

S U M M A R I E S

INVESTIGATION 1: Learning About Lenses

In Investigation One, you explored the refraction of light by lenses. During this Investigation, you:

1. observed images of a piece of oat cereal with the unassisted eye, a convex lens and a concave lens.
2. measured the inner and outer diameters of the oat cereal piece and of the images of the oat cereal piece made by the convex and concave lenses.
3. observed images of the word “letter” on a slide with the unassisted eye, a convex lens, a concave lens and the low power (4X) objective of the microscope.
4. measured the width and height of the word “letter” and the images of the word “letter” made by the concave and convex lenses.

Through these experiments, you concluded that:

1. lenses refract light, producing images of objects.
2. the images produced by convex and concave lenses are different.
3. a convex lens can produce an image that is magnified and has an increased resolution as compared to the object.
4. a concave lens can produce an image that is smaller and has a decreased resolution as compared to the object.
5. the overall proportions of the images produced by the convex and concave lenses and the lenses in a compound microscope are the same as the overall proportions of the object.

INVESTIGATION 2: Investigating Specimens

In Investigation Two, you explored how to prepare a specimen and the relationship between magnification, resolution and field of view of microscopic specimens. During this Investigation, you:

1. observed a cork and crossed fibers specimen using the low power (4X), medium power (10X), and high power (40X) objectives of the compound microscope.
2. calculated the total power of magnification produced by the objectives of the compound microscope.
3. prepared a specimen of your fingerprint for microscopic analysis.

Through these experiments, you concluded that:

1. the total magnification of images viewed with a microscope is calculated by multiplying the power of the objective used by the power of the eyepiece.
2. as the magnification of a specimen increases, its resolution increases but its field of view decreases.
3. more information about a specimen can be gathered by observing the specimen with lenses that provide different resolutions and fields of view.
4. there is a purpose to each step used in the preparation of a specimen.

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INVESTIGATION 3: Investigating Animal Cells

In Investigation Three, you explored the structures found in an animal cell. During this Investigation, you:

1. obtained a sample of cells from the inside of your cheek.
2. used the Wet Mount Slide Preparation technique to prepare a slide of your cheek cell specimen.
3. observed your cheek cells specimen with the three objectives of the compound microscope.

Through these experiments, you concluded that:

1. samples are placed in water on a slide and covered with a cover slip when the Wet Mount Slide Preparation technique is used.
2. cheek cells are animal cells that have a cell membrane, cytoplasm and nucleus.
3. cheek cells are eukaryotic cells.
4. different structures of an animal cell can be observed with different microscope objectives.
5. the function of a part of a cell may be predicted by observing its structure.

INVESTIGATION 4: Investigating Plant Cells

In Investigation Four, you explored the structures found in a plant cell. During this Investigation, you:

1. observed a slide of an Elodea leaf.
2. made a wet mount slide of a piece of onion skin.
3. observed the Elodea leaf and the onion skin using the three objectives of the compound microscope.

Through these experiments, you concluded that:

1. plant cells contain a cell wall, cell membrane, cytoplasm and nucleus
2. some, but not all, plant cells contain chloroplasts.
3. there are parts of a plant that do not contain chloroplasts and therefore cannot perform photosynthesis.
4. there are similarities and differences in the structure and function of different plant cells.

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INVESTIGATION 5: Investigating Tissues

In Investigation Five, you explored the microscopic structures of cells, tissues and organs. During this Investigation, you:

1. observed two plant specimens, a Pinus Stem and an Elodea Leaf, with the compound microscope.
2. observed two animal specimens, human blood and the colon, with the compound microscope.
3. created a model of the colon.
4. prepared models of a longitudinal and cross section from the model of the colon.

Through these experiments, you concluded that:

1. there are both similarities and differences in the cells from different parts of a plant and from different plants.
2. there are both similarities and differences in the cells from different parts the human body.
3. there are both similarities and differences between plant and animal cells.
4. cells combine to form tissues and tissues combine to form organs and organisms.
5. different tissues result from different arrangements of cells.
6. the function of a tissue or organ is related to the arrangement of its cells.
7. the appearance of the cross section of a specimen, the longitudinal section of a specimen and the whole specimen may be different.
8. viewing different types of sections of a specimen can give different information about the structure and function of the specimen.