Dragon Shockra

Ages: 13 year-old to Adult

General Learning Goal: Electrostatic charge, Coulomb's Law

Specific Content: How a lighting strike occurs when two conditions are met relating to force and distance

Devices: PC with Mouse or

PC with Microsoft *Kinect 2*

The Lesson. Learners first read a short lesson on the specifics of Coulomb's law. It is described in simple language before the formula is introduced.

$$|\boldsymbol{F}| = k_e \frac{|q_1 q_2|}{r^2}$$

The game approaches Coulomb's as a "proportionality" neglecting the constant *k.* This is very small number and as a 4th component that may be difficult for younger students.

Learners should leave the game understanding that the electric field is proportional to the forces in two objects being multiplied as the numerator (the cloud and the dragon), and it is also related to the distance between the two objects (how far the cloud and dragon are from each other). Distance, the denominator of *r*, makes this an inverse proportion. Thus, the proportionality that the learners work with in the game is:

$$E_f \propto \frac{q1 * q\,2}{r^2}$$

All computations resolve to being positive.

The Gameplay. Learners take on the role of the Electric Dragon either by driving the mouse, using the hand with the *Kinect,* or using their bodies in the upcoming VR version.

Mastery over Coulomb's law is shown by the learners being able to quickly feed the Dragon while keeping an eye on the charge (*q net*) in the cloud and dodging upcoming obstacles (adjusting for r^2).

Points accumulate during play, multiple play sessions are encouraged, and learners receive immediate feedback on progress.

(Upcoming versions with data saving and quizzes for the class can be downloaded by contacting INQUIRY at Embodied-games.com.)

Enjoy!