Question title: Potential Vorticity

Potential vorticity differs from vorticity in that (select many):

- [ ] 1. it is a scalar instead of a vector.
- [ ] 2. it is not materially-conserved.
- [ ] 3. vortex stretching and squeezing terms and vortex tilting need not be explicitly treated.
- [ ] 4. it cannot be used in the shallow water equations.

Question title: Rotating Flows

Most oceanic and atmospheric flows are rotating.

○ True ○ False

Question title: The most important equation for vorticity

For any scalar field g(x,y,z,t),

$$\nabla \times \nabla g(x, y, z, t) =$$

- ○ 1. 0
- ○ 2. g(x,y,z,t)
- ○ 3. g(x,y,z,0)
- ○ 4. g(x,y,z,t)*g(x,y,z,t)
- ○ 5. curl(g(x,y,z,t))

Question title: Vorticity

The vorticity of a fluid is (select all that are true):

- [ ] 1. the curl of the velocity.
- [ ] 2. an important materially conserved property.
- [ ] 3. always zero.
- [ ] 4. influenced by baroclinic forcing.
- [ ] 5. only valid for 2-dimensional flow.
- [ ] 6. closely related to Kelvin's circulation theorem.
- [ ] 7. increased and decreased by stretching and squeezing the fluid in the direction of the vortex tubes.

Question title: Vorticity Equation in a Rotating Frame

In a rotating frame, vorticity conservation must consider (select as many as are true):

- [ ] 1. the 'planetary vorticity' of the rotating frame.
- [ ] 2. the 'relative vorticity' of the moving fluid in the rotating frame.
- [ ] 3. the effects of curvature of the earth on vorticity (the beta effect).