

Name: _____

Science 7 Acceleration Study Guide

These are the units/topics covered in the exam:

Laboratory Safety

The Scientific Method and Measurement

Classification

Ecology

Evolution

Genetics

Cells/Microscope

Mitosis/Meiosis

Asexual/Sexual Reproduction and Development (plants, animals, unicellular organisms)

Human Body

Safety

- Correctly identify a piece of laboratory equipment if given a picture and state how it is used in the science laboratory
- Understand the basic safety rules that must be followed in the laboratory

The Scientific Method and Measurement

- Tell me the units (metric!) used to measure, length, distance, volume, temperature, and mass
- Be able to identify the parts of a microscope, calculate field of view and record total magnification
- Be able to create a wet mount slide
- Differentiate between qualitative and quantitative data and give an example of each
- Be able to correctly use and /or read the following: thermometer, triple beam balance, metric ruler and graduated cylinder
- Differentiate between an observation and an inference and give an example of each
- Be able to read a statement and tell me if it is an observation or an inference
- Write a hypothesis using ALL 3 forms we discussed in class
- Explain the concept of a controlled variable
- Describe why a good experiment has both a control group and an experimental group
- Define and describe the terms independent and dependent variables
- Graphing skills (labels on axes, format for a title, making a good scale, drawing conclusions from data)

Classification

- Define the 2 parts of binomial nomenclature
- Be able to recognize a scientific name that is written in the correct format (ex. *Homo sapiens*)
- Tell me why scientific names are better than common names
- Define phylogeny and the 3 analyses associated with it (fossils, embryology, DNA)
- Differentiate between prokaryotic and eukaryotic organisms and give examples of each
- Know the categories of classification in the correct order (KPCOFGS)
- Know which category is most general and which category is most specific
- Know how to use a dichotomous key to identify an organism
- Be able to group organisms using a student developed scheme

Ecology

- Define and describe ecology
- Describe and define abiotic and biotic factors and give examples for each
- Know the levels of organization and give an example of each (organism, population, community, ecosystem)
- Describe the 3 types of symbiosis (mutualism, parasitism, and commensalism) and provide an example for each
- Compare and contrast autotrophs and heterotrophs and producers and consumers
- Define and describe photosynthesis- what types of organisms can do this? What is the energy source?
- Define and describe cellular respiration- what types of organisms can do this? What is the energy source?
- Why is chlorophyll important?
- Define and provide an example of decomposers- why they are important and how they fit onto a food web?
- Be able to label the above organisms using the trophic levels (primary, secondary, tertiary, quaternary) AND tell me if they are a carnivore, omnivore, etc.
- Describe the direction of energy flow in a food chain or food web
- Describe what happens to the amount of energy available as you go up a food pyramid or food chain
- Human impacts on the environment (acid rain, global warming, greenhouse effect, pollution, etc.)
- Describe the difference between threatened, endangered, and extinct species
- Describe the idea of an invasive/alien species and give one example- why are they a problem?
- What cycles did we draw in class? What are the important terms from each cycle?

- Describe the two types of ecological succession. How are they similar? Different?
- What is carrying capacity? What does the carrying capacity graph look like?
- Describe at least two abiotic and 2 biotic factors that can affect population size
- What is the relationship between competition and population size?

Evolution

- Definition for evolution
- Define and describe the 3 types of adaptations
- Describe natural selection and identify the “parts” (variation, adaptation, survival, pass traits to offspring)
- Who was the scientist credited with the theory of evolution?
- Significance of homologous structures, embryology, and DNA studies
- Describe 3 types of fossils and the type of rock that has fossils
- How fossil evidence is a “clue” to discover evolutionary relationships
- How mutations can effect evolution
- Describe the difference between gradualism and punctuated equilibrium and give an example of an organism that would undergo each type of evolution

Genetics

- Difference between homozygous and heterozygous
- Difference between genotype and phenotype
- Difference between dominant and recessive
- All definitions at the beginning of the guided notes packet
- Gregor Mendel and why he is called the “father of genetics”
- How to complete a basic Punnett square with ratios
- The number of chromosomes in humans (body cells and sex cells)
- What it means if someone is a “carrier”
- Explain selective breeding and give 1 example
- Explain cloning and discuss advantages and disadvantages
- DNA double helix structure
- Complementary base pairing (A-T and C-G)
- Basic parts of DNA (sugar, phosphate, bases)

Cells, Mitosis/Meiosis, Asexual and Sexual Reproduction and Development

- Cell organelles and their functions discussed in class
- You should be able to compare and contrast mitosis and meiosis
How many daughter cells are produced?

Are the daughter cells identical to the parent cell or do they have variation?
How much DNA is in the daughter cells?
How many divisions occur for each?
When does crossing over occur?

- You should be able to name the 5 phases of mitosis and recognize them if shown a picture ****Remember I P M A T C****
- Define cancer
- Define fertilization and describe the difference between external and internal
- What are 2 types of asexual reproduction in plants?
- What are 2 types of asexual reproduction in unicellular organisms?
- You should be able to compare and contrast asexual and sexual reproduction
 - How many parents are needed?
 - Are the offspring genetically identical to the parents or are they different?
 - What types of organisms use asexual reproduction? sexual reproduction?
 - What are the sex cells of humans and how much genetic information do they carry?
 - Which type of reproduction requires more energy?
- You should know the follow regarding reproduction in plants:
 - Names and function of female reproductive structures
 - Names and function of male reproductive structures
 - 4 methods of seed dispersal and an example for each
 - The parts of the seed
 - Methods of pollination
 - Why pollination is important

Human Body

- Levels of organization in the human body
- Be able to look at a nutrition label and analyze it
- Major function of the body systems discussed, name the important organs in each system and describe their functions
- Be able to choose 2 systems and describe how they work together in the body
- Body systems to review:
 - Digestive
 - Circulatory
 - Skeletal/Muscular
 - Nervous
 - Reproductive
 - Endocrine
 - Respiratory
 - Excretory

