Math-in-CTE Lesson Plan Template

Lesson Title: DC series and parallel circuits		Lesson # 13
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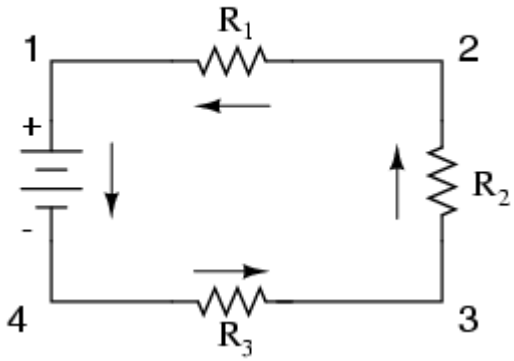
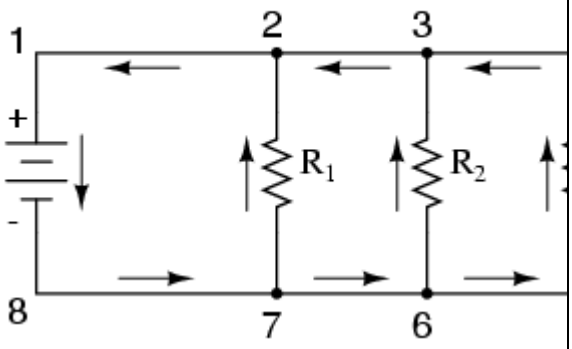
Occupational Area: Engineering Technology/Drafting		
CTE Concept(s): DC series and parallel circuits		
Math Concepts: Adding Fractions		
Lesson Objective: The student will be able to work with analyze series, parallel, and series -parallel DC circuits.		
Supplies Needed: paper, calculators, and optional computer stations		

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
1. Introduce the CTE lesson. **Lesson induction questions:** **Through question probing, assess students' math awareness as it relates to CTE topic**. **Why is it that in Christmas Tree when one light bulb in the wire does not work the rest of lights in that wire do not work either?** **Vocabulary: amperes, circuit, current, ohms, parallel, resistor, series, volts, voltage source, watts, wire**	1. Amperes(A): a unit of electric currents 2. Circuit: The conducting part, or a system of conducting parts, through which an electrical current passes. 3. Current (I): The transfer of an electric charge through a material. Current is measured in amperes. 4. Ohm (Ω) : A unit of resistance. 5. Parallel circuit: A method of connecting a circuit so that the current has two or more paths to follow. 6. Resistor: A device that opposes the flow of an electric current. It is used for protection operation or current control. 7. Series circuit: A method of connecting a circuit so that the current has one path to flow. 8. Volt (V): A unit of electrical potential or pressure. 9. Voltage (E): The electromotive force or electrical pressure. It is expressed in volts. 10. Watts (W): A unit of power. 11. Wire: A metal chord that connects electrical components.

2. Assess students' math awareness as it relates to the CTE lesson. **How do you add and divide** **fractions?**	FRACTIONS QUIZ.doc
3. Work through the math example *embedded* in the CTE lesson.	The Series Circuit.mht Batteries and Bulbs as DC Circuit Example.mht Students will transform circuit formulas to obtain parallel and series circuits results.
4. Work through *related, contextual* math-in-CTE examples. $R_T=R_1 + R_2 + R_3 +... + R_L$ T= total resistance L = Last resistor $R_P=1/R_1+1/R_2+1/R_3+.....+R$	**file 13 information CTE\Electrical Circuits - Series and Parallel Circuits, Ohms Law.mht** *Series*  *Parallel* 

5. Work through *traditional math* examples. **See attached document Fraction Addition and Division.doc.**	Fraction Addition and Division.doc
6. Students demonstrate their understanding.	The students will demonstrate that they will be able to calculate the equivalent resistance of series and parallel circuits by mastering the basic arithmetic of fraction addition and division
7. Formal assessment. **The format assessment will include in CTE series and parallel circuits.**	Series and Parallel Quiz.doc

Student Name: _____ Period: _____ Date: _____

DC series and parallel series **answers to math examples**

Add the following fractions and simplify:

1) 1/3 +2/3 = 2) 2/5 + 1/5 = 3) 1/6 + 2/6 =

Find the least common multiple for the following pairs of numbers:

4) 2:
4:

5) 2:
3:

6) 6:
8:

Find the least common denominators, then add and reduce the fractions:

7) 2/4 + 1/2 = 8) 3/2 + 2/3 = 9) 3/8 + 5/6 =

Divide and simplify

10) 2/3 / 1/6 = 11) 1 / 2/5 = 12) 1 / (1/2 + 1/3) =

Student Name: _____ Period: _____ Date: _____

DC series and parallel series **answers to math examples**

1) 1

2) 3/5

3) 1 / 2

4) 4

5) 6

6) 24

7) 1

8) 13/6

9) 58/24 = 29/12

10) 4

11) 5/2

12) 6/5

Student Name: _____ Period: _____ Date: _____

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Student Name: _____ Period: _____ Date: _____

DC series and parallel series **answers to math examples**

1) 1

2) 3/5

3) 1 / 2

4) 4

5) 6

6) 24

7) 1

8) 13/6

9) 58/24 = 29/12

FRACTIONS QUIZ

Add and simplify

1) 1/3 + 5/3 =

2) 5/4 + 3/2 =

3) 5/3 + 7/2 =

4) 1/6 + 1/8 =

Divide and simplify

5) 1/5 / 3/10 =

6) 1 / 2/7 =

FRACTIONS QUIZ

ANSWERS:

1) 2

2) 11/4

3) 31/6

4) 7/ 12

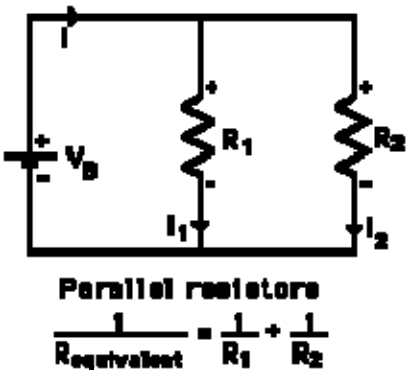
5) 2/3

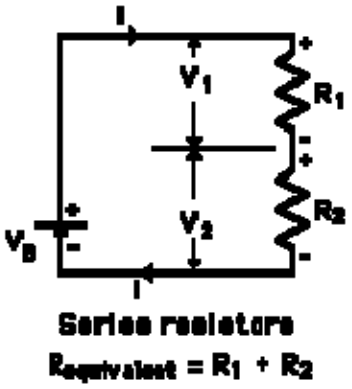
6) 7/2

Student Name:_____ Period: _____ Date: _____

Series and Parallel Circuit Quiz

Example





1. If in the series circuit R1 = 10 Ω and R_2= 10Ω. What is $R_{equivalent}$?

2. If in the series circuit R1 =1000 Ω and R_2= 0Ω. What is $R_{equivalent}$?

3. If in the series circuit R1 = 150 Ω and R_2= 200Ω. What is $R_{equivalent}$?

4. If in the series circuit R1 = 1k Ω and R_2= 10Ω. What is $R_{equivalent}$?

5. If in the series circuit R1 = 189 Ω and R_2= 234Ω . What is $R_{equivalent}$?

6. If in the parallel circuit R_1 =100 Ω and R2=100Ω. What is $R_{equivalent}$?

7. If in the parallel circuit R_1 =200 Ω and R2=300Ω. What is $R_{equivalent}$?

8. If in the parallel circuit R_1 =1k Ω and R2=2kΩ. What is $R_{equivalent}$?

9. If in the parallel circuit R_1 =1k Ω and R2=5Ω. What is $R_{equivalent}$?

10. If in the parallel circuit R_1 =5Ω and R2=600Ω. What is $R_{equivalent}$?

Student Name:_____ Period: _____ Date: _____

Series and Parallel Circuit Quiz

Answer Sheet

1. 20 Ω

2. 1000 Ω or 1 k Ω

3. 350 Ω

4. 1010 Ω

5. 423 Ω

6. 50 Ω

7. 120 Ω

8. 2000/3 Ω or ≈666.67 Ω

9. 1000/201 Ω or ≈4.98 Ω

10. 600/121 Ω or ≈ 4.96 Ω