

CNC MACHINIST/ PRECISION MACHINING

TEACHER BACKGROUND

Duration: Two 45-minute class

Grade: 7 and up

Group size: Individual and pairs

Setting: Indoors (classroom)



RATIONALE:

Procedure is defined as “an established or official way of doing something.” It is well documented that our lives are heavily influenced by routine, or procedures. Students should know how to write and document procedures accurately and effectively. Effective communication in explaining tasks is an important task to have in any industry and precision in these tasks becomes very important in certain trade areas.

METHOD:

In this activity, students will be asked to design a set of procedures that other students can follow to complete some sort of task accurately and effectively, without the supervision of the procedure writer. Using common everyday tasks, students will write procedures on completing a specific task. This could be, tying your shoes, getting dressed, putting on hockey equipment, setting up a computer, etc. The instructor should provide a detailed example of procedures they've written for a task.

Instructors need to be mindful and ensure that they are providing detailed “work procedures,” that take into account measurements (time per task and total time), any materials required, what finished product should look like, availability of items, etc.

CURRICULUM OUTCOMES:

Including but not limited to:

- Students will be expected to communicate information and ideas effectively and clearly, and to respond personally and critically. (ELA)
- Use direct and indirect measurement to solve problems. (Math)
- Students will examine key industry sectors in New Brunswick. (Technology)

MATERIALS:

- Paper/notebook
- Sample drawing with lines (i.e. house)
- Ruler
- Protractor
- Pencils

GETTING STARTED:

Procedures help people who are not familiar with a task or chore and give them steps to help them complete it, to the standards that you would like. In this activity, you'll experience writing a few sets of procedures. When you are done, you'll pass them to a fellow student and have them try to re-create or create what you intended.

THE ACTIVITY:

Students are given the following details to carry out this assignment:

1. Have students discuss a number of activities that they do routinely, but they don't really think of how they do it (i.e. putting on their clothes, pouring cereal, etc.). (Communication)
2. Work through an example of a procedure with students. Have a student come up and demonstrate as you walk them through a simple task. (Problem Solving)
3. Have students individually think of a task that they perform and ask them to write out every step to complete it. (Writing)

4. Once complete, students will pair up and switch their procedures and try to complete the task using the procedures documented. (Reading)
5. Students will then be given a picture of a house and asked to describe the procedure in drawing it, to exacting standards (i.e. draw a 9 cm straight line parallel to the bottom of the page; draw two perpendicular lines at 90o angles at each end of the original line that are 9 cm in length, etc. Precise measurements are crucial. (Numeracy, Problem Solving)
6. Discuss how this would be important in building or creating tables, chairs, desks, houses, screws, nails, lumber, etc.
7. Discuss with the class what the tasks of a precision machinist are and show the parallels between the tasks that were just done by students and the tasks that precision machinists carry out. Precision machining is what produces a huge number of both large and small objects that we use in daily life. Each intricate piece that makes up an object requires one level or another of a machinist's skills.

BRANCHING OUT:

1. Students could be asked to put together a piece of furniture to demonstrate why accuracy, to the nearest mm, is important.
2. Have younger students measure items like desks and chairs to make sure they are all the same size, then have them report on their findings.

INFORMATION BITE:

Machining is any of various processes in which a piece of raw material is cut into a desired final shape and size by a controlled material-removal process. Machining is a part of the manufacture of many metal products, but it can also be used on materials such as wood, plastic, ceramic, and composites.

Precision Machinists use many machine tools, such as lathes, milling machines, grinders, and drill presses, to produce precision metal / non-metal parts. These parts must be made to exacting standards, and the machinist uses precision measuring instruments to ensure accuracy and that the parts meet quality guidelines.

A machinist reads and interprets specifications and blueprints, calculates dimensions and tolerances, lays out their work and marks pieces for machining. Precision machinists often produce small batches or one-of-a-kind items. They use their knowledge of the working properties of metals and their skill with machine tools to plan and carry out the operations needed.

WHAT ABOUT SKILLS FOR SUCCESS?

The job of the precision machinist *combines mental ability with manual skills* – to develop a project from a blueprint requires careful thought, a thorough understanding of numeracy and the ongoing development of problem solving.