EXERCISE 3

Answers:

1. Five.
2. From bottom to top.
3. Yes – two (very small).
4. Coming "out" of the paper (or screen). You might have been a bit optimistic and assumed that the knock-on electrons are curving to the left. A better approach would be to use charge conservation as follows:
    - Four tracks came from the collision. Two of these curve to the right, one to the left, while the other kinks to produce a track that curves to the left. So, assuming charge is conserved in this decay, the collision has produced four particles – two positive and two negative – a total initial charge of zero.
    - Since charge is also conserved in the collision of the beam particles with the positive proton target, the beam particle must be negative.

   We see that the beam particles curve in the same way as we guessed the electrons did; so we are consistent.
   If negative particles curve to the left, the field must point out of the paper/screen.

5. One.
6. Four, assuming there are no missing neutral particles that escaped detection.
7. Two positive, two negative.
8. Negative (see answer for number 4).
9. One.
10. One.
11. Two from both decays.
12. From the kink: one negative, one neutral. From the vee: one negative, one positive.
13. $\Lambda^0 \rightarrow p\pi^-$ (Notice how the proton takes most of the momentum since it has most of the mass.) Also the vee points to the kink. See step 7 of tutorial.
14. From this visual inspection, we have two options: Ω^- or Ξ^-. Measurements of the momentum will give us the mass of the particle. From this we know that the particle is an Ω^- (measurements are not included here).

For animation of this event click here.