60% of the students chose distractors - Only 52% of 12th grade students could find the length of the hypotenuse given lengths of the legs - And only 15% of 12th grade students could sketch a right triangle based on given information about the lengths of the legs and the hypotenuse. - "Skinning the Pythagorean Cat: A Study of Strategy Preferences of Secondary Math Teachers" by Clara A. Maxcy http://eric.ed.gov.myaccess.library.utoronto.ca/?id=ED532731 - This study looked at preferred teaching strategies for teaching high achieving vs. low achieving high school students. - Teachers preferred questioning strategies for teaching Pythagorean Theorem to high achieving students - Teachers preferred using manipulatives for low achieving students - More experienced teachers also used more brain-compatible strategies when teaching high achieving students - No single strategy has been proven effective for all classroom situations - Mathematical Investigations—Powerful Learning Situations by Suzanne H. Chapin - Mathematical investigations enable students to learn the formula of the Pythagorean Theorem. - Writing about, and discussing the mathematics inherent in the solution of investigative problems broadens and deepens students' understanding. - Questioning procedures, solutions, and one another's reasoning helps students develop investigative habits of mind. - When students study a topic in detail, they not only learn a great deal of mathematics, they also learn the power of careful reasoning, thoughtful discourse, and perseverance. - "Pythagoras Meets Van Hiele" by Alfinio Flores - This article gives examples of Pythagorean explorations at each level of the Van Hiele, showing that your teaching of the theorem can be adapted to the level of the students. - This research supports our lesson by explaining how Pythagorean Theorem can be introduced to students before grade 8 (as suggested by the Ontario Math curriculum document).

Reflection

- This was the simplest proof of the Pythagorean Theorem and when other groups saw this proof they were able to draw connections between it and the task they had been working on.
- Some groups had mentioned they wish they had been able to do this activity first, before trying their more challenging task.
- One of the group members noted the usefulness of knowing the Primitive Pythagorean Triples as a teacher as it makes it easier to generate example right triangles for lessons.

Recommendations/Revisions/Extensions

- This activity could lead into the slide task (Group 3: Discovering Special Right Triangles) as an application activity.
- Instead of plastic tiles the group could be given 1 inch graph paper which they could cut to make tiles that will combine to form a^2, b^2, and c^2. If the group encounters non-Pythagorean triples, they can cut the tiles accordingly.

Group 3: Discovering Special Right Triangles

Results

- Instead of using the strategy we gave them (leaning the slide against a vertical surface) the group graphed the different leg lengths.
- After discovering one of the special right triangles, the group used mental math and prior knowledge of the theorem to solve the other leg lengths.
- The group was less interested in the activity and did not attempt the extension questions as a result.

Sharing Time

Another way to look at Pythagorean Theorem

http://www.youtube.com/watch?v=CAkMUdeB06o

Research 1

What do students know about geometry?

by Marilyn E. Strutchens & Glendon W. Blume

- Pythagorean theorem is probably the most universally addressed theorem in geometry
- Yet, students cannot apply it and probably do not understand it well

- Only 30% of 8th grade students could find the length of the hypotenuse given lengths of the legs, despite all lengths being relatively small integers
- 60% of the students chose distractors

- Only 52% of 12th grade students could find the length of the hypotenuse given lengths of the legs
- Also only 15% of 12th grade students could sketch a right triangle based on given information about the lengths of the legs and the hypotenuse.

Research 2

"Skinning the Pythagorean Cat: A Study of Strategy Preferences of Secondary Math Teachers"

by Clara A. Maxcy

- This study looked at preferred teaching strategies for teaching high achieving vs. low achieving high school students.

- Teachers preferred questioning strategies for teaching Pythagorean Theorem to high achieving students
- Teachers preferred using manipulatives for low achieving students

- More experienced teachers also used more brain-compatible strategies when teaching high achieving students
- No single strategy has been proven effective for all classroom situations