Modeling Flowchart*

October 16, 2014

???_{?,??}?
(1) OPEN-ENDED QUESTION
???_{?,??}?

(2a) ASKS FOR NUMBERS.
e.g.
How many hydrogen atoms are in a giraffe?
How much will this law cost?

(2b) DOES NOT ASK FOR NUMBERS.
e.g.
What is the optimal way to stir pancake batter?
Should the city build a new reservoir or not?

(2c) DEFINE NUMBERS YOU NEED TO KNOW!
e.g.
Clarify what quantities are requested
Come up with a metric to define "optimal"

(3) LIST EVERYTHING (2c) DEPENDS ON.
e.g. size of giraffe, composition of giraffe, population of city, temperature of batter, composition of batter, demand for water, cost of materials, weather...

(4) DETERMINE MOST IMPORTANT THINGS LISTED IN (3).
Make and justify assumptions here

(5) DECIDE HOW (2a) OR (2c) DEPEND ON (4)
Build the model here.

(6a) USE (5) TO DETERMINE VALUES FOR (2a) AND (2c).
May involve: background research (use reputable sources and give credit); analytic calculation; numerical methods, simulation...

(6b) GET AN ANSWER
Great! Almost there.

(6c) DON'T GET AN ANSWER
Hmm. Revise model and/or assumptions.

(7) PRESENT AND EVALUATE (6B)
What is uncertain? What improvements are possible?
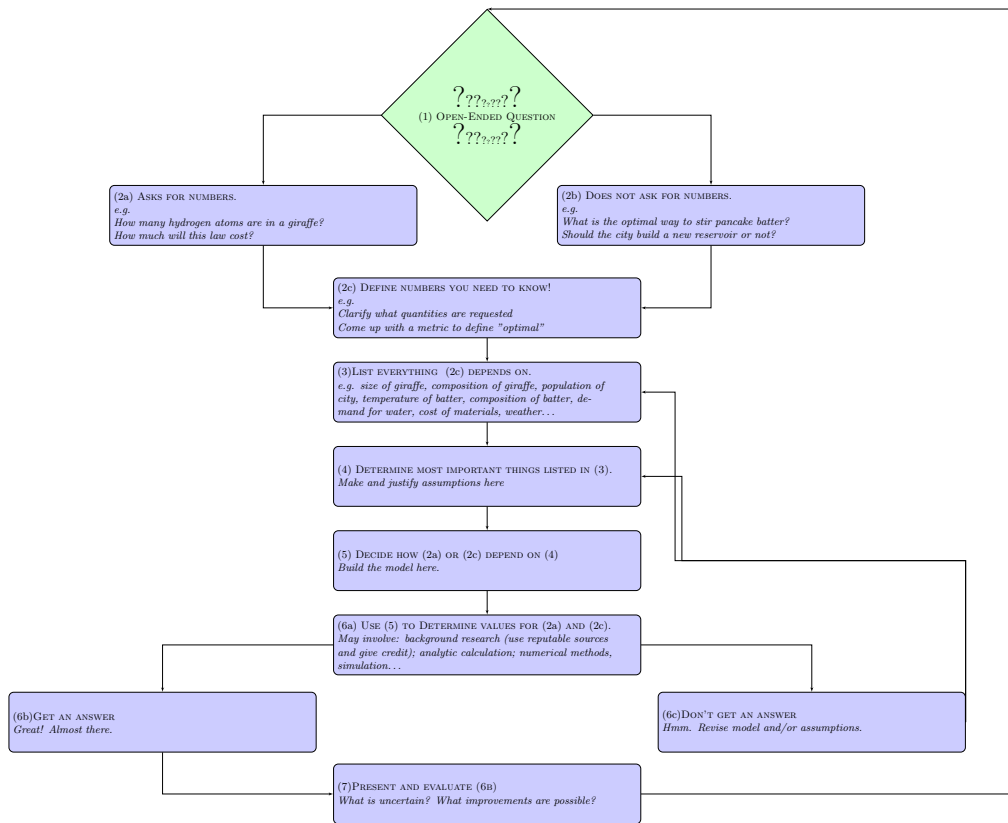
---

*Not so much rules as guidelines, and certainly not ironclad. This graphic developed by Anna Lieb for UC Berkeley Mathematical Contest in Modeling Workshops, and incorporates suggestions from SIAM's Modeling Guide