http://bio.fsu.edu/~winn/bsc2011-01/bsc2011_index.html

Stuff you should know for Quiz 1 (not necessarily an exhaustive list!)

Know the entities and the processes that comprise the central dogma and know their relationships to one another

know the basic composition of DNA – double strands of nucleotides, strand polarity, bonding specificity

Know and be able to distinguish chromatin, euchromatin and heterochromatin know the structure of RNA, the three major kinds, and their functions

Know the basic steps in transcription and the major players (template strand, RNA polymerase, promoter, mRNA processing, exons, introns) and the role of each player

Know the differences between Prokaryotes and Eukaryotes and know how their genomes differ

know the basic steps in translationn and the major players (tRNA, ribosomes), what the genetic code is and its role in transciption / translation, know and distinguish codon and anticodon

Understand what cell differentiation is and how the Waddington model has features that represent the processes of development and cell differentiation Know the two early hypotheses about how cells of the same organism become differentiated and know the experiments conducted to distinguish them and the evidence each supplied (carrots, nuclear transplantation in Xenopus)

Know the major features of the operon model and the role of each player (promoter, operator, structural gene, regulatory gene, regulatory protein, signal molecule – be able to label these in a diagram).

Be able to distinguish between positive and negative gene regulation and between induction and repression and know when each kind of gene regulation would be expected

Recognize why and how gene regulation differs between Prokaryotes and Eukaryotes

Know the levels at which gene expression can be regulated and the major mechanisms that control expression at each level (see the handout I gave you) Be able to define the following as used in class: gene amplification, polytene chromosome (=c'some), Barr body, DNA methylation, histone acetylation, control elements, enhancer sequence, transcription factor, initiation factor

Recognize the consequences of regulation at different levels and when regulation at different levels might be favored

Know the roles of male and female gametes and how they are specialized for those roles

Know the sequence of events in sea urchin fertilization

Be able to describe the events and consequences of the acrosomal reaction, the fast block to polyspermy, the cortical reaction, the slow block, egg activation Know the major features of cleavage including the pattern of cell divisions characteristic of protostomes and deuterostomes. Be able to draw and label diagrams of an unfertilized amhibian egg, a morula, and a blastula

Be able to describe two means by which cells can move

Know the major features of gastrulation and how and why they differ between sea urchins and amphibians

Be able to draw and label a sea urchin gastrula and an amphibian gastrula (labels would include blastopore, archenteron, three primary germ layers, anterior and posterior ends of the embryo, and dorsal and ventral sides) Know the general fate of each embryonic germ layer (i.e. what organ systems it contributes to in the adult)

Be able to describe the process of neurulation in the amphibian embryo Know each of the mechanisms that contribute to animal development, including cytoplasmic determinants (including the definition and role of morphogens), cell communication (including induction), pattern formation, and hormones Know how major axes of symmetry are determined in amphibians and fruit flies (Drosophila)

Know what Holtfreters work tells us about cell interactions during development Be able to define the process of induction in animal development

Be able to describe experimental evidence supporting our knowledge of mechanisms in development

Know what hormones are and how they coordinate events in development Know the role of thyroxin in amphibian development and the experimental evidence supporting this role

Be able to summarize the processes that contribute to determining cell fate in the embryo

Be able to define the cell cycle and describe the differences between Prokaryote and Eukaryote cell cycles

Know the major stages of the Eukaryotic cell cycle and what goes on in each Know what cyclins and cyclin-dependent kinases are and their roles in the control of the cell cycle and how cell fusion experiments support these roles

Know the four major stages of Mitosis and the events that occur within each Be able to draw and label a cell in each stage.

Be able to define: spindle, centriole, centrosome, kinetochore, kinetochore fiber, non-kinetochore fiber, aster, chromatid, centromere, cytokinesis