Biology – patterns in nature

Science, Biology

Biology – Pattern in Nature 1. Organisms are made of cells that have similar structural characteristics 1. 2. 1Outline the Historical development of the cell theory, in particular, the contributions of Robert Hooke and Robert Brown. •1665 English scientist Robert Hooke used microscope to examine thin slices of cork and saw small box-like compartments he called cells. He was first to realise plant material had organised structure at microscopic level. (compound microscope) •1831 Scottish Botanist Robert Brown was involved in a dispute about how pollination and fertilisation occurred in plants.

During his study with orchids, he noted that ‘ Each cell has a spherical structure’. He named it the nucleus of a cell. First to introduce the concept of a nucleated cell as unit of structure in plants. 1. 2. 2Describe evidence to support the cell theory. •Cell theory evidence accumulated over 600 years with advancement oftechnologywith the microscope and lenses. •14th century Italian monks invented magnifying glass spectacles. •1590 first two lens/ compound microscope made by Hans and Zacharias Janssen. •1676 Leeuwenhoek (Dutch) saw micro organisms under a microscope in a drop of pond water. 1824 Henri Dutrochet (French) suggested that all organisms are composed of cells. •1838 Schleiden and Schwann (German) further advanced idea that all organisms are made of cells.

Increasing evidence. E. g. first researcher to view single yeast cells budding and producing new cells. From that time on, cells regarded as building block of life. •1859 Rudolph Virchow (German) stated that all cells divide and that is how new cells are made. •1879 Walther Flemming (German) used biological stains to view cells dividing and verified the ideas of Virchow. 1. 2. Discuss the significance of technological advances to developments of cell

theory •Middle ages- Spontaneous generation- meat + maggots, tadpoles/frogs in H20. (Living matter arises from non-living matter. Problem= the source of new life/ eggs could not be seen, too microscopic. •Magnifying lens made in 1300 but not used in astronomical instruments and microscopes until 1600's. •Earliest microscope was single lens. Compound was developed soon after, had 2 lens, objective and an ocular- mounted in a tube. It wasn't until 1660's before developed enough to be useful. •Eye can only be 10cm close to an object to be able to see it in focus.

Closer than that the eye cannot resolve or separate small objects so blurred. Resolution= to see objects as separate and distinct. Magnifying lenses spread light rays so they strike the eye lens at a much greater angle of incidence than unaided eye. Magnification= to make things appear bigger. •Not much development happened for 200 years in microscope advances due to problems with chromatic aberration. •Schwann helped to dispel theory of spontaneous generation by magnifying 400 times meat extracts through which hot air had passed. It was found meat was sterile. Also used microscope to trace presence of yeast in grape juice and beer.