

Suggested Teaching Plan

Objectives

The Learning Outcomes below are designed to consolidate prior knowledge and understanding of workshop practice and provide a scenario for generating evidence for Unit 1 of Edexcel **BTEC First Certificate / Diploma in Engineering**, Working Practices in Engineering.

By creating a work related learning environment in the classroom the learners have the opportunity to consider the industrial approach to activities such as planning, safety, working with others and legislation.

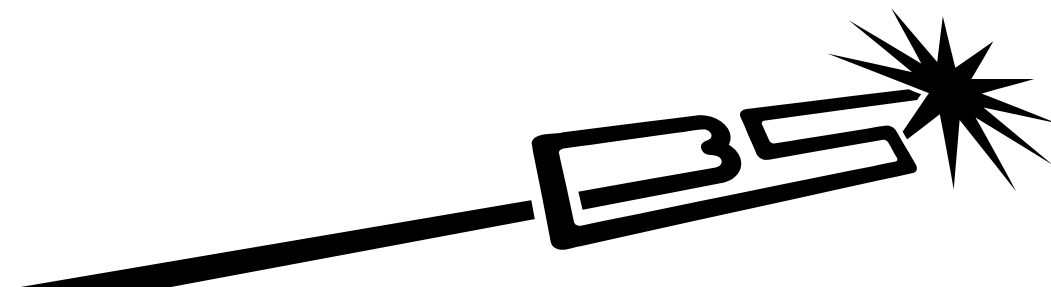
Not all of the elements in the activity are needed for Unit 1 and can be used for other units or used as generic learning activities.

Learning Outcomes:

- 1 Work Related Learning
- 2 Health and Safety Documentation and Risk Assessments
- 3 Time Planning
- 4 Quality Control Procedures
- 5 Scales of Production – Batch Production
- 6 Group work

See appendix 1, Assignment Brief for Learning Outcomes as grading criteria evidence for Unit 1.

The following teaching plan is based on **100 minute lessons** with a teaching group of 18 using a traditional Technology workshop. It is assumed the learners have prior experience in bench work, understanding basic working drawings and marking out.



Lesson 1

Resources

35 x (3x25x100mm) HIPs, marking out equipment, files, junior hacksaws
line bender(s), pillar drill(s), 4mm drill, countersink bit, coat hook drawing, blank Gantt charts, sample Gantt charts

Activities:

Introduction

Put learners into groups of three – suggest non- friendship groups and a balance of abilities. At this stage explain the work related learning element and importance of “working with others” in relation to Unit 1. Worth mentioning to the learners that some grading criteria evidence is by *teacher observation*.

10 minutes

Set first task: Make a batch of 5 coat hooks as to drawing number n. (appendix 2). Supply materials and provide access to line bending equipment and pillar drills. Allocate times to use equipment to the groups to avoid bottle necks. Leave learners to organise themselves – stand back and observe.

30 mins

Collect in first batch (completed or not).

Discuss successes and problems, highlighting the importance of planning. Introduce time planning mechanisms and Gantt charts – look at samples (app 3)

15 mins

Introduce and prepare for second task (To be completed next lesson): Make a batch of 5 coat hooks to modified specification - added aluminium strip element (app 4).

At this stage introduce the element of quality control – only perfect units to be accepted, and *a reward* will be given to group producing the most units to exact specifications.

5 mins

Give Gantt chart sheets (app 5), one per group, – learners discuss in groups and write out time planning for group for new batch.

15 mins

Feedback progress

Allocate job responsibilities within groups-

- 1 Quality control
- 2 Health & Safety
- 3 Time keeping

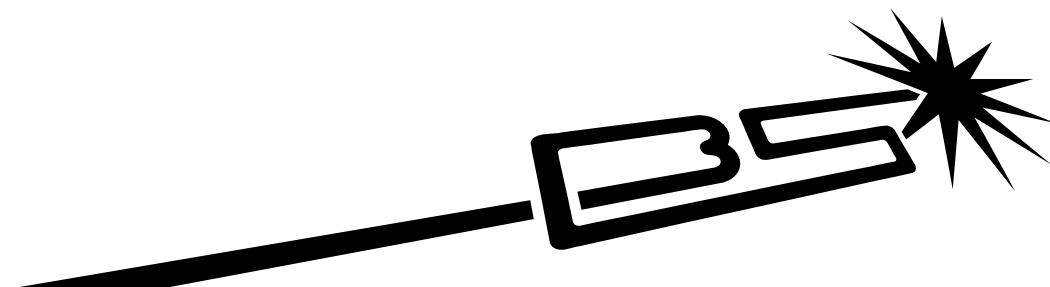
5 mins

In groups identify health safety points and quality control checks to the Gantt chart and add to chart. Therefore all three roles will have input to the planning. Complete chart.

15 mins

Feedback and plenary, introduce next lesson: Producing batch to new specification following planning sheets.

5 mins



Lesson 2

Resources

35 x (3x25x100mm) HIPs, 35 x (1x10x100mm) aluminium, 35x4mm csk machine screws and nuts, marking out equipment, files, junior- hacksaws, line bender(s), pillar drill(s), 4mm drill, countersink bit, coat hook drawing.

Activities:

Introduction

Learners back in groups, discuss pros and cons of last batch production. Reinforce the usefulness of using a Gantt chart and check understanding of new specification.

NB the idea of changing / adding a new element is to prevent monotony of working on another product which is the same as the previous lesson, it also adds another process to plan for which increases the sense of urgency.

10 mins

Batch production task

Organise timings for use of equipment.

Remind learners about reward for best production group.

Remind about individual responsibilities. Start production, observe.

45 mins

Collect in batch

Identify each group's batch for checking (this can be done by the teacher **now** or in the background by a technician or support assistant, or after the lesson for the results to be given next lesson).

Introduction to BRIGHT SPARKS Production exercise:

Explain the background to the production and demonstrate the board. Set the long term task of producing a perfect class set of 35 boards for local primary schools to share. Inspect the boards and show details from front of class or data presenter/visualiser and discuss processes.

10 mins

Task 2:

In groups, list as many processes involved in production of the boards as learners can think of / remember from discussion.

5 mins

Feedback:

List processes from groups onto board (see app 6)

5 mins

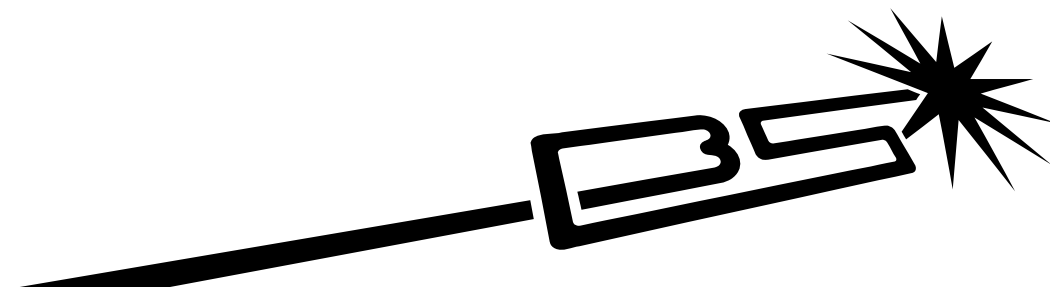
Discuss details of components to groups, elicit observations on the precision and quality control issues of each component.

10 -15 mins

Allocate component responsibility to groups: Example from Our Lady's assumes pre printed and drilled back board and top is supplied to groups. Components needed – aluminium switch, battery connectors, variable resistor and bulb holder. Groups *begin* initial planning in groups for their batch of 5 x TWO allocated components (app 7)

10 mins

Or: if ready give results of batch production best group and award prize / treat



Lesson 3

Resources

35 x (1x10x300mm) aluminium, thick single core copper wire, 100 x MES bulb holders, 70 x C battery holders, 35 x lolly sticks, 50m HR wire (18ohms/meter) multicore red and black wire, soldering equipment, 4mm pan head machine screws, washers and nuts, self tapping screws, marking out equipment, files, junior- hacksaws, pillar drill(s), 4mm drill(s), wire cutters & strippers

Activities:

Introduction

Give prizes / treat to winning group from last lesson.

Reinforce group component allocation.

Groups 1,2,3 switch and variable resistor; groups 4,5,6 battery holders and bulb holders

NB two groups will merge at later stage to produce assembled board.

Re-allocate additional responsibilities to individuals (or keep the same as for coat hook)

10 mins

Safety Discussion:

Labelling safety signs activity: Match the label to the safety sign.

3 mins

Feedback and discuss safety implications and introduce "regulations and legislation applicable to the working environment". P14 of BTEC specification.

10 mins

Task 1:

Between group members continue with (or begin) Gantt and production planning sheet which includes health and safety points and quality control checks and ONE sample of both components. Teacher to check quality.

Safety points are added to the Gantt chart as labels. (App 5) with *details* of safety points written separately.

Production plan shows evidence of materials and equipment handling safety, personal protective equipment needed, hazards and risks.

NB: Gantt chart must plan for number of products and include activity for all individuals to be busy (and not doing two things at once!).

20-30 mins

Task 2:

When happy with quality of planning and sample, teacher can allow learners to continue with batch of 5 of each component (to be kept as stock for production day).

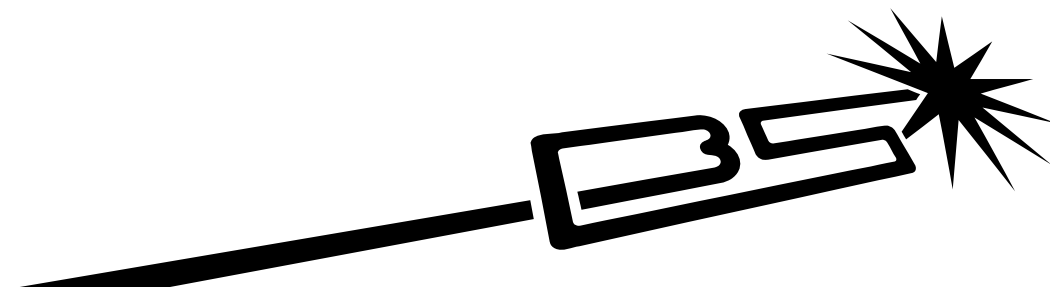
At this stage, inform learners of payments to be made for production. Example: 20 pence per component meeting specification.

NB, Ask Headteacher for permission to pay learners as part of their Work Related Learning experience

40-50 mins

Feedback progress – collect stock for groups check quality with quality controllers – reject any failing to meet specification. Record payments owed.

10-15 mins



Lessons 4, 5, 6

Resources

3x297x210mm (A4) HIPs pre-drilled, 8x297x210mm MDF pre-drilled
35 x (1x10x300mm) aluminium, thick single core copper wire, 100 x MES bulb holders, 70 x C battery holders, 35 x lolly sticks, 50m HR wire (18ohms/meter) multicore red and black equipment wire, soldering equipment, 4mm pan head machine screws, washers and nuts, self tapping screws, marking out equipment, files, junior- hacksaws, pillar drill(s), 4mm drill(s), wire cutters & strippers, screw drivers, pliers (incl. cordless) roll 10mm wide self adhesive flat draught excluder, camera

NB: Production day requires learners to be off timetable for the day to complete the production exercise.

Approximate timings – 100 mins completion of components,

200 mins assembly (groups 1 and 4, 2 and 5, 3 and 6 together to share production of ten boards each extended group).

Any additional components and boards are added to stock.

Evidence for portfolios is gathered during this session by photographing and making observation records.

Unit 1 Pass 1, 2, 3

Activities:

Introduction

Set timescales and equipment allocation. Check planning. Organise locations in room and new groupings (above). Explain additional payments - £1.00 per completed board (on top of components completed by end of component making session).

15 mins

Task 1: Complete component making to plans.

Meet quality controllers and time planners throughout to check progress and efficiency – give guidance as needed.

75 mins

Collect stock for groups, check quality with quality controllers – reject any not meeting specification. Record payments owed.

10 mins

Demonstrate assembly:

Organise extended groups and locations in room, organise stock supply and order of completion of assembly (see app 9)

Task 2:

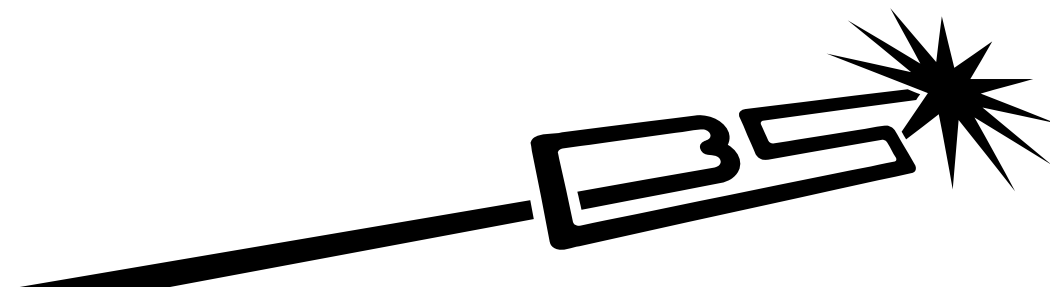
Complete production of 10 Bright Sparks boards per new groupings following "Assembly Gantt Chart" (app 9)

Check with quality controllers and time planners as progress.

Monitor and help. Stop as appropriate and reinforce quality criteria (app 10)

Collect stock for groups, check quality with quality controllers – reject any not meeting specification. Record payments owed

200 mins



Lesson 7

Resources

Assembly equipment, crocodile leads, production planning sheets, Gantt charts, safety statement sheets, risk assessment sheets.

Activities:

Complete outstanding assembly activity.

Test boards. Check quality and modify as needed.

30 mins

Creating evidence for portfolio:

Using documents made during planning learners re-write, copy for portfolio or make own versions of the production plan as evidence for **Pass 5**

20-30 mins

Use copies of learners' gantt chart / production plans which show evidence of group work. Attach a short paragraph explaining what the document is and was used for. **Pass 6**

20 mins

Discuss safety:

Refer to planning documents and reinforce safety legislation from lesson 3.

10 mins

Creating evidence for portfolio:

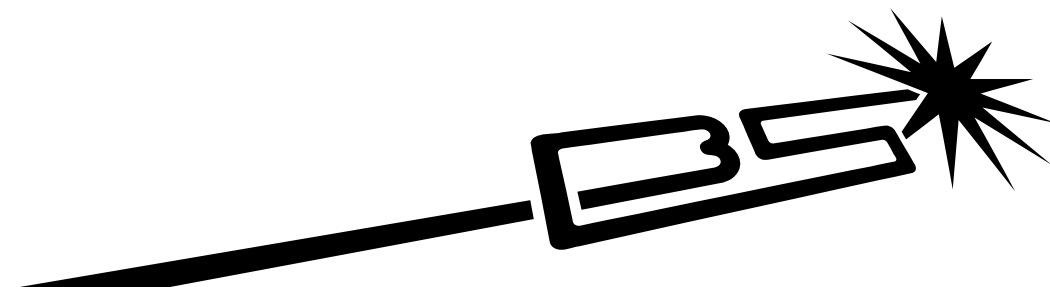
Identify evidence in planning for re-write, copy or composing for individual evidence. This evidence along with photographs and observation records meets **Pass 1, 2 and 3**.

20 mins

Extension activity.

Complete a risk assessment for the "workplace" in which the production activity took place (app 10) **Merit 1**.

NB Pass 4 to be completed in lesson 8



Lesson 8

Resources

Production planning sheets, Gantt charts, safety statement sheets, risk assessment sheets, PUWER regulations.

Activities:

Check progress, introduce remaining evidence for portfolio.

Discuss safety procedures in the workshop, technology room e.g. fire extinguishers, fire drill, first aid procedures, emergency stop procedures.

10 mins

Task 1:

Give fire alarm procedure sheet (app 11). Learners draw escape route and describe procedure to follow.

On same sheet learners describe *one* other safety procedure relevant to the location of the production activity. **Pass**

420 mins

Completion of additional portfolio evidence:

Introduce and discuss risk assessments and levels (matrix).

10 mins

Task 2:

Learners complete risk assessment (app 10) for three different activities involved in production. **Merit 2**

At this stage some learners will be working at different rates and the extension activities (accessing merit and distinction grades) can be given in small groups or individually, to be completed in the lesson or as personal study.

Merit 2 Written exercise:

Learners write a paragraph which demonstrates understanding of an existing safety procedure and how it could be improved, e.g. Changes made to fire procedure – organising lining up in forms, location and types of fire alarm switches etc

Merit 3 Written exercise:

Learners write notes about how the group's production activity could have been improved. Include organisational issues, processes, time management, working with each other.

Distinction 1 Written exercise:

Using PUWER workshop regulations (App 12) learners write a safety policy relating to the technology department or workshop quoting relevant parts from the text.

Distinction 2 Written exercise:

Learners evaluate (stating strengths and weaknesses) of the working relationships of the group and suggest changes that could be made to improve practice next time, e.g. Discussion and clarification of roles, appropriate allocation of tasks, reorganising tasks / priorities, being more patient and understanding etc.

If applying for Crest Bronze awards for the activity application forms can be used as part of the evidence for Pass 6 with references made to working with others.

