TECH
LABS

OBSERVATORY

SCIENCE AND TECHNOLOGY

APPLIED SCIENCE AND TECHNOLOGY

Teacher's Guide B
First Year of Secondary Cycle Two

The labs on the following pages prepare students for a number of different learning and evaluation situations (LES) that will help them to apply the concepts covered in Chapters 11 and 12 of their textbook.

The labs linked to Chapter 11 in the textbook (TECH 1–10) give students practice with various drafting techniques and with analyzing the operation and construction of selected technical objects in order to produce diagrams.

Note: TECH 5 targets students in the Applied Science and Technology (AST) program.

The purpose of the labs linked to Chapter 12 in the textbook (TECH 11–20) is for students to study the characteristics of materials and to distinguish among various types of guides, links and complex mechanical functions of familiar technical objects. The final lab (TECH 20) gives students the opportunity to put their knowledge into practice using techniques such as measuring, laying out, machining, assembling and finishing.

Note: TECH 14 and 18–20 target students in the Applied Science and Technology (AST) program.

There are four types of TECH Labs:

- **observation:** labs based on the observation method
- **experiment:** labs based on the experimental method
- **technological analysis:** labs based on technological analysis
- **technique:** labs based on techniques essential to technology

The student copy of all the labs is followed by notes to the teachers, an answer key and transparencies.

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TECH LABS– Description of labs

Number of lab (Student book chapter and page)	Lab title	Type of lab	Description of lab	Materials
TECH 1 (Chapter 11, page 340)	Geometric lines	Technique	Practising techniques for creating various types of geometric lines by constructing and reproducing figures.	• drawing board • T-square • 30°/60° set square • 45° set square • circle template or compass • ruler • sheet of letter-sized white paper (216 mm × 279 mm) • masking tape • pencil • eraser
TECH 2 (Chapter 11, page 344)	Projections	Observation	Observing an object (a rectangular prism) and drawing multiview, isometric and oblique projections of the object.	• drawing board • T-square • 30°/60° set square • 45° set square • ruler • masking tape • pencil • eraser • scissors
TECH 3 (Chapter 11, page 344)	Computer-aided drawing	Technique	Using software to create a multiview projection of a rectangular prism.	• rectangular prism constructed in TECH 2 • computer • word processing software

TECH 4 (Chapter 11, page 346)	Multiview projections	Observation	Reproducing an object in modelling clay from a multiview projection of the object.	• block of modelling clay (100 mm × 60 mm × 40 mm) • ruler • retractable utility knife • cutting mat • 10-mm length of 10-mm Ø wooden dowel
TECH 5 (Chapter 11, page 348)	Exploded view drawings	Observation	Dismantling an object (a doorknob) to illustrate it in an exploded view drawing.	• doorknob • crosshead screwdriver • scissors • glue
TECH 6 (Chapter 11, page 351)	Determining scale	Observation	Determining the scale used to make technical drawings of objects by comparing actual measurements of the objects with measurements indicated on drawings of them.	• ruler • calculator • CD case • CD • hex nut • 9-V battery • ring stand
TECH 7 (Chapter 11, page 351)	Dimensioning	Observation	Dimensioning a multiview projection of a mitre box.	• mitre box • ruler • protractor • eraser
TECH 8 (Chapter 11, page 351)	Cross sections	Observation	Cutting sections from egg cartons and associating them to their corresponding views.	• 4 one-dozen egg cartons (cardboard) • retractable utility knife • cutting mat • scissors • glue

Number of lab (Textbook chapter and page)	Lab title	Type of lab	Description of lab	Materials
TECH 9 (Chapter 11, page 356)	Design plan and technical diagram of a paper punch	Technological analysis	Studying the utility, function and operation of a paper punch in order to complete a design plan and a technical diagram.	• paper punch
TECH 10 (Chapter 11, page 356)	Design plan and technical diagram of a manual eggbeater	Technological analysis	Studying the utility, function and operation of a manual eggbeater to complete a design plan and a technical diagram.	• manual eggbeater
TECH 11 (Chapter 12, page 369)	How forces affect the deformation of four metals	Observation	Observing the effect of various forces on the deformation of four metals.	• 2 ring stands • 2 universal clamps • 500-g weight • 1000-g weight • ruler • 4 metal plates about 126 mm × 20 mm (electrodes): – copper – iron – nickel – zinc

TECH 12 (Chapter 12, page 371)	Hardness of metals	Observation	Comparing the hardness of various metals.	• ring stand • universal clamp • 10-cm iron nail • 1-m plastic tube • 4 pieces of metal about 20 mm × 20 mm: – iron – copper – nickel – zinc • scrap of wood
TECH 13 (Chapter 12, page 374)	Hardness of wood and modified wood	Experiment	Comparing the hardness of various types of wood and modified wood.	• ring stand • universal clamp • 10-cm iron nail • 1-m plastic tube • 5 pieces of wood and modified wood of equal size (about 20 mm × 20 mm): – pine – spruce – oak – maple – fibreboard
TECH 14 (Chapter 12, page 381)	Recyclable plastics	Observation	Identifying the types of plastic that go into the composition of various objects by studying their recycling code.	• 10 objects made of recyclable plastic
TECH 15 (Chapter 12, page 383)	Guiding function	Observation	Determining the type of guide in various technical objects.	• scissors • mechanical pencil • glue stick • retractable utility knife • beam balance • hot glue gun

Number of lab (Textbook chapter and page)	Lab title	Title of lab	Description of lab	Materials
TECH 16 (Chapter 12, page 387)	Types of links	Observation	Determining the types of links in various technical objects.	• screwdriver • hammer • pliers • scissors • beam balance • computer keyboard • dimmer switch • mastic applicator • eyeglasses • roll-on deodorant applicator • C-clamp • vise
TECH 17 (Chapter 12, page 389)	Complex mechanical functions	Observation	Observing complex mechanical functions in various technical objects.	• drill press • manual eggbeater • glue stick • corkscrew • pipe wrench • salad spinner
TECH 18 (Chapter 12, page 393)	Speed change	Observation	Observing speed changes during the operation of a manual eggbeater.	• manual eggbeater • non-permanent felt-tip marker • damp paper towel

TECH 19 (Chapter 12, page 400)	Electrical conductivity	Experiment	Determining the electrical conductivity in various materials by means of an electrical circuit.	• source of alternating current • push-button switch • 1.5-V light bulb in wooden or porcelain socket • 4 electric wires with alligator clips • piece of wood • piece of rubber • piece of copper • piece of aluminum • piece of nickel chromium • piece of porcelain • piece of glass
TECH 20 (Chapter 12, page 405)	Designing and constructing the "Fox and Geese" game	Technique	Practising techniques such as measuring, laying out, machining, assembling and finishing by designing and constructing a game.	• wooden plank at least 15 mm thick • 295-mm wooden dowel (6 mm Ø) • band saw • drill press • red paint • black paint • 2 small paintbrushes • pencil • combination square • hammer • centre punch • backsaw • mitre box • C-clamp • drill-press vise • 6-mm drill bit • 120-grit sandpaper • 120-grit sandpaper mounted on a sanding block • belt/disc sander • vise • ruler • flat rasp • permanent felt-tip marker