Name at least two mechanical differences between sand and silt.

Name a mechanical difference between gravel and sand.

Name a mechanical difference between sand and clay.

Name a mechanical difference between cobbles and gravel.

Describe the general differences (i.e., which is more accurate and how much computation time each simulation would relatively require) between a zero-equation eddy viscosity model, a k-ε model, LES and DNS.

Use the Stokes settling equation and know the bounds of its use.

Use Dietrich's (1982) formula to calculate settling velocity.

Name at least two ways the presence of other particles/sediment affects the settling velocity of individual particles.

Be able to Reynolds average a set of governing equations.

Diagram and describe the different portions of a boundary layer (viscous sublayer, buffer layer, intermediate/log layer, outer layer), know the limits of each portion (i.e., $z_+ < 5$ => viscous sublayer; $5 < z_+ < 30$ => buffer layer; $z_+ > 30$, $\eta < 0.1$ => intermediate log layer; $1 > \eta > 0.1$ => outer layer), and be able to identify and use the equation that describes the velocity profile in each section (except for the buffer layer).

Know where the following parameters/quantities are used and why:

- Reynolds stress
- Shear stress
- Bed shear stress
- Shear velocity
- Turbulent eddy viscosity
- Dynamic molecular viscosity
- Kinematic molecular viscosity
- Submerged specific gravity
- von Karman constant
- Magnus force
- Added mass force
- Lift force
- Basset/history force
- Viscous dissipation rate
- Kolmogorov wavenumber
- Kolmogorov time scale

- Kolmogorov velocity scale
- Integral time scale
- Integral length scale
- Corey shape factor
- Powers value of roundness

I'm not going to require you to memorize equations, but you should be able to discriminate between and use the following equations:

BBO equation
Dietrich's (1982) sedimentation formula
Stokes settling
Velocity defect law
2D boundary layer equations
Navier-Stokes equations