Here I will keep a list of the conjectures and questions we come up with in class. Consider these as part of our regular work.

August 23:

Conjecture A: (Hertzler) The Construction presented in class makes figure BAEH a {parallelogram, rhombus, square}.

August 25:

Conjecture B: (Carstens) Let ABCD be a rhombus. If angle BAC is congruent to angle BDC, then ABCD is a square.

Conjecture C: (Carstens) Let ABCD be a rhombus which is not a square. Then one pair of opposite angles of ABCD is each greater than a right angle, and the others less.

Conjecture D: (Class) There exists a rhombus which is not a square.

Conjecture E: (Hertzler) Let ABCD be a rhombus. The segment AC bisects the angles BAD and BCD.

September 1:

Conjecture F: (Bertacini-Feldmann-Koontz) The construction presented in class makes a square.

September 6:

Conjecture G: (Schafbuch) If a kite is not a parallelogram, then it has only one pair of congruent opposite angles.

Question H: (Schafbuch) Are all kites parallelograms?

September 8:

Question I: (Class) Suppose you are given two segments XY and UV, and an angle PQR. Is it possible to build a kite ABCD through Ms Carstens' construction such that:
AB is congruent to XY, BC is congruent to UV, and angle ABC is congruent to angle PQR?

Conjecture J: (Coyle) The following construction should make a kite ACBF:

1. Draw circle AB
2. Draw circle BA, get points C & D as intersection of the two circles
3. Draw line CD
4. Draw circle CD, get F as intersection of this circle with line CD
5. Draw the segments AC,CB,BF,FA

Conjecture K: (Kilburg) The following construction should make a kite ACED:

1. Draw circle AB. choose a point C “inside” AB
2. Draw circle AC
3. Draw circle BC, get point D as the second intersection of the last two circles
4. Draw line AB, get E as intersection of AB with circle AB.
5. Draw AC, CE, ED, DA

Question L: (Class) Suppose that ABCD is a kite with AB congruent to AD and CD congruent to CB. Also suppose that LMNO is a kite with LM congruent to LO and MN congruent to NO. If AB is congruent to LM, CD is congruent to MN, and angle ABC is congruent to angle LMN, is it true that the kites are congruent?

Question M: (Class) Can you construct a rhombus or a kite with the “hourglass” shape?

September 20:

Conjecture N: (Carstens) Let ABCD be a quadrilateral. Then the angles ABC, BCD, CDA, and DAB, taken together, make four right angles.

Conjecture O: (Otterbein) Let ABCD be a quadrilateral. It is possible to divide ABCD into two triangles.

Conjecture P: (Amos) The diagonals of a rectangle must cross.

Conjecture Q: (Hertzler) Let ABCD be a quadrilateral.

1. If AB is congruent to CD and BC is congruent to DA, then the diagonals of ABCD bisect one another.
2. If AB is not congruent to CD and BC is not congruent to DA, then the diagonals of ABCD do not bisect one another.

September 27:

Definition: Let ABC be a triangle. Draw the line through A which is perpendicular to line BC. Let this new line meet the line BC at point X. The segment AX is called the altitude of ABC from A. The point X is called the foot of that altitude.

Question R: (Coyle-Schafbuch-Hertzler) Let ABC and DEF be triangles. Suppose that AC is congruent to DF, but triangle ABC is not congruent to triangle DEF. Then the altitude of ABC from B is not congruent to the altitude of DEF from E.

Conjecture S: (Kilburg) If the diagonals of a quadrilateral bisect one another, then the quadrilateral is a parallelogram.

September 29

Definition: We say that a kite is *convex* if its extended diagonals meet a point inside the kite. We say that a kite is non-convex if its extended diagonals meet at a point outside the kite.

Question T: (Carstens) What should we mean by the phrases “Point X lies {inside/outside} of a quadrilateral ABCD”?

October 6

Conjecture U: (Otterbein) Suppose circle A and circle B meet at exactly one point C. Then A, B, and C are collinear.

Question V: (class) What should the term “convex polygon” mean?

Questions W: (class) How should we define the terms “simple polygon” or “non-simple polygon”?

October 9

Definition: Let L be a line. Let A and B be two points which do not lie on the line. We say that A and B lie on opposite sides of L if the segment AB meets L. We say that A and B lie on the same side of L if the segment AB does not meet L.

November 13

Challenge X: Conjecture 7.3 is false, but seems to fail only in controlled, specific ways. Investigate and prove a theorem.

December 4

Conjecture Y: (Amos) Let R and S be rectangles of equal content. If R, S have a congruent side, then the rectangles themselves are congruent.