Pseudoforces, aka Fictitious Forces

A pseudoforce is an imaginary force sometimes used to explain an apparent (non-real) acceleration of an object that occurs because the observer's rest frame is accelerating (non-inertial). The pseudoforce is a useful tool because sometimes it is easier to calculate and/or explain motions using the pseudoforce concept and a non-inertial frame rather than using an inertial frame. Two pseudoforces are so commonly used that they bear names:

1. **Centrifugal Force**: The apparent force making a revolving object tend to fly away from its axis of motion, such as a ball being twirled at the end of a string in one's hand. It seems that there is a centrifugal force making the ball want to fly away in a straight line. In reality the ball just wants to fly off in a straight line, in accordance with Newton's 1st Law. The tension in the string which pulls outward on the twirler's hand is merely the 3rd Law reaction to the inward (centripetal) force exerted by the string on the ball which is necessary to compel it to move in a circular path.

2. **Coriolis Force**: As observed from a rotating coordinate system, moving objects appear to veer to the right (left) for counterclockwise (clockwise) rotation. Thus in the earth's northern (southern) hemisphere freely moving objects appear to deflect to the right (left). This is a subtle effect, not noticeable for short trajectories (such as tossing a baseball to a team mate), but important for long trajectories. For example, the winds around a surface high pressure weather system blow radially outward on the equator (where there is no Coriolis force), but they deflect to the right around a northern high and to the left around a southern high as illustrated below.

Wind streamlines about an equatorial atmospheric high pressure region
Wind streamlines about a northern hemisphere atmospheric high pressure
Wind streamlines about a southern hemisphere atmospheric high pressure