Lab 1

1) What is the magnification of the specimen under the microscope with the present objective lens in place?

2) What is the name and function of the indicated microscope part?

3) The section of cloth in this slide is made up of interwoven fibres of cotton, each of which is a bundle of tiny fibrils. What is the estimated thickness of a fibre?

4 a) Which objective lens on this microscope has the greatest depth of focus? b) Which one has the smallest working distance?

5) Which lenses on this microscope have “empty” magnification?

Lab 2

1) What is the difference between Brownian movement and diffusion?

2) How would the rate of diffusion of a substance be influenced by temperature? Explain.

3) If the cytosol of a bacterial cell is hypotonic to its environment, what would you expect to happen?

4) The right side of an aquarium has a solution of salt in water. The left side of this aquarium has a solution of sugar in water. If the right side is hypertonic to the left side, which way will the sugar diffuse?

5) These red blood cells are in what kind of solution? (in terms of tonicity)

Lab 3
1) In what stage of mitosis is the cell indicated by the pointer?
2) What stage of mitosis precedes the stage of the cell in question 1?
3) How many chromatids are present in each chromosome of the cell indicated by the pointer? 4) In what stage of mitosis is the cell indicated by the pointer?
5) What is indicated by the pointer?

Lab 4

1) In humans, the allele for "attached" earlobes is recessive to the allele for "free" earlobes, and the allele for "straight" hairline is recessive to the allele for "widow's peak" hairline. A man who is heterozygous at both loci has a large family with a woman who is homozygous at both loci and has a "straight" hairline and "free" earlobes. Approximately what proportion of their children would we expect to have which phenotypes?

2) Define heterozygote in genetic terms.

3) If you suffer from an extremely rare genetic disease that is caused by a recessive allele at a single locus, and neither your parents nor your brother have this disease, what is the probability that your brother is a carrier (heterozygous at this locus)?

4) If half the members of a population have the phenotype of the dominant allele, and half have the phenotype of the recessive allele, which allele at this locus is probably more common in the population?

5) In ants, males develop from unfertilized eggs (and are therefore haploid) while females (including workers) develop from fertilized eggs (and are therefore diploid). Imagine that ant colour is determined at a single locus, with the allele for dark being dominant and the allele for light being recessive. If the only breeding ants in a colony are a dark male and a light female, what proportion of the male offspring would be dark, and what proportion of the female offspring would be dark?

Lab 5
1) Why is SDS in the lysis solution?

2) After exposure to the electric current, the gel is immersed in a warm stain solution. Why do we keep this solution warm?

3) In this drawing of DNA bands in a gel after electrophoresis, which lane (indicated by letter) includes the band with the smallest DNA fragments? Why?

4) What are the four bases that are found in DNA?

5) A sample of DNA is 100,000 bases long. It is cut between bases 20,000 and 25,001, and between bases 50,000 and 50,001. This DNA is then loaded into a gel and exposed to an electric current (electrophoresis). How many bands of DNA would result?

Lab 6
1) Is this plant a monocot or a dicot? Explain.
2) How many petals would you expect in the flowers of the plant in question #1? 3) Exactly what kind of tissue is indicated by the pointer?
4) What organ is seen in question #3?
5) Exactly what is the structure indicated by the pin?

Lab 7

1) Exactly what kind of tissue is indicated by the pointer?

2) What is the structure indicated by the pointer?

3) Where would you find this tissue?

4) When blood is returned to the piglet heart from the rest of the body via the vena cava, what part of the heart does it first enter?

5) What is the organ indicated?

Lab 8
1) List two characteristics of fungi.

2) State the complete Linnaean classification of the species Rhizopus stolonifer (clack bread mould), omitting class, order, and family.

3) Identify four (4) multicellular organisms on display in today's lab. 4) In which domain does the organism under the microscope belong? 5) Is the organism under the microscope a heterotroph or an autotroph?

Lab 9
1) In which phylum does this animal belong?
2) Does the animal in question #1 have a nervous system, and if so what kind? 3) In which phylum does this animal belong?
4) In which phylum does this animal belong?

5) In which phylum should you classify an animal with the following characteristics: bilateral symmetry, incomplete digestive system, no coelom or appendages or circulatory system or respiratory system?

Lab 10
1) In which group (class) does this animal belong?

2) In which group (class) should you classify chordate with the following characteristics: 2-chambered heart, 5 pairs of gill slits, swim bladder, scales?

3) In which group (class) does this animal belong?

4) How many chambers are there in the heart of the animals in question #3?

5) In which group (class) does this animal belong?