Questions for a guided discussion BEFORE students start to design and build

(Note these questions are aimed for 8th to 10th graders, please adjust as necessary)

1) How is the sand bin model like Oregon coast and how is it different and what are the assumptions of the model?

    a) This has many correct answers. (Below are some samples – this should be a good discussion/debate for your student, it's a good place to start where there are fewer right/wrong answers, more shades of grey)

    Similarities: The components of the model are similar to the coast, water, sand waves, houses, but on a smaller scale.

    Differences: It is very simplified; there is no "bathymetry" (shape to the seafloor).

    Assumption: the wave made is a simple but accurate representation of a tsunami. The friction of the

2) How do you think the wave we make is similar to a tsunami and how is it different?
    a) It has a "run-up" like a tsunami. Goes far in-land, over the beach and into the houses. But it is much simpler without all the complex forces.

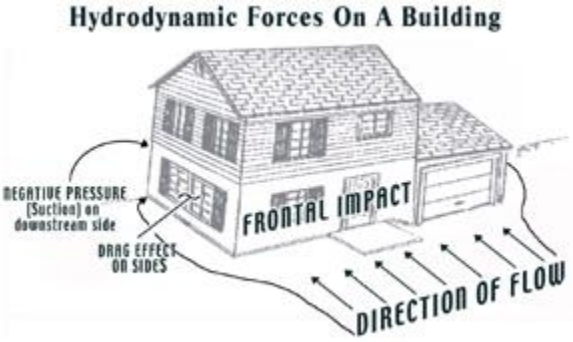
3) What do need to consider when building reinforcements to your beach town? Why?

    a) (Again there are many possible answers) -- Inundation height, lay-out of the houses, possible environmental effect, beach/coast access, cost.

4) What sort of forces will there be on the model from the tsunami? (here is video that highlight some of these forces) http://watch.discoverychannel.ca/daily-planet/march-2012/daily-planet---march-09-2012/#clip635345

    a) There are four types' forces that designs will have to resist, with fancy names, but if you have ever stood in running water the ideas won't be hard to understand conceptually.

        i) Hydrodynamic Forces: this is the water running and the forces it applies, a good example is water running against your legs when you stand in the surf.



        ii) Hydrostatic Forces: this is the force of the water pushing inwards; a good example is water pushing in on your legs when you walk into a pool.

iii) Buoyant forces: the uplifting forces of water.

iv) Impact forces: when items carried in the water impact structures (example shipping containers in Japan).

5) Which are the dominant forces for our model? Which one is most likely to cause the damage to the structures? In our, model hydrodynamic forces and buoyant force are dominant.
6) What are some different building techniques you think you could use to reduce these different forces.