Quiz 6 - Interaction Strengths

My name is: _____

One of the simplest non-pathological models of a predator-prey interactions adds only logistic prey growth to the classic (pathological) Lotka-Volterra model:

$$\frac{dR}{dt} = bR\left(1 - \frac{R}{K}\right) - aRC \qquad \frac{dC}{dt} = eaRC - dC\,.$$

An empirical ecologist measuring the effect of a predator on a prey species might measure values reflecting any of the following terms: a, aR, aC, and aRC. Indeed, all four terms could be (and have been) called measures of the "interaction strength" between the two species (i.e. the top-down effect of the predator on the prey). But clearly tthey are not equivalent.

1) *Why* aren't these measures equivalent? Answer by interpreting each for an empiricist and by defining it in terms of its units.

a –

aR –

aC –

aRC –

2) Which measure(s) would an empirical ecologist prefer to measure if they want to compare the "interaction strength" that different predator species have on one common prey species? Why?

3) Which measure(s) would they best measure if they want to compare different pairs of predator-prey species across an entire food web? Why?

3) Which measures(s) would a theoretical ecologist hoping to parameterize their mathematical models with empirical data prefer to have the empiricist estimate? Why?