SUMMARY OF CHAPTER II

THE HUMAN ORGANISM AND THE DEVELOPMENT OF TECHNOLOGY

1. COMMUNICATING WITH SYMBOLS

- Humans can express their thoughts through gestures, speech and drawings. When we use drawings, we are using graphics to communicate (p. 336).
- Technical drawings are used in technology to communicate information about an object or a system (p. 337).
- The two most common types of technical drawings are engineering drawings and diagrams (p. 337).

2. LINES AND GEOMETRY IN TECHNICAL DRAWINGS

- Technical drawings contain the precise pieces of information required to construct an object or a system (p. 337).
- Designers must respect conventions to produce technical drawings that can be understood by all. Among the conventions in use are basic lines and geometric lines (p. 337):
  - Basic lines are lines with an appearance and meaning determined by international convention (p. 338).
  - Geometric lines are figures that are composed using drafting tools according to the rules of geometry (p. 340).
- Technical drawings can be done in three different ways:
  - Freehand: This sort of drawing is referred to as a sketch (p. 341).
  - With the use of drafting tools: For this, the term manual drafting instruments is used (p. 341).
  - With the use of drafting software on a computer: This is called computer-aided drawing, or CAD (pp. 341–342).

3. PROJECTIONS AND THEIR USE IN TECHNICAL DRAWINGS

- A projection is a representation of a three-dimensional object in two dimensions (p. 343).
- Projections differ in the following two ways: the position of the object with respect to a sheet of paper and the angle between the visual rays and the sheet of paper (p. 344).
- A multiview projection is a projection in which one side of the object is parallel to the sheet of paper and the visual rays run perpendicular to the sheet of paper. The result is a two-dimensional view in which measurements and angles are exact or to scale (p. 345).
- Projections in which the visual rays of the object are perpendicular to the sheet of paper (such as multiview projections and isometric projections) are also called orthogonal projections (p. 345).
- Conventionally, views of the top, front and right-side are used and they are positioned in an L-shape (p. 346).
- An isometric projection is a projection in which no side of the object is parallel to the sheet of paper and the visual rays run perpendicular to the sheet of paper. Angles of the object are positioned in a way that corresponds to the three isometric axes, meaning each angle measures 120°. Measurements parallel to the isometric axes are exact or to scale; angles are not (p. 347).
- An oblique projection is a projection in which one side of the object usually is parallel to the sheet of paper and the visual rays are oblique. Measurements and angles of the side parallel to the sheet of paper are exact or to scale, but not those of the third dimension (p. 348)

- Projections that represents the three dimensions of an object in the same view (such as isometric projections and oblique projections) are also called perspective drawings (pp. 347–348).
- The most commonly used technical drawings are general drawings, exploded view drawings and detail drawings.
  - A general drawing is an engineering drawing that shows the overall design of an object (p. 348).
  - An exploded view drawing is an engineering drawing that shows the different parts of an object separately (p. 349).
  - A detail drawing is an engineering drawing that specifies all the details necessary to make a particular part of an object (p. 350).

4. WHAT'S IN AN ENGINEERING DRAWING?

- Engineering drawings generally contain indications of scale, dimension and tolerance. They may also feature cross sections and sections (p. 351).
- The scale indicated on a drawing is the relationship between the measurements of an object on a sheet of paper and the real measurements of the object (p. 352).
- When a drawing is smaller than the object, a scale reduction is used. When a drawing is the same size as the object, it is full size. When a drawing is larger than the object, a scale increase is used (p. 352).
- Dimensioning allows for the indicating of the real dimensions of an object and the location of various design elements. Dimension measurements are usually noted in millimetres (p. 353).
- Tolerance refers to the maximum variation of a specified dimension between a measurement on a drawing and the real-life measurement (p. 353). AST PROGRAM ONLY
- A cross section reveals the interior of an object, exposing its hidden details to view (p. 354).
- A section represents a surface located in a cross-sectional view (p. 355). AST PROGRAM ONLY
- When a section is found inside the object, it is called an aligned sectional view. When it is found outside the object, it is called an offset sectional view (p. 355). AST PROGRAM ONLY

5. DIAGRAMS

- A diagram is a simplified representation of an object (p. 355).
- Diagrams must follow certain guidelines and use certain symbols in order to be understood by all (p. 356).
- There are symbols to represent forces, constraints, movements, certain parts, guides, electrical components, etc. (p. 357).
- The most common types of diagrams are design plans, technical diagrams and circuit diagrams (p. 358).
- A design plan is a simplified drawing that represents one or more elements of the functioning of an object or a system (p. 358).
- A technical diagram is a simplified diagram that contains information about the construction solutions for manufacturing an object or a system (p. 359).
- A circuit diagram uses symbols to show how to connect the various parts of an electrical circuit (p. 359).