**Course 2**

**Unit 1**

**“Toolkit”**

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| --- | --- | --- |
| **Literacy Strategies**  (Check all that apply.) | **Habits of Success**  (Check one per unit.) | **Multiple Intelligence Areas** |
| * Admit/Exit slips * Graphic organizer * Know/Want to Know/Learn chart (KWL) * Open-response questions * Double-entry/Two-column notes * Retelling * Reflection * Jigsaw reading * Anticipation guide * RAFT (Role/Audience/Format/Topic) * Interactive reading guide * Concept definition maps * Frayer model * Visual prediction guide * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | * Create relationships * Teamwork, responsibility, effective communication) * Study, manage time, organize * (Organization, time management, study skills) * Improve reading/writing skills * (Use reading and writing to learn strategies) * Improve mathematics skills * (Estimate, compute, solve, synthesize) * Set goals/plan * (Set goals, plan, monitor progress) * Access resources * (Research, analyze, utilize) * USE OF TECHNOLOGY | * Logical/Mathematical * Spatial * Musical * Bodily—Kinesthetic * Interpersonal * Intrapersonal * Naturalist * Linguistic |

**UNIT Assessments:**

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| --- |
| Pre-Assessment: |
| Daily/Weekly: (Included on daily activities plans) |
| Post-Assessment: |

**Course 2**

**Unit 1 - Toolkit**

State Standards and Benchmarks:

**9-12.A.1.1** Use the special symbols of mathematics correctly and precisely – Vector, theta, transformation subscripts, infinity, interval notation, geometry notation for congruence, parallel, and perpendicular

**9-12.A.1.2** Classify and use equivalent representations of natural, whole, integer, rational, and choose which type of number is appropriate in a given context

**9-12.A.1.8** Solve formulas for specified variables

**9-12.A.1.15** Compare and order polynomial expressions by degree

**9-12.D.2.5** Compare distributions of univariate data using back-to-back stem and leaf plots and parallel box and whisker plots.

**9-12.D.2.8** Describe the shape of a scatter plot

**9-12.D.2.12** Explain why correlation does not imply a cause-and-effect relationship.

**9-12.G.4.5** Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

**9-12.G.4.6** Apply basic trigonometric functions to solve right-triangle problems

**9-12.G.1.1** Understand that numerical values associated with measurements of physical quantities must be assigned units of measurement or dimensions; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert a measurement using one unit of measurement to another unit of measurement.

**9-12.A.2.3** Translate among tabular, symbolic, and graphical representations of functions and relations

**9-12.A.3.1** Model real-world phenomena using linear equations and linear inequalities interpret resulting solutions, and use estimation to detect errors.

**Day 1**

Benchmark: **9-12.A.1.1**  **9-12.A.1.2**  **9-12.A.1.8**  **9-12.A.1.15 9-12.D.2.5**  **9-12.D.2.8**

**9-12.D.2.12 9-12.G.4.5** **9-12.G.4.6 9-12.G.1.1 9-12.A.2.3**  **9-12.A.3.1**

Learning Objective: Students will be able to pass the pre-test with an 80% accuracy rate.

Assessment: Pre-test – need to make

Accommodations:

Tier 2:

Tier 3:

Materials: Pre-test

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| **Strategy** | **Time** | **Activity** |
| Bell work | 3 min | Have students go to the websites below and watch the “tool” song and “fix it right” song in order for the students to understand that this unit consist of the basic tools they need to fix their “mathematical” problems.  <http://www.youtube.com/watch?v=QRFGU8y4iNg&feature=related>  <http://www.youtube.com/watch?v=ZmWZQ4r0Kp0&feature=related> |
| Introduction/Engage | 5 min | Explain to students how we are going to take a pre-test to make sure they have the solid foundation they need in order to complete this course. We are going to review and enjoy some of the basic concepts (“the tools”). |
| Explore/Review | 5 min | Refresh students what whole numbers, integers, natural, and rational numbers are. Briefly review how to solve for specified variables. See if students know what polynomials are and how to express them by degree. Correlation, basic trig. functions , independent/dependent variables. Last but not least, ask the students to refresh your memory of – stem & leaf plots, parallel box & whisker plots, and scatter plots are. |
| Assessment | 25 min | Students will be assessed through the pre-test |
| Closure | 7min | Have students reflect on test and each student will write down the one problem he/she had the most trouble with |

Reflection:

**Day 2**

Benchmark:

**9-12.A.1.1** Use the special symbols of mathematics correctly and precisely – Vector, theta, transformation subscripts, infinity, interval notation, geometry notation for congruence, parallel, and perpendicular

**9-12.A.1.2** Classify and use equivalent representations of natural, whole, integer, rational, and choose which type of number is appropriate in a given context

Learning Objective:

Students will be able to classify numbers (i.e. whole, natural, integer, etc.) as well as use special mathematical symbols correctly in 4 out of 5 problems.

Assessment:

Ticket out the door

Accommodations:

Tier 2:

Tier 3:

Materials:

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Have students pair up and quiz each other on different types of numbers. If students do not remember they can refer to the Venn diagram on the following website.  <http://www.kwiznet.com/p/takeQuiz.php?ChapterID=2377&CurriculumID=40> |
| Introduction | 10 | Introduce some of the special symbols for mathematics and how to use these symbols. Symbols such as vectors, theta, transformation subscripts, infinity, interval notation, geometry notation for congruence, parallel, and perpendicular. This website is a good resource.  <http://www.w3schools.com/tags/ref_symbols.asp> |
| Investigation | 25 | Students will get with a partner and look up the different types of symbols (either in their text books or on the internet) and write out  Name; what the symbol looks like; how the symbol is used; a brief explanation on why they think the symbol looks the way it does; and give an example for each symbol on how to use it |
| Closure | 5 | Ticket out the door – students will show me what they have come up with during their investigation |

Reflection:

**Day 3**

Benchmark:

**9-12.A.1.8** Solve formulas for specified variables

Learning Objective:

Given different formulas for specified variables, students will be able to answer correctly with an 80% accuracy rate.

Assessment:

Exit Pass

Accommodations:

Tier 2:

Tier 3:

Materials:

Note cards

|  |  |  |
| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Have student play the arcade game – solving for a variable (one & two step equations).  <http://www.xpmath.com/forums/arcade.php?do=play&gameid=64> |
| Brainstorm | 5 | Have students brainstorm how they might be able to solve equations if no numbers where involved. What if you had to solve for a variable? |
| Guided Practice | 15 | Teacher can explain the process by their self or they can use resources  Resources for extra guided practice:  <http://www.youtube.com/watch?v=S8VjgMvBERk>  <http://www.purplemath.com/modules/solvelit.htm> |
| Group practice | 15 | Have students get into groups of 3 and have each person pick 4 different problems to work on from the worksheet founded on: <http://www.glencoe.com/sec/math/algebra/algebra1/algebra1_05/study_guide/pdfs/alg1_pssg_G026.pdf> |
| Close | 5 | Exit pass written on note card:  Write 3 mathematical formulas where you have to solve for a specified variables |

Reflection:

**Day 4**

Benchmark:

**9-12.A.1.15** Compare and order polynomial expressions by degree

Learning Objective:

Given a polynomial, each student will be able to put the polynomial in the correct order by degree.

Assessment:

Summary at the close of class

Accommodations:

Tier 2:

Tier 3:

Materials:

Note cards from the day before (the students made up)

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Each student will get a note card (from the day before) and will solve for the specified variable |
| Investigation | 5 | KWL – about polynomials – have students write down, in their journal, what they may or may not know about polynomials |
| Guided Instruction | 20 | The following website has a good explanation of polynomials – but don’t go too far because it will get into Quadratics (which we will cover later in the semester)  <http://people.hofstra.edu/Stefan_waner/realworld/tut_alg_review/framesA_5B.html>  You can print out this website for the students to have in their notes/journal  <http://tutorial.math.lamar.edu/Classes/Alg/Polynomials.aspx> |
| Independent practice | 10 | Students will need to go to the website given, read the entire instructions and answer question one at the end of the page. Students will write out their answers in an ACE (answer, compute, explain) format.  <http://www.mathsisfun.com/algebra/degree-expression.html> |
| Closure | 5 | Summarize the lesson: Students will summarize what they have learn today. Students need to tell me in complete sentences, what today was about, what they liked and didn’t like |

Reflection:

A great interactive website for multiplying, adding, subtracting polynomials is

<http://www.ehow.com/list_6017289_interactive-polynomial-games.html>

**Day 5**

Benchmark:

**9-12.D.2.5** Compare distributions of univariate data using back-to-back stem and leaf plots and parallel box and whisker plots.

**9-12.D.2.8** Describe the shape of a scatterplot

Learning Objective:

Given different sets of data students will be able to make a stem and leaf plot, parallel box, scatterplots, and whisker plots. As well as read this types of graphs and get 4 out of 5 questions right.

Assessment:

The Group presentations at the end of class

Accommodations:

Tier 2:

Tier 3:

Materials:

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | As students enter the room have students go around and get the day (number) they were born for each student in the class. For example if Johnny was born on the 22nd then I would write down 22 on my paper. Once they are done, they need to put them in numerical order. (You can use any other way to gather data if you need more – i.e. height in inches, shoe size, number of people in your family, etc. ) |
| Engage | 10 | Then have the students find the mean, median, and mode of their set of data. Once they have done that, we can start talking about putting this information on different types of charts (i.e. back to back stem and leaf carts, parallel box and whisker plots, and scatter plots). |
| Cooperative Learning | 15 | Students will break up into three groups and each group will put their set of data in one of three different plot we just discussed. One group will do a stem and leaf, one will do a whisker plot, etc. |
| Modeled/Guided instruction | 10 | Once the students are done then each group will get up and present their chart and explain the chart. |
| Closure | 5 | Pros & cons of this lesson |

Reflection:

Interactive websites for plots

<http://www.shodor.org/interactivate/activities/StemAndLeafPlotter/>

<http://www.shodor.org/interactivate/activities/BoxPlot/>

<http://www.shodor.org/interactivate/activities/ScatterPlot/>

**Day 6**

Benchmark:

**9-12.D.2.12** Explain why correlation does not imply a cause-and-effect relationship

Learning Objective:

Students will be able to explain why a correlation does not always have a relationship with cause and effect.

Assessment:

Closure

Accommodations:

Tier 2:

Tier 3:

Materials:

Make your own - Big sheet of grid paper or may be able make one up on your projector/whiteboard

This website helps make grid paper: <http://incompetech.com/graphpaper/lite/>

Sticky dots/sticky notes

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | As students come into class, have students plot (with the sticky dots) their height/weight on the big sheet of grid paper you have in front of the room |
| Introduction/Engage | 10 | The bell work should have created some kind of scatter plot. We can now talk about correlation (pos. neg. no. - strong/weak) Is this the trend? Can we rely on this data to make a true statement that will hold up for every case? Is there a true cause-effect? |
| Discussion | 15 | Discuss how even if there is a strong correlation, one cannot predict an outcome based on this kind of data. If you’re tall, does that mean you have big feet? If you work hard, does that mean you are going to get rich? Etc. Even though scatter plots can show a trend, that trend does not hold true for every situation. There are other factors (“lurking” variables) to consider. |
| Modeled/Guided instruction | 5 | Model another scenario – If you drive a heavy vehicle does that mean you are going to be safe from a crash? Show students graph on the following website.  <http://www.informedforlife.org/demos/FCKeditor/UserFiles/Image/weightCorrelationPerIIHSjpe.jpg> |
| Closure | 10 | Have students come up with their own real life scenario that deals up with - “Correlation does not imply causation” |

Reflection:

**Day 7**

Benchmark:

**9-12.A.1.1**  **9-12.A.1.2**  **9-12.A.1.8**  **9-12.A.1.15 9-12.D.2.5**  **9-12.D.2.8 9-12.D.2.12**

Learning Objective:

Students will be able to pass the quiz with an 80% accuracy rate.

Assessment:

QUIZ – need to make

Accommodations:

Tier 2:

Tier 3:

Materials:

QUIZ

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Have students look over their journal/notes and ask each other questions |
| Independent assessment | 35 | Quiz |
| Closure | 5 | What students struggled with and if we need to cover something further in depth. |

Reflection:

**Day 8**

Benchmark:

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

**9-12.G.4.6** Apply basic trigonometric functions to solve right-triangle problems

Learning Objective:

Students will be able to apply basic trigonometric functions in solving right-triangles

Assessment:

Summary at the close of class

Accommodations:

Tier 2:

Tier 3:

Materials:

Construction paper

Scissors

Protractor (?)

Calculators

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Have student construct and cut out two different right triangles. |
| Introduction/Engage | 5 | Have students read the “History of Trig. Article” to give the students some background into today’s objective. |
| Cooperative Learning | 10 | We can investigate and introduce the three basic trig. Functions (sine, cosine, & tangent). Students can watch video  <http://www.youtube.com/watch?v=zLheqxMrc68&feature=related>  Just learning the ratio right now for this function |
| Discussion | 10 | Discussion on video and where trigonometry is used. Pros and Cons about the video |
| Modeled/Guided instruction | 10 | Have students use their calculators to explore and to get use to finding the buttons of their trig functions. |
| Closure | 5 | Ticket out: have students re-write the three basic trig. Functions and their ratios. |

Reflection:

**Day 9**

Benchmark:

**9-12.G.1.1** Understand that numerical values associated with measurements of physical quantities must be assigned units of measurement or dimensions; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert a measurement using one unit of measurement to another unit of measurement.

Learning Objective:

The student will be able to use a protractor, ruler, & compass efficiently, as well as the students will be able to apply linear functions while doing the experiment.

Assessment:

“Sum of Angles” experiment

Accommodations:

Tier 2:

Tier 3:

Materials:

Straightedge or ruler Calculator

Protractor Scratch Paper

Compass Graph Paper

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Have students get out their compass, protractor, and ruler. Have students draw a perfect circle. Ask students to predict where the 90 degree, 180 degree, 270 degree, and 360 degree points are. ( They will be making their own circular protractor.) |
| Investigation | 5 min | Have students partner up and have them check each other self made circular protractor. See how close each one got |
| Cooperative Learning | 20 min | Students will break up into groups and do experiment 15 “Sum of the Angles” The work sheets are self explanatory of all procedures and material the groups need. |
| Assessment | 10 min | As a group – the experiment has some assessment dealing with collecting data, finding the equations, and interpreting the data. Each group will fill out the assessment (one per group) |
| Closure | 5 | Pros and Cons of Project |

Reflection:

Students may need more time with the experiment?

**Day 10**

Benchmark:

**9-12.A.2.3** Translate among tabular, symbolic, and graphical representations of functions and relations

**9-12.A.3.1** Model real-world phenomena using linear equations and linear inequalities interpret resulting solutions, and use estimation to detect errors.

Learning Objective:

The students will be able to identify the real world independent and dependent variables from today experiment with an 80% accuracy rate.

Assessment:

“Rolling Stock” experiment

Accommodations:

Tier 2:

Tier 3:

Materials:

Marble or small toy car Yardsticks or tape measure

Ramps of varying lengths, 15’’ – 22’’

Blocks, books, or something to raise the ramps Graph Paper

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Have students watch video of other students investigating a ramp with a toy car  <http://www.youtube.com/watch?v=V_C9VsF28Uc>  <http://www.youtube.com/watch?v=5pcpXaRxtTA> |
| Investigation | 5 min | Making Predictions – give a brief explanation of the experiment and ask students what they think. Higher the ramp – further the car goes? What will affect the distance travel? Etc. |
| Cooperative Learning | 20 min | Students will break up into groups and do experiment 6 “Rolling Stock” The work sheets are self explanatory of all procedures and material the groups need. |
| Assessment | 10 min | As a group – the experiment has some assessment dealing with collecting data, finding the equations, and interpreting the data. Each group will fill out the assessment (one per group) |
| Closure | 5 | Pros and Cons of Project |

Reflection:

Students may need more time with the experiment?

**Day 11**

Benchmark:

**9-12.A.2.3** Translate among tabular, symbolic, and graphical representations of functions and relations

**9-12.A.3.1** Model real-world phenomena using linear equations and linear inequalities interpret resulting solutions, and use estimation to detect errors.

Learning Objective:

The students will be able to identify the real world independent and dependent variables from today experiment with an 80% accuracy rate.

Assessment:

“Walking the Plank” experiment

Accommodations:

Tier 2:

Tier 3:

Materials:

Bathroom scale Yardstick or tape measure

Plank or board Graph Paper

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Have students get out their calculators and graph different linear equations with a negative slope. |
| Introduction | 5 min | Take some time to explain what the students are going to do today and see if they can make a connection that this experiment produces a line with a negative slope before they start the experiment. |
| Cooperative Learning | 20 min | Students will break up into groups and do experiment 10 “Walking the Plank” The work sheets are self explanatory of all procedures and material the groups need. |
| Assessment | 10 min | As a group – the experiment has some assessment dealing with collecting data, finding the equations, and interpreting the data. Each group will fill out the assessment (one per group) |
| Closure | 5 | Summarize the days review lesson. On a scale of 1 to 4, how comfortable are you with independent & dependent variables? Show of hands.   1. no idea 2. need some help 3. got it on my own 4. help others |

Reflection:

Students may need more time with the experiment?

A website that also talks about the same experiment:[**http://illuminations.nctm.org/LessonDetail.aspx?id=L682**](http://illuminations.nctm.org/LessonDetail.aspx?id=L682)

**Day 12**

Benchmark:

**9-12.A.1.1**  **9-12.A.1.2**  **9-12.A.1.8**  **9-12.A.1.15 9-12.D.2.5**  **9-12.D.2.8**

**9-12.D.2.12 9-12.G.4.5 9-12.G.4.6 9-12.G.1.1 9-12.A.2.3**  **9-12.A.3.1**

Learning Objective:

Students will be able to pass the post-test with an 80% accuracy rate.

Assessment:

Post Test – need to make

Accommodations:

Tier 2:

Tier 3:

Materials:

Post test

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Quick verbal review |
| Post Test | 40 min | Post Test |

Reflection: