Eukaryotic Cell (True Nucleus), (Plant or Animal cell + fungi & protists. E.g. Human Liver cells)

- Reproduce my meiosis
- Has a nucleus
- DNA in linear chromosomes - located in the nucleus
- Has membrane bound organelles
- Larger than prokaryotic cells (diameter 20μm or more)
- Cellulose based cell wall (if present)
- ATP production occurs in the mitochondria
- Has a phospholipid bilayer
- Large ribosomes

ORGANELLES and their FUNCTIONS:

1. **Mitochondrion -** Sausage-shaped organelles, where later stages of aerobic respiration takes place in cells. Surrounded by a double membrane: Inner is highly folded into cristae (gives a large surface area). The space enclosed by the inner membrane is called the mitochondrial matrix and contains small circular strands of DNA. Inner membrane is studied with stalked particles made from protein which are the site of ATP synthesis. Outer is simple and quite permeable.
2. **Ribosomes -** Smallest organelle, 80s, but most numerous; are sites of protein synthesis. Composed of protein and RNA; are manufactured in the nucleolus of the nucleus. They are either found free in the cytoplasm where they make proteins for the cell's own use, or they are attached to the rough ER where they make protein from the cells.
3. **Temporary Vacuoles**
4. **Endoplasmic Reticulum** - Series of membrane channels called cistern involved in synthesising and transporting materials.

ROUGH: Numerous ribosomes give a rough appearance. The ribosomes synthesise proteins which are processed (enzymatically modifying the polypeptide chain or adding carbohydrate) before being exported from cell via Golgi Body.

SMOOTH: Has no ribosomes; is used to process materials, mainly lipids and carbohydrates, needed by the cell.

5. **Nucleus -** Largest organelle. Interior is called the nucleoplasm which is full of chromatic - a DNA/protein complex. During cell devision the chromatin become condensed into discrete chromosomes. Surrounded by a nuclear envelope which is a double membrane with nuclear pores, which are larger holes containing proteins that control the exit of substance such as RNA and ribosomes from the nucleus.
6. **Nucleolus** - Dark region of chromatin which makes ribosomes.
7. **Cytoplasm -** everything contained within a cell is found suspended in cytoplasm, except the nucleus, which is separated from the cytoplasm by a membrane. Cytoplasm helps rid cells of waste material, aids in cell respiration and helps convert glucose into energy.
8. **Lysosome** - Small membrane bound vesicles formed from the Golgi apparatus and contain a cocktail of digestive enzymes (lysozymes) which are used to break down unwanted chemicals, toxic and organelles or even whole cells to the materials can be recycled. They can fuse with a feeding vacuole to digest its contents. They are involved in: digestion of bacteria in phagocytes, releasing enzymes from the cell (exocytosis), digestion & recycling of worn-out organelles and the complete breakdown of cells after death (autolysis)
9. **Cell Membrane -** The cell membrane is selectively permeable to ions and organic molecules and controls the movement of substances in and out of cells. The basic function of the cell membrane is to protect the cell from its surroundings. It consists of the phospholipid bilayer with embedded proteins.
10. **Golgi Body -** Series of flattened membrane sacs called cisternae formed from the ER. Jobs is to transport protein from ER to cell membrane for exports. Part of the ER that contain protein are fused with one side of the Golgi body membranes, while at the other side, small 'bubbles' of membrane called vesicles bud of and move towards the cell membranes; they fuse and release contents by exocytosis. It also adds carbohydrates to proteins forming glycoproteins, modifies and transports and stores lipids, produces secretory enzymes and forms lysosomes.