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My Family and Me: Our Similarities and Differences

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ABSTRACT

MY FAMILY AND ME is a Genetics science unit that will answer the questions “Where did I come from?” and “How am I the same and different from my family and friends?”. In addition, this unit will reaffirm each child’s uniqueness by demonstrating that each child is special and one of a kind. This unit is intended for low functioning students with special needs, however, early primary teachers may find this information appropriate for their students. MY FAMILY AND ME is an integrated curriculum unit with hands-on lessons that span several subject areas: art, math, whole language, and science. This unit reinforces positive self-esteem and includes avenues for parental involvement.

MY FAMILY AND ME will include a section containing basic genetics information to enable the teacher to prepare and carry out the lesson plans. Sample lesson plans will be included to assist the teacher in the preparation of this unit. In addition, a reference list of appropriate children and adult level books will be included as part of this unit.

INTRODUCTION

I teach a special needs class for students with severe mental retardation. The ages of these students range between thirteen and twenty-one years. My students have limited expressive language. They use repetitive language, one word responses and/or simple phrases or sentences of a concrete nature. Some of my students are able to communicate a choice by pointing to the object or colored picture. My students’ use of receptive language is also limited. Most of my students are able to follow simple one-step directions with few verbal prompts using controlled language. A small number of students have learned to follow two to three step directions with verbal and visual prompts. Therefore, I use simple, concrete language consistently during instruction. My class responds best to simple, concrete, and manipulative activities that are repetitive in nature. In addition, the use of multi-media equipment such as computers, television, and tape recorders seem to generate a heightened excitement and increased attention to an activity.

Teaching and developing concrete lessons from content areas is challenging. Science, I have found, is an

excellent field from which to develop appropriate units of instruction for my class. All of science seems to incorporate a foundation from which to build future knowledge. This foundation is often simple, concrete, and able to be taught through observation and experimentation. Therefore, I believe the field of Genetics supports my premise.

Often, when one thinks of Genetics, one envisions complex theorems, microscopic materials, and space age discoveries such as cloning. On the surface, Genetics would not appear to be a subject appropriate for students with severe mental retardation. However, when one looks at the foundation of Genetics as information to explain similarities and differences between individuals, one can begin to develop a unit of study appropriate for students with extensive special needs.

As I began to plan my unit on Genetics, I looked to capitalize on my students' strengths and interests. They have learned to sort objects and pictures by a single characteristic. They enjoy using their hands to create words of art or assist with scientific experiments. In addition, they respond best to repetition and varied learning experiences that tap into different learning styles (ie. auditory, visual, and kinesthetic). Therefore, I choose to develop an across the curriculum unit that integrates lessons from math, science, language, literature, and art. Experiencing the unit through varied curriculum areas ensures the student's increased exposure to information. These lessons will include hands-on manipulatives, learning centers, and the use of multi-media technology.

An added advantage to developing a Genetics curriculum is the opportunity review basic readiness skills. Due to the severe developmental delays of my students, progress is painfully slow and requires over-learning skills to an excessive degree. While the repetition of lessons is often necessary, it can become tedious. However, when I reteach basic skills using thematic units, these same skills become fresh and exciting again. This excitement encourages and challenges my students to explore and create meaning in their world.

GOALS AND OBJECTIVES

My curriculum supports basic, concrete goals and objectives

in the area of Genetics. These goal

s and objectives revolve around basic decision-making between simple, concrete choices. Other lessons are based on the concept of learning through experiences. I believe that children learn through exposure to various learning experiences. Children will draw as much meaning as they are able from these varied opportunities for learning.

A) Students will learn the basic concepts of heredity across the curriculum.

1. Given a choice between a picture of a living and nonliving object, students will choose the living object.

2. Given two objects, students will verbalize or point to the similarities or differences.

3. Given a group of objects, students will sort them by one specific trait.

B) Students will expand their scientific vocabulary.

1. Students will be exposed to the usage of basic vocabulary in genetics. (same, different, cell,

trait, gene, chromosome, DNA, dominant, recessive, and inherit)

C) Students will participate in activities to build self-esteem.

D) Students will develop a scientific connection between themselves and their families.

1. With assistance, students will develop a family tree.

2. Students will identify and name their immediate family members.

E) Students will develop a general understanding of reproduction and off-spring.

1. Students will name living things/animals.

2. Given a selection of various parents and off-spring, students will match the parents with the appropriate baby. (ie. Mommy-baby, cat-kitten, dog-puppy, hen-chick, frog-tadpole, etc.)

VOCABULARY

Language is a vital tool used in the teaching of this Genetics science unit. When I am teaching, I am very selective in the language I use. I choose very concrete, simple vocabulary to enhance my lessons. I also repeat language consistently so that my students will increase their comprehension of spoken language. For the purposes of this Genetics unit, I have chosen the following key vocabulary words to be taught and used throughout the thematic unit. I have included definitions and possible methods for teaching the meanings or concepts represented by the vocabulary.

The vocabulary words SAME and DIFFERENT are used often in my classroom mathematical readiness lessons. I use various manipulatives to demonstrate how objects are the same and different. I may use color bears to illustrate that the bears can be grouped according to the same colors. During morning circle, I show how students are the same or different by using articles of clothing. For example, I may have students wearing sneakers stand up. Students are encouraged to observe their own clothing and decide if they meet the criteria for standing. These words are useful in Genetics, when we begin sorting by genetic traits.

TRAITS are the characteristics we observe that make us similar or different from each other. For example, hair and eye color are observable traits that students can comprehend. The students will take part in graphing activities to illustrate the number of individuals in their class with the specific traits being observed. Graphing

is an excellent tool for organizing information in a manner that students with special needs can understand. Graphing is highly visual and can be used in a concrete manner. When graphing eye color, the teacher can use pictures of eyes placed in the appropriate columns to visually illustrate the objective being taught.

CELLS are like seeds that increase in number to form various life forms. While cells are microscopic, comparing them to seeds provides a visual representation that students are able to comprehend. The information needed to create a life form is locked within the cell or seed.

GENES tell the cells what to do. They direct the cells to perform various tasks within the body. Genes are like managers that tell the different cells what jobs or work that they have to complete, This is a relevant analogy for my students as they are all involved with job training and work experience programs. They understand that managers direct the workers to do different tasks.

CHROMOSOMES are found inside the cells. Chromosomes are like file cabinets which store information. The information that chromosomes store is called DNA. The DNA is a map of the human body. The word map will stump my students. To illustrate the meaning of map, students will take part in a treasure hunt. They will follow a map and discover the prize at the end of their journey. My students will also participate in a second activity to continue to develop meaning for the word map. As a class, we will create a map of our classroom that illustrates the placement of windows, doors, and furniture, Then we will draw connections between a map and DNA. As with a map, DNA partially determines what a person will look like.

A person carries chromosomes that he or she INHERITS from his or her parents. Children inherit or receive genetic information from their parents. Children receive 23 chromosomes from each parent for a total of 46 chromosomes. Therefore, double information may exist. For example, a child may have a gene for blue eyes and a gene for brown eyes. Genes can be sorted into two categories: DOMINANT or strong genes and RECESSIVE or weak genes. This concept of strong and weak will be illustrated with a cooking lesson. The students will have a bowl of chocolate cake batter and a bowl of vanilla cake batter. The students will combine the two batters and witness the chocolate batter taking over the vanilla batter. The students will see the chocolate batter as the stronger or DOMINANT batter.

Science vocabulary is important to the thematic unit and should be taught slowly, concretely, and consistently throughout the lessons in the unit. Through constant repetition and varied learning experiences, students will develop their own language framework for comprehending subsequent unit lessons within various curriculum areas.

DESCRIPTION OF UNIT

I plan to launch this unit with a viewing of *Barney's Families Are Special* video which is available in most department or video rental stores. This viewing would lead to a general discussion of where we came from and our similarities and differences. For example, one could discuss how a mommy and a daddy make a baby which grows inside mommy's abdomen. When the baby is born, it lives with a family. While every family unit is different, each is special. This type of introduction may alleviate some of the awkwardness teachers and students may feel with non-traditional family structures. Students will understand that all children have two biological parents, however, both parents may not live in the same household.

In addition, each person in the family is special and unique. Barney's video reinforces this concept through lively song, dance, and skits. A particular educational skit revolves around parents bringing home twins from the hospital. The audience learns that identical twins develop from the same cell and therefore have the same DNA. However, each twin is still unique because he or she has his or her own personality. I will reinforce the concept of uniqueness and individuality with the reading of *All The Colors Of The Earth* by Sheila Hamanaka. Her inspiring text and artwork exposes the richness of our diversity.

Next, I will continue my unit with another literary selection. We will read *Me And My Family Tree*, a children's book which provides a good introduction to heredity. The students will learn about family trees and the connections between family members. They will see how certain traits are inherited from ancestors. As a class activity, the students will create their own family trees with the assistance of their families. This project will provide a wonderful opportunity for parents to involve themselves in their son or daughter's education.

Before engaging in this activity, I will contact all of my classroom parents to gather the information that they would like to see in these projects. Then, I will plan a parent/child activity. The parents will bring in photographs of their child and other family members. Then we will comment on our similarities and differences between family members. Also, we will reassure each child that he or she is an important part of his or her family. In addition, each child will learn how he or she is a unique individual to this world. I hope that my classroom parents enjoy their time with their children and feel that they have made an important contribution to their child's education.

Another important piece of literature to introduce genetics is *Grandfather's Nose: Why We Look Alike or Different*. This children's book explains how different combinations of genes given to us by our parents create our unique individuality. This book is especially good for reviewing basic genetic vocabulary. After reading this book, we will have a discussion on the information we learned from our parent activity. This is especially useful for tapping the students' prior knowledge. They will need to remember and express the information from their family tree.

I find that it is extremely important to review information in a variety of ways. Also, I have had success with repeating the same lessons or reading the same books. When presented with a familiar activity, the students are free to recognize points that they may have missed the first time the information was presented to them. Therefore, when planning my weekly lessons, I combine lessons I intend to repeat with new lessons.

This unit's primary science lessons will reinforce the concept of same and different. An analogy will be drawn between the single cell formed at conception and a flower seed. The end products are very different from the beginning cell or seed. In addition, many cells or seeds of the same species can develop differing end-products. For example, one can plant many marigold seeds. The resulting marigold flowers can have different characteristics. Some will have large flowers while others will have small flowers. Some will be tall and others will be short. In addition, the flowers will represent a variety of colors. While all of the flowers are different, they all are beautiful and belong to the marigold family. Parallels can be drawn to the children and their families. There are similarities and differences among family members but all are beautiful and play an important part in the family.

The concept of same and different can be reinforced within the area of mathematical readiness. I will begin by using Attribute Blocks by MacMillan Early Skills Manipulatives. The students will begin to sort objects by a single attribute. Once the students have become successful with sorting objects by a single trait, I will increase the difficulty of the lesson to include more traits. I will give the students blocks for two to three attributes in a single pile without naming the attributes. I will then instruct the students to make piles of things

that are the same. Then, I will have the students verbalize or point to the similarities and differences. In this way, I will build cognition by having the students decide what the attribute blocks have in common and how they are different.

After the students are familiar with traits and how to group things together according to their attributes, I will show how the class can be grouped according to specific traits such as hair color, hair type, eye color, eye glasses, skin color, and gender. I will make a large graph on the board with separate pictures or markers representing each child and the specific trait being used. (I have found column graphs with pictures to be the most successful.) Then each child will place their marker or photograph in the appropriate category. The class will count the number of students in each category and decide which group has more students. This is an activity that should be repeated a number of times. It is great for visual kinesthetic learning and is often a lot of fun for the students.

The arts can also reinforce the concept of same and different. Our first art project will be full-size self-portraits illustrating the traits discussed in previous math classes. The students will paint them and hang them around the classroom. This will provide wonderful material for a discussion of how we are the same and how we are different. For example we can observe that everyone in our class has hair, however everyone's hair is different. Some have straight hair and some have curly hair. Some have dark hair and some have light colored hair. This activity will reinforce the concept of individual uniqueness and build self-esteem.

Another art activity to reinforce similarities and differences will be fingerprint art. The students will observe that everyone has fingerprints, however, no one has the same fingerprints. In addition, each art paper would be different and a reflection of the student who created the art.

GENETICS INFORMATION

The following genetics information is presented in a manner in which it may be taught to students with special needs. Because of the students' special circumstances, the information must be presented in a simple and concise fashion.

Our bodies are made up of cells that are too small for us to see without the help of a microscope. These cells are directed by genes. Genes are recipes for making proteins. These proteins make up cells that have different jobs. Some make different organs in the body; some influence the five senses; and some create skin and hair color (Balkwill, 1993).

Chromosomes are found inside the center of the cells. The chromosomes are made up of DNA. The DNA is a map of how the body will look. Everyone has a different mixture of genes, therefore, each person is formed differently (Balkwill, 1992).

Mommy and Daddy make a baby. Each parent contributes or gives half of the map that creates the baby. No two maps are the same, even if they have more than one child in the family. Therefore, no two babies are exactly the same except for identical twins. However, even identical twins grow up feeling and thinking differently from each other. They are still unique and special individuals (Balkwill, 1992).

We can demonstrate our differences and uniqueness by looking at our photographs and by taking our fingerprints. The teacher can also reinforce positive self-esteem by discussing our strengths during class.

meetings or morning circle. The class can discuss how everyone is special with his or her own special talents. For example, one child may be a great line leader, another child may complete puzzles easily, while another child may share very nicely. Anything in life that my students do well should be praised and reinforced so that they feel good about themselves.

LEVEL OF DIFFICULTY

MY FAMILY AND ME is a science thematic unit designed specifically for students with severe mental retardation. However, this unit can easily adapt to early primary age students. Teachers can increase the level of difficulty by increasing the amount of genetics information being presented to the students. I feel that my methodology is appropriate for all students. Every student

learns best through varied educational experiences. Young children and students with special needs respond best to hands-on manipulative activities that are both educational and exciting. As a result, this unit is designed to give students with special needs many opportunities for exploration in science.

ASSESSMENT

Due to the serious developmental delays experienced by my students, traditional assessment procedures are not appropriate. I do not use teacher-generated written tests, research reports, or letter-grade systems. Rather, I use cooperative learning techniques that revolve around manipulatives and class projects. Through observation and monitoring student participation, I can determine the student's level of understanding. By reteaching concepts using varied learning experiences, I can provide more opportunities for students to acquire knowledge. Often, it is difficult to ascertain the extent of a student's understanding due to expressive and receptive language processing problems. However, as long as a child participates in class to the best of his or her ability, I feel that the student has met the requirements of the class and is able to "pass".

An interesting form of assessment could take the form of a school science fair. The students could work on a culminating class project that would reflect on the genetics theme. This could broaden into a school-wide science fair that included other classroom sciences units. This would provide another opportunity for parents to meet together and observe the progress being made by their students in the field of science. A science fair would generate increased excitement with science and encourage active student and teacher involvement in order to be successful.

CONCLUSION

MY FAMILY AND ME is a genetics unit appropriate for students with special needs. It is a language based, concrete, manipulative unit that spans the curriculum. It is an exploration of the concepts of heredity and similarities and differences, which is meant to be fun and educational. This unit includes a section of classroom lessons that can be used with primary age children and students with special needs. It also includes

an annotated bibliography of children's literature that would work well with this unit. Some of the children's books may only be found in libraries, so planning a few weeks in advance may be necessary to ensure the availability of the books for classroom use.

LESSON PLAN #1 (LANGUAGE)

OBJECTIVE To attach meaning to the vocabulary words: Dominant and Recessive through language experience.

MATERIALS bowl of chocolate batter

bowl of vanilla batter

picture of mother with brown eyes

picture of father with blue eyes

two pictures of a blue eye

four pictures of brown eyes

empty bowl

picture of baby with brown eyes

PROCEDURE

1. Teacher will present class with pictures of 2 parents: a brown eyed mother and a blue eyed father.
2. Teacher will present two bowls of batter; one chocolate and the other vanilla. The teacher will explain that the chocolate batter represents brown eyes and the vanilla batter represents blue eyes. Pictures of the eyes can be taped to the corresponding bowls.
3. Each parent will contribute an eye gene shaped like an eye into a third bowl.
4. Teacher will combine the two cake batters with student help. Each child can take turns mixing the batter.
5. Children will witness the 2 batters become chocolate batter.
6. Teacher will take a baby with brown eyes out of the third mixing bowl.
7. Teacher will explain that brown eyes are dominant or strong and blue eyes are recessive or weak. Therefore, the baby developed brown eyes even though the father gave him or her a blue eye gene.

LESSON PLAN #2 (ART)

OBJECTIVE *Students will enhance their self-esteem by creating self-portraits. Students will use self-portraits to point out their similarities and their differences.*

MATERIALS *large rolls of paper*

pencils

crayons

paint

PROCEDURE

1. Teacher will trace the students' bodies on the large rolls of paper.
2. Teacher will then draw in specific details with the help of the students. For example, hair type, eye color, glasses, etc will be added to the pictures as necessary.
3. Students will color or paint their self-portraits as accurately as is possible. For examples, those wearing blue jeans will color their jeans with a blue crayon or use blue paint.
4. Teacher will hang the portraits around the room to stimulate classroom discussion.
5. Teacher will lead a group discussion about the similarities and differences among the students.
6. Teacher will use the following sample questions:
 - Who is wearing _____?
 - Who has brown hair (eyes, etc)?
 - Who wears glasses?
 - Who has legs (arms etc.)?
 - Who has sneakers?

LESSON PLAN #3 (MATHEMATICS)

OBJECTIVE *Using a graph with columns, students will sort themselves by their hair color.*

MATERIALS *pictures of various hair colors (black, brown, red, blond) a large graph with columns for each hair color*

photographs of each student in the class

PROCEDURE

1. Teacher will discuss hair color showing the various pictures of hair to the students.
2. Teacher will discuss each student's hair color with that particular student.
3. Teacher will present a large graph with columns illustrating brown, black, blond, and red hair colors.
4. Students will have pictures of themselves and take turns placing them in the appropriate columns.
5. Students will count the number of people in each column.
6. Students will describe the results using the vocabulary words more and less.

Please note that this lesson format can be repeated using other attributes such as hair type, eye color, skin color, eye glasses, and gender.

REFERENCES

I. CHILDREN'S LITERATURE

Aliki. *Corn Is Maize*. New York: Harper Trophy, 1976.

Provides step-by-step information on growing corn from seed. Includes a history of the use of corn.

Balkwill, Dr. Fran. *DNA Is Here To Stay*. Minneapolis: Carolrhoda Books, Inc. 1992. (1-800-328-4929)

An excellent children's reference that introduces chromosomes, genetic code, and DNA in a concise, easy to understand format.

Balkwill, Dr. Fran. *Amazing Schemes Within Your Genes*. Minneapolis: Carolrhoda Books, Inc. 1993. (1-800-328-4929)

An excellent children's reference that explains our uniqueness. Explains how genetics and DNA create individuals.

Ehlert, Lois. *Growing Vegetable Soup*. New York: Scholastic, Inc. 1987.

Simple text describing gardening.

Hamanaka, Sheila. *All The Colors of The Earth*. New York: Morrow Junior Books, 1994.

A multi-cultural celebration of diversity enriched by text and illustrations.

Herskowitz, Joel. *Double Talking Helix Blues*. New York: Cold Spring Harbor Laboratory Press, 1993 (1-800-843-4388)

Teaches basic genetics information through rhyme and song. Tape included.

Kraus, Robert. *Leo The Late Bloomer*. New York: Windmill Books, 1971.

An upbeat children's story that reaffirms each child's individuality.

Patent, Dorothy Hinshaw. *Grandfather's Nose: Why We Look Alike or Different*. New York: Franklin Watts, 1989.

Introduction to basic genetics. The genes passed on to us from our parents determines our uniqueness. Reviews basic genetics vocabulary. Includes a glossary.

Showers, Paul. *Me And My Family Tree*. New York: Thomas Y. Crowell, 1978.

An introduction to heredity. Explains family trees and how traits are inherited from ancestors.

Titherington, Jeanne. *Pumpkin, Pumpkin*. New York: Scholastic, Inc. 1986.

Simple text describing the growth of a pumpkin from seed.

II. INTERMEDIATE LEVEL BOOKS

Bornstein, Sandy. *What Makes You What You Are: A First Look At Genetics*. New York: Julian Messner, 1989.

An explanation of how traits are passed on to the next generation through DNA. Includes simple experiments.

Edelson, Edward. *Genetics and Heredity*. New York: Chelsea House Publ. 1990.

An explanation of DNA and contemporary genetics research with future implications.

Gutnik, Martin J. *Genetics: Projects For Young Scientists*. New York: Franklin Watts, 1985.

Discusses how to identify and organize a science project with guidelines for displaying results.

Morrison, Velma Ford. *There's Only One You: The Story Of Heredity*. New York: Julian Messner, 1978.

Heredity makes all living creatures unique.

III. ADULT LEVEL

American Journal Of Ethics and Medicine. Spring 1996.

Various articles about genetics.

Gardner, Eldon J. *Human Heredity*. New York: John Wiley & Sons. 1983.

Detailed explanation of genetics.

Jackson, John F. *Genetics and You*. Totowa NJ: Humana Press, Inc. 1996.

Current reference on genetics. Easy to understand format.

Lewin, Benjamin. *Genes IV*. New York: Oxford Univ. Press. 1990.

Detailed explanation of genetics.

Tamarin, Robert. *Principles of Genetics*. New York: William C. Brown Publ. 1991.

Detailed explanation of genetics.

IV. POSSIBLE CHILDREN'S TEXTBOOK

Hooper, Tony. *Breakthrough Genetics*. Austin: Raintree Steck-Vaughn Publ. 1994.

Student Genetics textbook. Excellent for students with special needs.

V. VIDEO TAPE

Barney's Families Are Special

Available in most department and rental stores.

VI. MANIPULATIVES

Are available from *MacMillan Early Skills Manipulatives*

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