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32806351 Applied Science

Course Outcome Summary

Course Information

Alternate Title	previously Applied Science I
Description	Applied Science is a basic science course that applies concepts from physics and chemistry to the trades and industry. Topics include work, power, energy, the principles of fluids applied to hydraulics and pneumatics, and the basic properties of solids.
Instructional Level	Two-Year Technical Diploma
Total Credits	2.00
Total Hours	48.00

Types of Instruction

Instruction Type	Credits/Hours
Classroom Presentation (Lecture/Demonstration/Discussion)	1/16
On Campus Lab and/or Shop Experience	1/32

Course History

Revised By	Erin Winesburg (15237468)

Course Competencies

1. **Solve SI and USCS measuring system problems**
Domain Cognitive *Level* Application *Status* Active

Assessment Strategies
1.1.   by completing lab assignments
1.2.   in the laboratory with appropriate equipment
1.3.   using a calculator, paper, and pencil

Criteria

Criteria - Performance will be satisfactory when:
1.1.   learner solves SI and USCS problems involving length, mass, volume, and temperature
1.2.   learner performs a lab involving SI units of length, mass, and volume

Learning Objectives

1.a.	Compare the SI and USCS units of length, mass, volume, and temperature
1.b.	Convert from SI to USCS and USCS to SI units of length, mass, volume, and temperature
1.c.	Distinguish between mass and weight for SI and USCS units
1.d.	Convert from larger to smaller and smaller to larger SI and USCS units
1.e.	Use prefixes to express numerical notation for SI and USCS units
1.f.	Use the proper symbol for SI and USCS units

2. Apply the concepts of mechanics to work, power, energy, simple machines, and friction
Domain   *Psychomotor*   *Status*   *Active*

Assessment Strategies
2.1.	by completing lab assignments
2.2.	in the laboratory with appropriate equipment
2.3.	using a calculator, paper, and pencil

Criteria

Criteria - Performance will be satisfactory when:
2.1.	learner solves problems involving work, power, energy, simple machines, and mechanical advantage
2.2.	learner performs a lab on inclined planes and a lab on pullies

Learning Objectives
2.a.	Explain what a machine is
2.b.	Describe the six simple machines
2.c.	Explain the three classes of levers
2.d.	Explain the difference between a single-fixed and a compound pulley
2.e.	Use the work equation $W = F*D$
2.f.	Explain the difference between output work and input work
2.g.	Use the equation efficiency = output work/input work *100
2.h.	Identify machines that have an Actual Mechanical Advantage and an Ideal Mechanical Advantage
2.i.	Use the formula AMA = Resistance/effort
2.j.	Use the formula IMA = distance input/distance output
2.k.	Explain the relationship among work, power, energy, and friction

3. Apply the principles of fluidics to hydraulic and pneumatic equipment
Domain   *Cognitive*   *Level*   *Application*   *Status*   *Active*

Assessment Strategies
3.1.	by completing lab assignments
3.2.	in the laboratory with appropriate equipment
3.3.	using a calculator, paper, and pencil

Criteria

Criteria - Performance will be satisfactory when:
3.1.	learner solves problems using the pressure - force equation, Pascal's principle, the pressure - height formula and the weight density formula
3.2.	learner performs a lab on weight density

Learning Objectives
3.a.	Apply the pressure-force equation $P = F/A$, showing the relationship between pressure (P), force (F), and area (A)
3.b.	State Pascal's hydraulic principle: pressure applied to an enclosed fluid is transmitted undiminished to every portion of the walls of the container
3.c.	Determine pressure under a column of liquid if given the height and weight density--that is, apply the pressure height formula $P = HD$
3.d.	Distinguish between substances in regard to their densities
3.e.	Determine weight density for a substance, if given its weight and volume
3.f.	Compare various substances with water as to their specific gravities
3.g.	Distinguish between gauge pressure and absolute pressure

4. Solve problems using the basic properties of solids

Domain   Cognitive   *Level*   Application   *Status*   Active

Assessment Strategies
4.1.   by completing lab assignments
4.2.   in the laboratory with appropriate equipment
4.3.   using a calculator, paper, pencil, and appropriate references

Criteria

Criteria - Performance will be satisfactory when:
4.1.   learner solves problems using the equations for stress, strain, and elasticity
4.2.   learner performs a lab on Hooke's law and tensile strength

Learning Objectives
4.a.   Explain the kinetic theory of matter
4.b.   Explain that in solid objects molecules attract most strongly
4.c.   Demonstrate how forces applied to solids may be tensile or compressive forces
4.d.   Apply the stress equation $S = F/A$ to find the stress (S), force (F), or area (A)
4.e.   Show how a stress applied to an object will cause that object to deform its shape
4.f.   Apply the strain equation $e =$ change in L/L to find the strain (e), stretch (change in L), or original length (L)
4.g.   Apply the elasticity equation $E = S/e$ to find the elasticity (E), stress (S), or strain (e)
4.h.   Explain what is meant by elastic range, elastic limit, plastic range, and ultimate strength
4.i.   Demonstrate how various solids differ in ductility, malleability, brittleness, and hardness

5.   Identify the basic concepts of chemical hygiene
Domain   Cognitive   *Level*   Knowledge   *Status*   Active

Assessment Strategies
5.1.   on an exam
5.2.   using paper, pencil, and appropriate references

Criteria

Criteria - Performance will be satisfactory when:
5.1.   learner identifies hazardous substances
5.2.   learner identifies how to safely dispose of hazardous substances

Learning Objectives
5.a.   Describe the physical and chemical effects of hazardous substances on the human body
5.b.   Apply safe handling procedures when using hazardous chemicals
5.c.   Demonstrate emergency first aid for a chemical spill or other hazardous material
5.d.   Identify safe methods to dispose of hazardous substances
5.e.   Describe the effects of hazardous materials on the environment

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Solve SI and USCS measuring problems	Course	Active
LP	Solve mechanics problems Assessment Task 2	Course	Active
LP	Solve SI and USCS measuring problems	Course	Active
LP	Six Simple Machines	Course	Active
LP	Single fixed and Compound Pullies	Course	Active