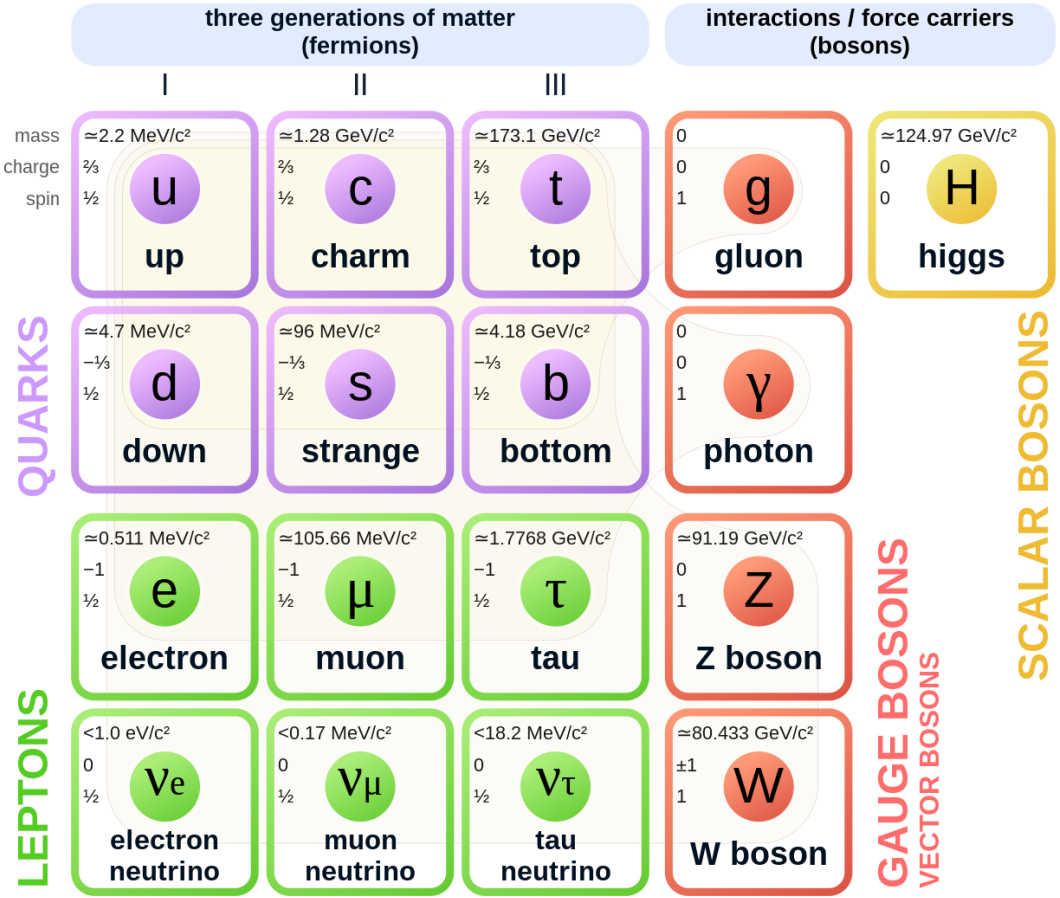
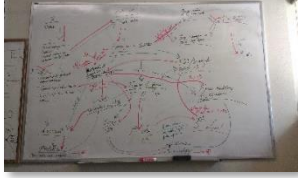
Standard Model of Elementary Particles



Some more for you to try!



1. Recalling that a free particle has $\psi = e^{i\vec{p}\cdot\vec{x}/\hbar}$, write the wave function for two bosons with momenta p_a and p_b. (Looking for a full mathematical function here!).
2. Two electrons, both spin up, around a hydrogen atom. One in the 1s ($n = 1, \ell = 1$) state and one in the 2s ($n = 2, \ell = 2$) state (ignoring their mutual repulsion for now!).
3. Two electrons, both in the 1s state and both spin up.

For a properly constructed Hamiltonian of identical particles, does $\hat{P}$ commute with $\hat{H}$?

A. Yes.
B. No.

Will the "(anti)symmetric-ness" ever change with time?

Hint: Think about $\langle \hat{P} \rangle$. Thinking *way* back to the start of QM I, how do expectation values change with time?

A. Yes.
B. No.