

Information Technology Career Cluster

TITLE OF LESSON: Computer virus training.

MICHIGAN PROGRAM STANDARDS:

SUGGESTED TIME FRAME:

Section #1: Cluster Foundations

1	ACADEMIC FOUNDATIONS
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.1	Identify whole numbers, decimals, fractions, complex numbers, polynomials, geometrical figures.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.2	Apply basic arithmetic add, subtract, multiply, and divide operations.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.3	Applied relational (equal, not equal, greater than, less than, etc.) and logical expression.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.4	Understand the relationship of data and measurements to the problem
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.5	Produce mathematical formulae, expressions, and/or sequence of solution steps from problem statements.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.6	Analyze problem statements for missing/irrelevant data, estimate/exact values, inconsistent parameters.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.7	Construct charts/tables/graphs from functions and data.
2	<i>Demonstrate Mathematics knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
2.8	Describe problem solving techniques (for example: successive approximation, trial and error).
1	ACADEMIC FOUNDATIONS
3	<i>Demonstrate Science knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
3.1	Analyze/evaluate conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, variables.
3	<i>Demonstrate Science knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
3.2	Use computers for information processing, mathematical applications and problem solving.
3	<i>Demonstrate Science knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.</i>
3.3	Apply/use scientific methods in qualitative and quantitative analysis, data gathering, direct & indirect observation, predictions, problem identification.
X	TECHNICAL SKILLS
6	Access the Internet.
6.4	Understand virus protection procedures.
6.4.1	Demonstrate acute awareness of virus protection techniques.

Section #1: Cluster Foundations

Michigan Career Pathway: Business/Management/Marketing & Technology

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MATH CONTENT STANDARDS:

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ENGLISH LANGUAGE ARTS CONTENT STANDARDS:

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SCIENCE CONTENT STANDARDS:

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SOCIAL STUDIES CONTENT STANDARDS:

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TECHNOLOGY CONTENT STANDARDS:

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CAREER AND EMPLOYABILITY SKILLS CONTENT STANDARDS:

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SUPPLIES/EQUIPMENT	RESOURCES
<p>Computers need to have antivirus software installed.</p>	<p>Antivirus software Scientific calculators or equivalent software. Handout 1: Spreadsheet sample Handout 2: Understanding Exponents Handout 3: Saving Money to Open a Business</p>

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1. INTRODUCE THE CTE LESSON	TEACHER NOTES/ANSWER KEYS
<p><i>How many of you have had a computer virus or know of someone who has experienced the effects of a computer virus? What was the outcome?</i></p> <p><i>What is a virus? How does your computer get one?</i></p> <p><i>Discuss myths about viruses and what they might do (some may have more than one characteristic).</i></p> <p><i>Discuss some of the ways viruses attempt to disguise themselves. Point out that many viruses fail in their efforts.</i></p> <p><i>What kinds of AntiVirus software are available?</i></p> <p><i>Do you know what an exponential graphs look like?</i></p> <p><i>What other types of Malware are there?</i></p>	<p>Use Power Point Presentation with the “what is a virus” step.</p> <ul style="list-style-type: none">• Answer: An annoying or harmful program that can attach itself to other programs, e-mail messages, macros in applications software, or disk media; viruses are transmitted over networks, via modem connections, and through the exchange of infected media; software utilities to combat computer viruses are a common facilities management tool.• Have the students follow the links below and share the findings. <p>http://www.symantec.com/home_homeoffice/security_response/index.jsp</p> <p>http://www.mcafee.com/us/threat_center/default.asp</p> <p>http://www.grisoft.com/doc/9/Ing/us/tpl/tpl01</p> <p>http://www.clamwin.com/</p> <p>http://www.avast.com/</p> <p>http://www.pandasoftware.com/com/virus_info/default</p>

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2. ASSESS STUDENTS' ACADEMIC AWARENESS AS IT RELATES TO THE LESSON	TEACHER NOTES/ANSWER KEYS
<p><i>What do you know about exponential growth? (Use Handout 2)</i></p> <p>$4^0 = 4^0 = ?$</p> <p>$4^1 = 4^1 = ?$</p> <p>$4^2 = 4^2 = ?$</p> <p>$4^3 = 4^3 = ?$</p> <p>$3^8 = 3^8 = ?$</p>	<p>http://en.wikipedia.org/wiki/Exponential_growth</p> <p>Handout 2</p>
3. WORK THROUGH THE ACADEMIC EXAMPLE EMBEDDED IN THE LESSON	TEACHER NOTES/ANSWER KEYS
<p><i>There is a virus.</i></p> <p><i>Let's assume that each computer that is infected will infect 2 other computers every minute. How many computers will be infected after the first minute? How many will be infected after the 2nd minute? Suppose your antivirus software stops the virus after 30 minutes. How many computers were infected in the 30th minute? How many computers were infected in all?</i></p> <p><i>Graph the data in a spreadsheet.</i></p> <p><i>What if each computer affects 3 computers? What if the virus travels through the address book (i.e. 25 people in student's address book)?</i></p>	<p>To find the total number of computers infected, add the number infected during each minute.</p> <p>After the 1st minute, 2 other computers are infected; during the 2nd minute 4 more are infected, and so on. This simple virus is caught after only 30 minutes.</p> <p>Create a spreadsheet to represent the number of computers infected each minute for the life of the virus.</p> <p>Students should come up with spreadsheet formulas: $y=3^x$ and $y=25^x$. See Handout 1.</p>

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4. WORK THROUGH RELATED, CONTEXTUAL ACADEMIC EXAMPLES	TEACHER NOTES/ANSWER KEYS
<p><i>Find the mean (average) number of addresses in everyone's address book.</i></p> <p><i>Now create a similar spreadsheet using that number instead of the 2 we used before.</i></p> <p><i>How many people will be affected on the 10th minute?</i></p>	<p>Relate this to a Power outage across the country.</p>
5. WORK THROUGH TRADITIONAL ACADEMIC EXAMPLES	TEACHER NOTES/ANSWER KEYS
<p><i>Use Handout 3: Saving Money to Open a Business and answer the questions.</i></p>	<p>Note: This activity is also known as the Penny Problem.</p>
6. STUDENTS DEMONSTRATE THEIR UNDERSTANDING	TEACHER NOTES/ANSWER KEYS
<p><i>Let's say you have a virus that infects 5 computers every minute.</i></p> <p><i>How many computers will be infected in the 6th minute? How many will be infected in all after 6 minutes?</i></p>	<p>In the 6th minute: 15,625</p> <p>The total after 6 minutes is 19,531 (don't forget step 0)</p> <p>Students can use either a spreadsheet or a scientific calculator to perform the calculations.</p> <p>To use the calculator on the computer, go to accessories, then to calculate, go to view and change the view to scientific. Type in the base number, click the x^y key, then type the exponent and click the = key. To get the total, calculate: $5^0+5^1+5^2+5^3+5^4+5^5+5^6=$</p>
7. FORMAL ASSESSMENT	TEACHER NOTES/ANSWER KEYS
<p><i>Let's say you have a virus that infects 4 computers every minute.</i></p> <p><i>How many computers will be infected in the 5th minute?</i></p> <p><i>How many will be infected in all after 5 minutes?</i></p>	<p>In the 5th minute: 1,024</p> <p>The total after 5 minutes is: 1,365 (don't forget step 0)</p>

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VOCABULARY

Exponent – tells how many times the base is used as a factor.

Factor – the numbers you multiply together to get a product. (i.e. $3 \times 5 = 15$, the factors are 3 and 5)

Product – the answer to a multiplication problem.

Base – the number that is raised to various powers

Exponential Growth – is represented by the Formula:

$$y = a^x$$

y is the answer (y column on chart)

a is the base (the multiplier, how many computers are infected by each computer)

x is the (exponent) unit of time that it takes for the virus to spread

Note: on spreadsheet and on a calculator, the ^ key represents an exponent.

PRELIMINARY

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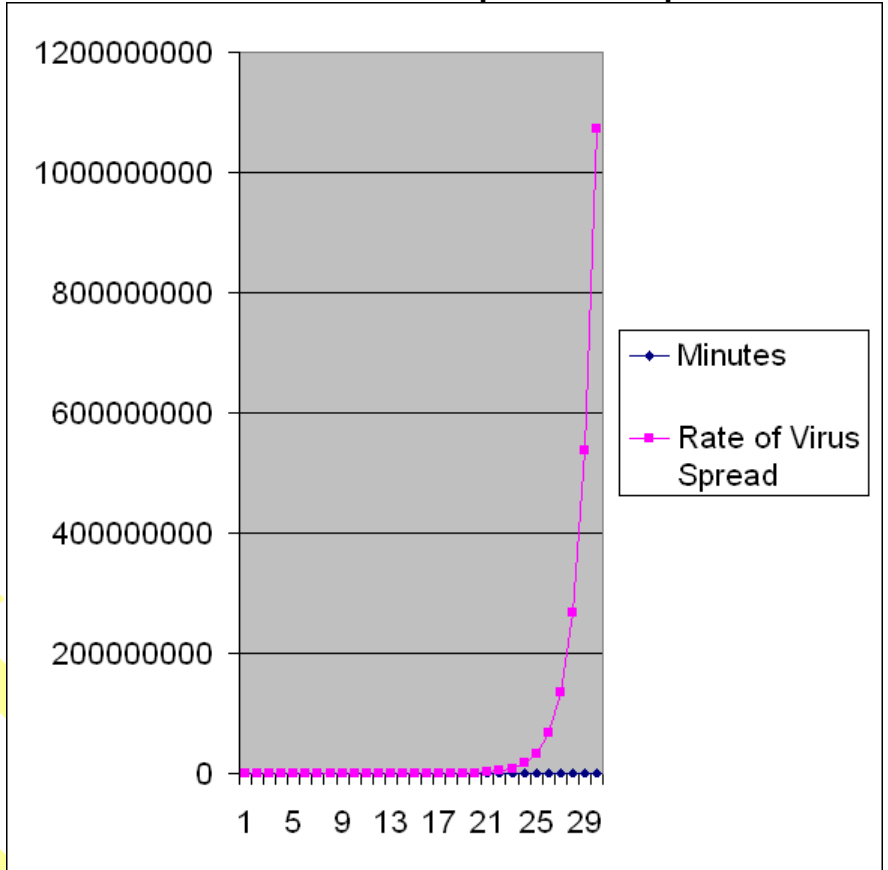
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HANDOUT 1

Example Growth Rate

Minutes	Rate of Virus Spread
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576
21	2097152
22	4194304
23	8388608
24	16777216
25	33554432
26	67108864
27	134217728
28	268435456
29	536870912
30	1073741824

Example Line Graph



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HANDOUT 2

Name _____

Understanding Exponents

<p>Solve the problems below.</p> <p>1) $16^2 = 16 \times 16 =$ _____</p> <p>2) $7^4 =$ _____ $=$ _____</p> <p>3) $22^0 =$ _____ $=$ _____</p> <p>4) $9^1 =$ _____ $=$ _____</p> <p>5) $2^2 =$ _____ $=$ _____</p>	<p>Rewrite each problem in the format that you would use to in a spreadsheet.</p> <p>6) $3 \times 3 \times 3 \times 3 =$ _____</p> <p>7) 16 cubed $=$ _____</p> <p>8) 5 squared $=$ _____</p> <p>9) two to the power of eight $=$ _____</p> <p>10) seven to the third power $=$ _____</p>
<p>Solve each expression with the base of 2.</p> <p>11) $2^0 =$ _____</p> <p>12) $2^1 =$ _____</p> <p>13) $2^2 =$ _____</p> <p>14) $2^3 =$ _____</p> <p>15) $2^4 =$ _____</p>	<p>Solve each expression with the base of 15.</p> <p>16) $15^0 =$ _____</p> <p>17) $15^1 =$ _____</p> <p>18) $15^2 =$ _____</p> <p>19) $15^3 =$ _____</p> <p>20) $15^4 =$ _____</p>

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HANDOUT 3

Name _____

Saving Money to Open a Business

You are saving your money to open a business. Your financial planner wants you to understand how your money grows so he/she has suggested two methods that you can use to save money. The two methods are below.

Method A: Save \$10 a day for 15 days

Method B: Save \$.01 the first day, \$.02 the second day, \$.04 the third day, and your pay doubles every day until the 15th day

- 1) How much will you save with option 1?
- 2) How much with option 2?
- 3) Which option should you choose if you plan on saving your money for a year (365 days)?