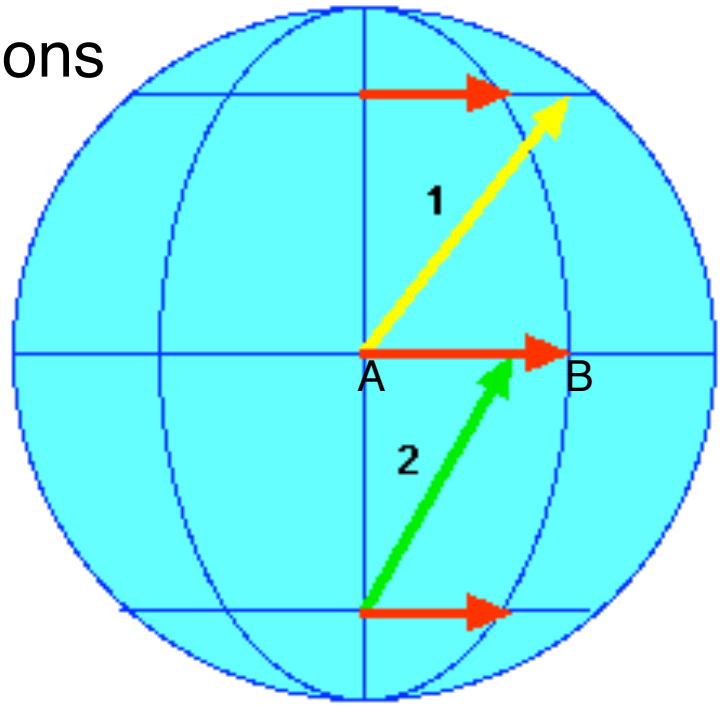
Coriolis Force for North-South Motions

Derived from conservation of total angular momentum along Earth's axis of rotation

Imagine you and an air parcel are at rest on Earth. You nudge the air parcel due north from point A (along the longitude intersecting A). You continue looking north as you rotate. Sometime later you arrive at B. Now due north is along the longitude intersecting B. The parcel is at the yellow arrow head, to the right of the longitude, moved by the Coriolis force.



Horizontal Arrows represent motion of objects fixed to surface

Arrows 1 and 2 are not fixed to the surface

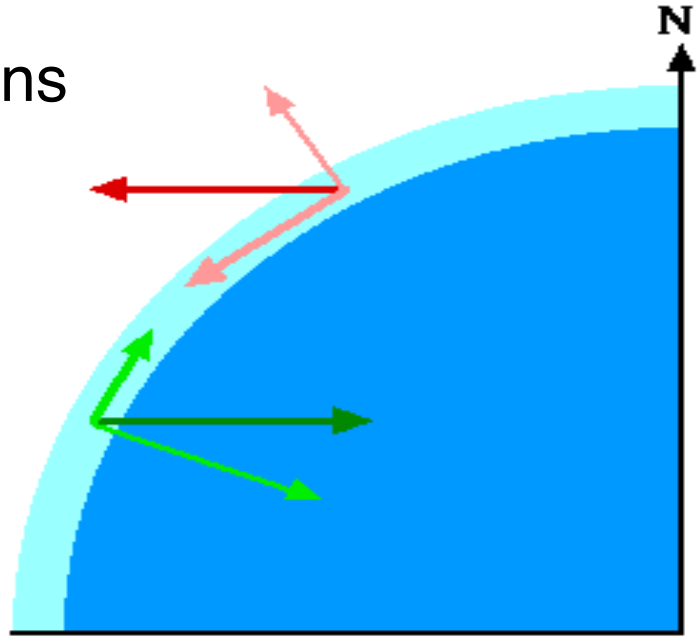
Arrow 1 shows the deflection to the right of the upper horizontal arrow

Arrow 2 shows the deflection to the left of the middle horizontal arrow

Coriolis Force for East-West Motions

Results from the change in centrifugal force caused by motion. The centrifugal force of objects at rest on earths is balanced by the departure of true gravity **g*** from the local apparent gravity **g**.

If you nudge a formerly resting parcel to the east, the motion adds to the rotation and causes the centrifugal force to exceed what gravity can balance. This "extra" centrifugal force is the Coriolis Force.



The red arrow is the displacement from the "extra" centrifugal force for an object initially moving east (out of page) w.r.t. Earth. The pink arrows are its local Cartesian coordinate components.

(lower arrows are for initial westward motion)

Facts about the Coriolis Effect:

- Displaces winds to the right in the NH (left in the SH)
- Only acts when an object is in motion on a rotating body
- It is zero on the equator
- Doesn't have a significant effect on water in your sink
- Does affect midlatitude storms and airplane travel