**Differentiation and Assistive Technology for Individual Needs**

Over the next week we will be looking at differentiating instruction for student with special needs. We will be connecting what we learned last semester in SEC210 Diverse Learners with this course. Look at the Differentiation PowerPoint <http://people.uncw.edu/robertsonj/SEC210/DifferentiatedInstructionSEC.ppt> and read the linked handouts below to help you to complete the following activities. You will also need to use your SEC300 textbook and your unit textbook. **All assignments are in bold.** *Examples are in italics.*

1. **Models and Individual Needs**

We discussed using task analysis and graphic organizers. What are some other suggestions our textbook has on meeting individual needs? Please read the “Meeting Individual Needs” of each chapter. **Write one suggestion for each model below that may work for your lesson plan.**

|  |  |
| --- | --- |
| **Model** | **Meeting Individual Needs** |
| Direct Instruction (p 77) | Varying questions (about parent functions) |
| Concept Development or Attainment (p 96 or 115) | Participation rules and the role of the role of competition (about the Pythagorean Theorem) |
| Inquiry (p 143) | Interviews and focus groups (about the intro. to functions) |
| Cooperative Learning (p 275) | Jigsaw puzzles for dilations and translations of functions to create a game |
| Optional (your choice: p 164, 181, 204, 226, or 250) | Consider how words are built, using prefixes, suffixes, and root words (for composition of functions) |

1. **Differentiation**

Please incorporate one type of differentiation for 4/5 of your lessons of your unit plan. You can either describe differentiation you are already doing or add differentiation. **Only describe it for each lesson here, you do not need to resubmit all of your lessons. Afterwards, please add it to your lessons for your unit plan. The Differentiation chart handout gives an explanation of each type of differentiation.** <http://people.uncw.edu/robertsonj/SEC210/Differentiatedstrategieschart.pdf>

Types:

* Tiered Assignments and Products
* Compacting
* Independent Study
* Interest Centers /Groups
* Flexible Grouping (roles in groups)
* Multiple Levels of Questions
* Learning Contracts
* Choice Boards

|  |  |
| --- | --- |
| **Model Lesson Plan** | **Type of Differentiated Instruction with short description. (Only need 4)** |
| Direct Instruction | Independent study- This works well with direct instruction and students will be given time to relearn the information if needed. They can use their independent time to review or further work on the independent practice work. |
| Concept Development or Attainment | Flexible Grouping- Students will be placed into groups that I assign. The students will be placed into the groups based on how well they understand the information needed to do the problems. Those who need more time to learn the concepts will be in a group with each other and those who want to further work on the practice problems will be in a group with each other. |
| Inquiry | Choice Boards- I believe choice boards will work well with an introductory lesson on functions. Students will be given the option to work on learning about functions through an auditory process (listening to a video), a kinesthetic process (making a function on the smart board), or a visual process (watching me make a function), for example. |
| Cooperative Learning | Learning Contracts- Because cooperative learning involves the students working together using the STAD model, learning contracts will work great. The students will be given a set of standards to work towards. For those who need more understanding, their standards will involve a more detailed plan of work. For all students, learning contracts will set up steps for the student to use in order to complete the dilations and translations of function graphs. |
| Choice (model of your choice) | Tiered Assignments- This fits well with Vocabulary Acquisition. The key concept will be focus on the terms for composition of functions. Those students with moderate understanding will look further into the root word to fully understand the concept. Those with more advanced understanding will apply the definition of the vocabulary to practice the composition of functions. |

1. **Accommodations and Modifications: Strategies**

Read one case study below associated with your subject area.

*Math and Science:* Sandra: <http://www.allkindsofminds.org/sandra>

*English and Social Studies:* Lee: [http://www.allkindsofminds.org/Lee](http://www.allkindsofminds.org/Lee%20)

Use the Accommodations and Modification Handout to help you through the process.

<http://people.uncw.edu/robertsonj/SEC210/Accommodations.pdf>

* **What are the student’s Strengths and Affinities? Name 3.**

1. Sandra likes working on the computer
2. Strong memorization skills
3. Sandra is a visual learner

* **What are the student’s concerns? Name 3.**

1. Sandra has trouble with abstract concepts
2. She also has trouble applying concepts to broader situations (making inferences)
3. Sandra has self-esteem issues that stop her from completing work

* **What are 3 interventions you can use to help this student in your subject area? Hint: Use the strengths to help overcome the concerns.**

1. Finding key words in word problems and how to apply them into the formulas she can memorize.
2. Raise her self-esteem and learn to not be discouraged by giving praise.
3. Create concept maps for the harder topics.

Now we are going to identify one strategy to use with your student. Then take the following teacher survey about your case study and fill out the parts you can.

<http://coe.jmu.edu/LearningToolbox/printer/pQuest.pdf>

* Once you have completed the survey, match the concerns to the appropriate strategies.

<http://coe.jmu.edu/LearningToolbox/printer/match.pdf>

* **What is one strategy you would use with the student and why? Please describe it briefly.**

<http://coe.jmu.edu/LearningToolbox/strategies.html>

With Sandra, I would use the FASTDRAW for basic math to help break down word problems that she may find difficult. This strategy breaks down the entire problem, starting with the question, what information you need, and what information you already have.

* **What are the steps to teaching a strategy? List them.**

<http://coe.jmu.edu/LearningToolbox/how.html>

1. Secure the student's commitment to learning the strategies.
2. Identify the specific problems that the student is having.
3. Use the Learning Toolbox Questionnaire in which there are questions related to each of the strategies on the website. We both, student and teacher, fill the questionnaire out.
4. Identify those areas that are most in need of attention.
5. Go to the website and study the strategy that "matches" the area of difficulty identified on the questionnaire.
6. Use advance organizers to explain the purpose of the strategy and review any relevant skills.
7. Model the strategy by first going over each of the steps.
8. Provide guided practice where you assist the student in applying the strategy to the assignments.
9. Continue with guided practice until you feel that the student is ready for independent practice.
10. Have the parents assist in providing independent practice at home.
11. Work toward having the student generalize use of the strategy to other classes.

**4. Informal Reading Inventories**

Can all of your students read the textbook you chose? Read the handout on "Creating Informal Reading Inventories." Then find a one hundred word passage from the textbook you will be using for your teaching if possible. If not, choose any 100 word passage you can find online designed for high school students.

**a) Type out or scan or copy and paste the 100 word passage.**

Since a function is a special kind of relation, the domain of the function is the set of all first elements of the ordered pair of the function. Similarly, the range of the function is the set of all second elements of the ordered pairs of the function. The notation f(a)= b or “f of a equals b” signifies that the value of the function f, at a is equal to b.

The independent variable is the variable that represents the first element of an ordered pair. The domain of the function is the set of all values that the independent variable is allowed to take. The dependent variable is the variable that represents the second variable of an ordered pair. The range of the function is the set of all values that the dependent variable is allowed to take.

<file:///C:/Users/ade5734/Downloads/Chapter09.pdf>

**b) Create 5 comprehension questions for passage you chose. Make sure two questions are factual and two are inferential (inferential - based on interpretation; not directly expressed). The fifth can ask about the meaning of a vocabulary word.**

1. What is a function a special type of?

2. What is the notation of a function?

3. How is an ordered pair composed, using independent and dependent variables?

4. In f(a)=b, is “a” or “b” the independent variable?

5. What is the definition of a “dependent variable”?

**c) If a student read the passage with 7 oral reading mistakes and missed 2 of the 5 questions, what level would you say it was on according to the handout? Why?**

The student would be a borderline Struggling Reader of the Text. Because of the 7 oral reading mistakes, I would say the student cannot fluently read the passage. Also, the student missed 2 of the 5 questions asked, which is not the majority of the questions, but is enough to make me concerned that the student has trouble with comprehension.

**d) In math, science, and social studies, and language arts students also need to learn how to understand graphics, photos, graphs, charts and maps. Write one comprehension question each for any two graphics found in your textbook or online.**

<file:///C:/Users/ade5734/Downloads/Chapter09.pdf>

On page 339: If there was an arrow from 18 to Debbie, what would be the ordered pair created?

On page 342: Using the equation in the chart (-3x+7), what would the ordered pair be if x=2?

1. **Graphic Organizers and Study Guides**
2. **Graphic Organizers:** There are evidenced based organizational accommodations that will help all of your students, but they are especially helpful for students with learning difficulties. These organizational aids include graphic organizers, study guides, and models. Most of you have already used these in one or more of your lessons. Please describe when you have used these techniques in your lessons. If not, where could you put them? You should have two of these organizational aids in your unit.

**Examples:**

**Teachervision:** <http://www.teachervision.fen.com/graphic-organizers/printable/6293.html>

**Freeology:** <http://freeology.com/graphicorgs/>

**DPI also has Graphic organizer examples under Support Tools:** <http://www.dpi.state.nc.us/acre/standards/support-tools>

**Description of Graphic Organizer 1:** A two-column chart will be very useful in my cooperative learning lesson. We will be studying dilations and translations of parent functions. This means that for every translation made, the students will need to know how to change the graph and a clear chart of what to do for each step will help accommodate all students.

**Description of Graphic Organizer 2:** A guided problem solving graphic organizer could be helpful when starting to look at composition of functions. I think this organizer would be harder to incorporate into a lesson, but could benefit students who really need the steps to be laid out in front of them. The organizer will work as a great differentiation method.

1. Study Guides:

There are two types of study guides that are helpful to be familiar with. They are 1) guided notes and 2) visual/graphical models (also known as nonlinguistic models)

1. Guided notes follow the textbook/reading or lecture/presentation. They usually have spaces where the student fills in information. This way they have a study guide, controlled by the teachers, but still have to pay attention to the lecture or chapter to fill it out. Other note taking strategies are better for many students but for complex information or student with poor note taking skills these can actually adapt a high level book into accessible material.

*Example:* [*http://www.interventioncentral.org/sites/default/files/pdfs/pdfs\_interventions/guided\_notes\_example.pdf*](http://www.interventioncentral.org/sites/default/files/pdfs/pdfs_interventions/guided_notes_example.pdf)

1. The Visual /graphical model notes has a math problem or other skill modeled step by step, with annotation explaining what happens at each step. Having a visual or graphical model can greatly increase the student’s ability to remember each step and complete them successfully.

*Example:*

[*http://faculty.mdc.edu/mmontane/quadratic-models.pdf*](http://faculty.mdc.edu/mmontane/quadratic-models.pdf)

**Describe or develop one example study guide (either guided notes or visual model) for one of the lessons for your unit.**

<http://www.sparknotes.com/math/algebra2/functions/problems.html>

This could be used as guided notes or a study guide that the students could work on. During the introduction to functions lesson, we will talk about relations and the study guide focuses on what functions are. They also make the student work out problems about functions instead of just doing mindless work.

**6. Alternative materials**. (answer either A for English, Science or Social Studies or B for Math)

* 1. Math is a different case. Usually, teachers use lower level math books if the content is inappropriate, or switch to consumer math or functional math books which have different content. Another solution for math teachers is to use technology or manipulatives. Some virtual manipulatives are at the National Library of Virtual Manipulatives ( Utah State University): <http://nlvm.usu.edu/en/nav/vlibrary.html>

**- Would virtual manipulatives be useful for you in your unit or teaching your class?**

There are a few virtual manipulatives that could be useful in a unit about functions. Any manipulative that shows translations of functions is helpful, for example the Function Transformations manipulative from the website.

**- What real life items do you think you could use to teach high school mathematics if you were not able to buy manipulatives?**

A great example of a real-world function problem would be dropping a tennis ball from a high point and seeing how fast it dropped. The students would time the ball drop and figure out the height to figure out the function.

**7. Assistive Technology Module**

Go to: <http://iris.peabody.vanderbilt.edu/at/chalcycle.htm>

Go through the Module in order. It is pretty self-explanatory but if you need directions they are at: <http://iris.peabody.vanderbilt.edu/instructors/instructorPOP_module_howto.htm>

I will be grading you on the questions below (altered from the Assessment)

Please answer the questions below. If you have difficulty answering them, go back and review the Perspectives and Resources pages in this module. (5 points total, 1 point each)

1. Name at least three items that could be considered AT and describe how those devices could support a student with a disability in the classroom.

Planners are considered an AT device. Planners can organize a student and keep the students focused on the tasks that need to be completed. Another example is specialized writing tools. Some students may have difficulty writing because of a disability, so certain writing tools will help academic performance. Third, a portable keyboard device could help with definitions of difficult words. This could also come in handy for students without disabilities, such as ESL students who are being integrated into a classroom with only English. A portable keyboard device could prove useful with focusing on writing, instead of the process of actually writing.

1. Explain two reasons why it is necessary to consider AT for students with disabilities.

AT can improve the functional performance of students with disabilities. They can be used for many functions, such as communication and performing academic tasks. Also, AT helps with compensation, meaning students will be able to focus on the completing work instead of the mechanics of doing the hard work. For example, a student may be given a calculator to complete harder multiplication problems that may take up time.

1. Why is it important to consider both AT devices and services?

AT devices can be very beneficial for students with disabilities, but if the student doesn’t know how to use the device, AT services come in handy. If the student does not have training with the device, it cannot be used to its full potential. Also, the device may not be as helpful as a different device, and AT services will be able to tell the student if the device is appropriate for his or her needs.

1. Describe three responsibilities of the Implementation Team.

One responsibility of the Implementation Team is determining classroom implementation. This means deciding which devices to use and when they should be used. Another responsibility is matching the student up with the appropriate training for the AT device. AT services will become vital, because the device will not be beneficial if there is no training or if the student is not comfortable with the device. Last, considering tasks and environments is a responsibility. The student could be in any environment, and the team’s job is to figure out what the student will need to do during any task in any environment. They have to decide if devices will be needed outside of the classroom, around the house, etc.

1. Imagine you are a teacher (let me know your grade and one subject area) and a student in your class has an upcoming IEP meeting. What types of information should you gather ahead of time to contribute to the discussion of the student's AT needs? Name at least four.

For mathematics (grade 9)

* 1. Does your “naked independence” (without AT) really differ from the use of AT?
  2. Is the student making progress with/without the AT?
  3. What are the skills needed to know before using the AT?
  4. Does the student enjoy using the AT?
  5. What are the student’s strengths and weaknesses after using the AT in class/outside of class?

Make sure to look at the Wrap-up. Some of the best information is there J

Other resources:

8. **Accessibility** There are accessibility devices available on every computer. Look at the following and tell me one pro and one con to each tool.

|  |  |  |
| --- | --- | --- |
| **Tool** | **Pros** | **Cons** |
| **Narrator** | Helpful for those who are visually impaired or those with very little writing skills. | The narrator doesn’t read names well and the voice is annoying. |
| **Magnification** | People who are visually impaired use magnification often because it is beneficial. | The screen will take longer to read, especially if there is a lot of magnification. |
| **On Screen Keyboard** | The on screen keyboard would be very helpful for those with very limited mobility. | The keyboard could be covering up part of the computer screen that you need to see. Also this process is time consuming since you only have one finger to type with. |
| **Mouse changes**  **Keyboard changes**  **Screen changes** | Screen changes, like inverting the colors, could be beneficial for those who are visually impaired. Also, you can make the mouse bigger which will be easier to see. | The mouse keys are very slow. I also find the screen changes, like the inverted colors, very difficult to see and they might cause more problems for visually impaired students. |

**Assistive Technology** One of the most common computer AT for mild disabilities is Dragon (or speech to text. Try to write an entire paragraph using Dragon. **How successful were you?**

The text was, for the most part, accurate. There were some words that the technology didn’t recognize, but for the most part, it was very helpful.

**Software** Try out the other games and assistive tools on the IPAD with you partner. **Did you find any that you think would be useful in class?**

The games and the assistive technology on the iPad seemed to be geared towards younger children, but I suppose that for students who are behind in grade level, these games could be beneficial. For example, there was a math quiz game that went over basic math operations. To me, they seemed very easy and something to keep me on top of my mental math. But, I know from my experience tutoring the Foundations of Mathematics class at Hoggard High School, most of the students in that 9th grade class could very much benefit from relearning the operational skills.

**Case Studies** Do you have any suggestions for devices the people in these case studies could use?

Online Catalog of AT devices: <http://www.enablemart.com/>

UNCW Assistive Technology Center <http://www.uncw.edu/ed/assist/>

Case study examples:

<http://www.pacer.org/c3/curriculum/session4/handouts/Assistive%20Technology%20Case%20Studies%20Worksheet.pdf>

For student #1, a handheld dictionary would help him figure out what the more difficult words mean. Also, if his handwriting is what is making it difficult for him to communicate by, he could use a typed note system instead of a hand written note. Not only will the writing be neater, but the process will create efficiency, especially if he uses talk-to-text applications.

For student #2, the already programmed accessories on any computer will be very helpful. The magnification will expand small type and make anything easier to read. The onscreen keyboard will help her with her limited use of her upper extremities. She will be able to type and read larger prints all on the computer monitor.

For students #3, the Microsoft Narrator will read aloud anything that is typed through a Microsoft product. She will be able to type what she would like to say, and the computer will say what she is not able to say.

Finally, for student #4, the talk-to-text will prove helpful for him while he fills out applications. Also, ActiveWords could be beneficial for this student. It creates an active word, that whenever typed becomes a shortcut to a longer piece of text. For example, if he typed “resume”, his complete resume would show up automatically.

**Grading Total points- 10**

5 points possible for Questions 1-6 complete. Deduct 1 point for each item missing. Partial credit is given. We will try to complete much of this in class.

5 points possible for Questions 7-8 complete. Deduct 1 point for each item missing. Partial credit is given. We will try to complete much of this in class.

**Coming soon . . .** Why are we doing all this? Effective teaching for learners with special needs also is effective teaching! See what strategies have evidence of effectiveness for teaching. We will be discussing these two articles when we work on our unit plans:

<http://www.netc.org/focus/>

Read on each of the effective practices:

1. [**Thematic Instruction**](http://www.netc.org/focus/strategies/them.php)
2. [**Identifying Similarities and Differences**](http://www.netc.org/focus/strategies/iden.php)
3. [**Summarizing and Note Taking**](http://www.netc.org/focus/strategies/summ.php)
4. [**Reinforcing Effort**](http://www.netc.org/focus/strategies/rein.php)
5. [**Homework and Practice**](http://www.netc.org/focus/strategies/home.php)
6. [**Nonlinguistic Representation**](http://www.netc.org/focus/strategies/nonl.php)
7. [**Cooperative Grouping**](http://www.netc.org/focus/strategies/coop.php)
8. [**Setting Objectives**](http://www.netc.org/focus/strategies/sett.php)
9. [**Providing Feedback**](http://www.netc.org/focus/strategies/prov.php)
10. [**Generating and Testing Hypotheses**](http://www.netc.org/focus/strategies/gene.php)
11. [**Simulations and Games**](http://www.netc.org/focus/strategies/simu.php)
12. [**Cues, Questions, and Advance Organizers**](http://www.netc.org/focus/strategies/cues.php)

And some research specific to mathematics.

<http://www.nctm.org/uploadedFiles/Research_News_and_Advocacy/Research/Clips_and_Briefs/Research_brief_02_-_Effective_Strategies.pdf>