- **Theme Music:** **When Push Comes to Shove**
  Greatful Dead
- **Cartoon:** **Rick deTorie**
  One Big Happy

Example: The Black Brant

- http://www.physics.umd.edu/perg/abp/TPProbs/Problems/Solutions/K/K28-S.htm

Reading questions

- Since the equation a = F/m is not the definition of acceleration, then is F = ma not the defintion of force? If not, what is the definition of force?

Thought experiments

- In physics we often create idealized "though experiments" to see what the fundamental principles are that we should be using – a building our analysis of complex situations around.
- Bringing in the full complexity or real-world experiments confuses rather than helps.
- Galileo – falling objects.

Technical term alert: What's a Force?

- The "*F*" in the last slide is an expression of the idea:
  - When two objects touch they do something to each other that tends to change the other's velocity.
- Although the technical term for this is "force" it is different from the common speech idea of force.
  - It is an interaction between two objects.
  - It only occurs via contact or by the non-touching examples of gravity, electricity, and magnetism.
- Until we are accustomed to this new term we will refer to "physical-force" (pForce).

Even if we have a new name for it, what the &*$#% is it?

- How can we "define" a pForce?
- What would a definition look like?
- Process:
  - Define some force that can set a quantitative measurable standard (spring)
  - Measure object's masses by seeing how much a standard force accelerates them.
  - Create models of new forces (as, perhaps, functions of position) by seeing how they accelerate objects.
  - Use our force models to predict motions.
  - If we quickly stop having to add new forces we have a stable structure.