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Who am I and Why?

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We live in a time of changes which are affecting the very core of family life. One grand scale project which exemplifies these changes is the Human Genome Project; a world-wide multi-million dollar undertaking that is attempting to analyze the human genetic heritage in its ultimate molecular detail. The project, which began five and a half years ago, has outstripped many expectations by uncovering the code of human existence.

Leaders of the project have known from the beginning that unlocking the code of human genetics could be harmful as well as useful. While many of us are insured for health coverage in health plans that are part of a benefits package connected with our employment, and may never know the mystical code that defines our existence, our children risk living in a world whose insurance companies and prospective employers will accept or reject them based on something that was inherited by chance.

This world of genetic research and application that 21st century adults will encounter needs to be opened up to them now as children, so that it will be less of an unknown in adulthood. While it is not possible to expect young children to completely understand the science of human genetics, or to grasp the large-scale repercussions of the human genome project, it is helpful; even important, that children begin to learn the key terminology and acquire a basic understanding that our physical characteristics and overall health are the result of a biology that is predetermined by our parentage. In addition to this “genetic pool” that creates our physiology, we are who we are as a result of a whole host of other factors which are shaped by our environment and individual life experiences. By learning some basic concepts in the area of genetics and doing a series of experiments, or explorations that illustrate these concepts, young children will begin to make comparisons about themselves and others which will be real and meaningful.

This unit is intended for a third grade group of children but can be adapted up or down to fit the needs of a wider population. *Who am I and Why?* should take about three to four weeks to complete. The lessons on simple genetics are taught concurrently with lessons on character development for the purpose of defining the physical, unchangeable self and then seeing the self as a vital, worthy, important being. These lessons on character development will also serve to help children nurture and practice the “moldable self,” that part which can be guided and controlled. For social development activities to be meaningful they need to be infused into the everyday mechanism of the classroom. When character building lessons are taught in isolation from the rest of the curriculum, their meaning becomes lost, because there is no framework for application of the ideas taught. Character building and personality awareness activities that are an integrated piece of the total daily curriculum have a much better chance of being remembered and applied, because

they have been practiced and modeled in a context that reinforces both curriculum areas.

There are two reasons for teaching a unit in genetics with social development. First, children today, especially in urban settings, are exposed to many forces which foster poor self-control, negative self-concept, and disregard for others. These forces, or factors, include weak home lives, the influence of television, or the influences of other, older peers who are setting poor role-model examples. Secondly, children in this age group are at a pivotol developmental point. At this juncture they are building a foundation for social behavior which will be very difficult to change later on in their development.

As the children become more proficient in understanding the concepts that involve genetics, they will begin to look around them and make reasonable assumptions about themselves and their peers. But more importantly, these children will have learning opportunities to identify characteristics about each other that cannot be assumed, such as personal likes and dislikes.

Finally, to engage the children, make the experiences more meaningful, and to provide a springboard for discussion, a selection of juvenile literature will be used to spark interest, generate ideas, and illustrate concepts.

What is genetics?

The main objectives for the following activities are:

-Every living thing around us is made up of cells, which are very small and can only be seen through a microscope.
-Within cells are units called genes, and these genes determine the physical characteristics of all living things.
-Characteristics, or traits, of living things are passed on from parents to offspring according to the laws of genetics.
-Each trait has its own genes.
-All living things resemble their parents, but each individual has certain characteristics.
-Heredity is the passing on of traits from an organism to its offspring.

KEY VOCABULARY: gene, genetics, trait, cell, heredity, characteristics

ACTIVITIES

1-A Seed is a Promise by Claire Merrill. Used as a unit opener, this story compares a seed to a promise because there is the promise of a new plant contained within every seed.
2-Lima been dissection activity. Students will disect a lima bean seed and observe the new life within.
3-“Stack the Deck,” an activity played with index cards that helps learners to discriminate between a physical characteristic and a learned behavior.
4-“Same or Different?”, and activity that used photographs of plants and animals to see likenesses and differences in species.
5-“Cold Weather Combo”, and activity that uses hats, scarves, and gloves to illustrate the many ways a few items can be combined to produce different results.

Activities

A Seed is a Promise

This story by Claire Merrill is a non-fiction informational selection that compares a seed to a promise because there is the promise of a new plant contained within every seed. Using text and illustrations, the story explains how seeds form, how they grow, and what conditions are necessary in order for them to keep their promise.

Read the story with the class. Make a classroom chart that lists all the different seeds named in the story and what they produce after they grow and mature.

Make a list of all the conditions that need to be in place for a seed to grow into a healthy adult plant. Contrast these factors with all and many things which can go wrong, such as the inability for a seed to land in healthy soil, or a seed being eated by squirrels.

Begin to talk about the promise of a healthy, educated, happy adult that each child will someday become. What plans do any of the children have for themselves in terms of their lifestyles or careers? Explain that these desires are like seeds that are growing, being fed by everything they do now as children. What factors are feeding and preparing the students right now? How does school help? How does rest and healthy eating help? How does the way they treat each other prepare them for their future as adults?

Make a “Promise in a Seed” bulletin board. Make some colorful flowers, a bright background, and indicate a soil line. Below each flower (or fruit), display a seed from which it is growing. On each seed write the name of

the adult plant in the following form:

“This seed holds the promise of a (fill in name of plant).

On additional plants interspersed between these, make some more flowers, one for each student. In the middle of each flower head put a drawing or photograph of the student. On the seed from which the flower grows, have each student write their personal promise. Responses might include:

“This seed holds the promise of a computer scientist.”

“This seed holds the promise of a teacher.”

“This seed holds the promise of a track star.”

“This seed holds the promise of a very kind friend.”

“This seed holds the promise of a great reader.”

Be sure to talk about values, especially that people should always be held in high esteem when they display an honest character. Career choice and intelligence are secondary to behavior both in childhood and adulthood.

Stack the Deck

Teacher dialogue
“Do you have a cat, or do you have a friend who has a cat? You probably know that there are many different kinds of cats. Some cats have long, soft hair and fluffy tails. Others have short, curly hair and skinny tails. There is even one kind of cat that seems to have no hair at all! Even though cats can have many different kinds of variations, you have no problem knowing that they are cats. Why is this so? What makes one cat different from another cat, and yet still recognizable as a member of the cat family? The answer is found in the study of the science of genetics.

The study explains why one cat is different from all other cats and also why a cat is different from a person or a tree. All living things, including cats, resemble their parents. But each person has unique characteristics that make it different from every other living thing on earth. In our study and experiments with the study of genetics, you will hear a fascinating story of mystery and discovery. You will learn a lot about who you are, because of who your parents are, and more importantly, who you choose to become.”

Activity You will need lots in index cards and two colors of magic markers. Brainstorm with the class all the human physical characteristics that you can think of. Write each one down on an index card. (You might want to make two copies of these so that it can become a learning center activity later on.) Make sure to include traits such as height, skin and hair color, facial features, etc.
Now, using new cards, change the color of the marker, and brainstorm all the talents, interests, and other characteristics of people that can be considered learned behavior, or something that you were not necessarily born with.

To play the activity, spread all the cards face down on a table. Working in small groups or in two teams, the first players to begin turn over two cards. The player then identifies the two cards as being either learned or

inherited traits. If the two traits match in terms of being either both learned or both inherited, then the team (or player) keeps the cards. If not, then the cards are returned to their original position. Play proceeds to the next team or player. The game continues until all the cards are picked up and identified, and the team or player with the most cards wins.

Cold Weather Combo

Teacher dialogue "All living things contain something called DNA. DNA is a blueprint, like the set of instructions that an architect uses to build. This "blueprint" gives directions that decide who we will be before we are born. Our bodies are made up of many, many cells. In fact, there are so many cells in our body, that we couldn't count them here in our time in third grade! Inside each of the cells in our body is a complete set of chromosomes. A grasshopper has 12 pairs of chromosomes, a fruit fly has four pairs of chromosomes, and a person has 23 pairs of chromosomes. What are chromosomes made of? They are made of genes. In fact, there are so many genes on a chromosome, that scientists have been busy for many years studying them all! Genes are responsible for the traits that we have been talking about all along. They are what make us somewhat alike, and somewhat different. There is an enormous amount of variety in the ways our physical characteristics can be combined. We can be tall or short, have different colored eyes and hair, we can have a variety of skin colors, and we can look very much different. We are going to play a game that will help us to understand this variety."

Activity
Gather and display five different-colored and styled hats, gloves, and scarves. Give the children time to view these items and think about what they see. Choose a volunteer to put on a hat, scarf, and a pair of gloves. Ask another volunteer to put on a different combination of hat, scarf, and gloves. Repeat this process several times. Remind the children that more combinations can be reached by using the same items over again with new choices. Make a large grid and begin writing down all the combinations that are modeled by the volunteers, and other combinations too. As an extention activity, make cut outs of the 15 items, and do a "Paper Doll" version of the activity. This will address the needs of the more visual learners in your classroom. Remember to stress that this activity illustrates the many combinations of genetic variety that can result in nature. [1]

"What are chromosomes and genes?

The main objectives for this segment of study are:

-Changes that occur in certain genes can cause changes in the characteristics of the next generation of organisms.
-Changes in the genetic code can result in different traits.
-Genes are located on chromosomes, which are made up of long strands of DNA molecules. These DNA molecules are arranged like the rungs on a twisted ladder.
-All living organisms contain DNA, and variations in the genetic code account for the diversity of traits among organisms. Even though each species is different, all species' DNA is made of nitrogen bases, sugar molecules, and phosphate groups.
-DNA replicates; each DNA molecule makes an exact duplicate of itself so that the genetic code in a parent can be passed on to each new daughter cell.

KEY VOCABULARY: gene, DNA, chromosome, molecule, chemical.

ACTIVITIES

1-“Shuffle and Share,” a card shuffling activity using decks of different colored cards to illustrate the mixing and distribution possibilities of gene variables.
2-“Chain of Codes” activity uses colored shapes and plain shapes to provide an allegory of how DNA is a genetic recipe for life.
3-“GACT necklaces,” and activity that shows how the four nitrogen bases in DNA fit together between sugar molecules and phosphate groups by building a wearable model.
4-“A Page from the Library” activity illustrates the hierarchy of packaging that begins with a nucleotide and ends with a genome.
5-“Bond-Sponge Bond!”, an activity that uses colored sponges to demonstrate the dynamic structure of the DNA bond.
6-“Mutant Corn Seeds,” and experiment that illustrates that the information within a seed needs to be perfect for the seed to sprout.

Activities

Shuffle and Share

Teacher dialogue “By itself, a gene can never carry on the processes that our body needs to survive. Just as a complex machine, such as an automobile, is a combination of many smaller, simpler machines, our bodies are a combination of many smaller working parts. Among the smallest working parts are the genes, which are present on each of 23 chromosome pairs, which are contained within every cell of our body. The 50,000 to 100,000 genes that are located on each of the 46 chromosomes can be combined in countless ways to produce many, many combinations.”

Activity Obtain two decks of cards, each deck a different color. Begin with two cards from each deck. Work with the children to see how many ways the four cards can be combined. Add two more cards and do the activity again. Keep adding cards and coming up with more combinations. This can be done in smaller groups, with each group recording their results and comparing with

other groups.
Finally, recombine each 52 card deck separately. Shuffle each deck. Divide each deck in half, and then use half of each deck together. Shuffle these cards together and record the combination. If you have enough cards, work again in small groups, to come up with many combinations using only 27 each of two different decks of cards. Challenge each group to record their ourcomes by making a chart of their results.

Chain of Codes

Teacher dialogue "The main difference between living and non-living things is that living things use information to create and maintain themselves. Rocks and rain contain no information on how to be rocks and rain. The same is true of the desks, chairs, and computers in our classroom. But all of our pets do contain information on how to be pets, and our bodies contain important information on how to stay alive and well.
Information is a way of comparing one thing with another. We get information from the letters of the alphabet. People who play an instrument get information from sheet music. The information for our bodies is encoded in our genes. The message in genes is read by machinery in our body that makes the parts that work together to create us! It works very much like a cook who follows a recipe to make dinner. The activity that we are about to do shows how a chain made up of different symbols can store information."

Activity Trace the following patterns onto red, green, blue, and yellow construction paper. Direct the children to cut out as many of each shape as they have time to. After many shapes are made, take all the yellow shapes and line them up on a table. Help the learners to understand that this simple chain does not tell much of a story, because it does not contain variety in its pattern. Next, randomly add the other three colored shapes to the chain. You might do this by putting all of the childrens' shapes into a can and pulling them out randomly, one at a time. Explain that the various sections of the chain are directions for a recipe. Even though there are only four simple shapes and colors represented here, they send a message that says, "Take this, add this, then add this....stop here, etc."
Note that these same shapes can be saved and used for a future activity that will illustrate how the four nitrogen bases fit together. [2]

GACT Necklaces

Teacher Diologue Just like the letters in the words that we read and write with in school are our language, the four elements of DNA, called nitrogen bases, are the language that our bodies use to make protiens. These four nitrogen bases are called adenine (A), guanine (G), thymine (T), and cytosine (C). They are arranged like a twisted ladder, or a spiral staircase. The sides of the twisted staircase are made of sugar and phosphate. We are going to make a model of this structure that we will be able to wear as a neck chain. Remember, the real DNA is so small, that we would need a very powerful microscope to see it!"

Activity Obtain a large amount of ziti to represent the sugar and phosphate groups. Color half of the ziti orange to represent the sugar. Leave the rest of the ziti white to represent the phosphate groups. Now you need to get colored beads, the kind that look like clear colored plastic with the large hole. Make sure you get several bags of each color, enough for each child in the class to make a necklace. You will also need a piece of string for each child, about 6 times as long as the length of the final necklace. Be sure to use the type of twine that will not fray while the children

are threading it through the beads and ziti. Use the following threading pattern to string the necklaces, demonstrating the proper combination of nitrogen bases. Use the following key, which should be posted in the front of the classroom.
Adenine-yellow combines with Guanine-blue.

Thymine-red combines with Cytosine-green.

Begin threading with a nitrogen base pair, and then add a sugar and a phosphate to each end. Then thread both ends of the string in opposite directions through another nitrogen base pair. Take those two ends individually and add a sugar and a phosphate to each strand. Repeat until the chain is the desired length. Take the entire strand and twist to show the "spiral staircase." Tie the ends tight to make a necklace that is also a model of DNA.

(figure available in printed form)

"Bond-Sponge Bond!"

Teacher dialogue We have been learning that DNA is a double chain of one pattern of elements (necleotides) that is pair with another chain of elements. The base parts of these four elements, which we mark A, T, G, and C match up in pairs. These pairs, when fitted together, have exactly the same width. There shapes and chemical make-up are such that A only fits with T and G only fits with C. So the pattern of the nucleotides in one chain of DNA will match exactly its' opposite set. The two chains will also be exactly the same distance apart. For example, if the pattern on one side is G-T-A-C-C, the pattern on the other side is C-A-T-G-G.
If the bond is too tight, however, then the DNA chain will not be able to come apart when it needs to, in order to make more, or replicate, itself. We are going to make a model out of sponges that will show us just how this bond works."

Activity Enlarge the patterns for the "Chain of Codes" activity. Use a marker to trace the patterns onto sponges colored yellow for adenine, red for thymine, blue for guanine, and green for cytosine. Any sharp pair of scissors will easily cut through the sponge material. This is a good activity for groups of four students. Have the children practice putting the nucleotide shapes together and taking them apart. Remind them that it is important for these nucleotides to come together and break apart easily. [3]

(figure available in print form)
These are the patterns for "Chain of Codes" "Bond-Sponge Bond!"

Observing the Growth of Mutant Corn Seeds

Teacher dialogue "Now that you know about how DNA is a recipe for life, we are going to do an activity that will show what can happen when there is a mistake in the DNA code. Remember, all living things have DNA, which is why we will be able to use corn seeds to do our experiment. We will find out what the effect of a mistake, also called a mutation, is on a corn plant."

Activity Fill a flower box three-fourths full with potting soil. Use a piece of string to divide the flower box in half across the width of the box. Label the right side of the box "Albino." Label the left side "Normal." Plant 10 albino (available from a farmer or from a scientific supply house) and 10 healthy corn seeds in their corresponding place in the planting box. Place the flower box on a

table near a window where it will receive direct sunlight. Keep the soil moist. Observe and record your observations every day for three weeks.
What was the total number of seeds which sprouted?

How many albino and how many normal seeds sprouted?

What happened to the plants one week and two weeks after they sprouted?

Describe the difference between the albino plants and the normal plants.

Be sure to explain to the children that both albino and normal seeds were able to sprout, because both seeds contained food within them. However, once the food within the albino seed was used up, these plants would die, since they would not be able to perform photosynthesis.

What is Human Genetics?

OBJECTIVES

-The basic principles of heredity can be applied to human genetics.
-Gene mutations can result in errors in DNA, which can cause genetic disorders.
-Humans have about 50,000 to 100,000 genes located on 46 paired chromosomes.

KEY VOCABULARY: human, message, messenger

ACTIVITIES

1-“Lisa’s Fingerprints,” a poem by Mary O’Neill which is written from Lisa’s point of view and tells what makes her unique. This literature is followed by a fingerprint making activity.
2-“Whisper Down the Lane,” a new twist on an old favorite illustrates why written instructions are more accurate.
3-“The Gathering of the David Bernsteins,” a story about a boy who has four Davids in his class, and longs for a more exotic name. Later he hosts a party for six other boys with his same name, and they find out that they are more different than alike.
4-“Clothespins and Donuts,” and activity that uses four different colored clothespins to represent 20 different kinds of donuts.

Activities

Lisa's Fingerprints

Written by Mary O'Neill, this is a poem about individuality written from a child's point of view. In the poem, Lisa ponders those things which make her unique, even though she has her mother's nose, her father's eyes, and her uncle's toes. Lisa decides to celebrate her nonconformity by wondering if the animal kingdom shares the same distinction within the world of hoof, paw, and fin.

Before reading the poem with the children, ask them if any of them look like other members of their family. Talk about how this makes them feel. Are there twins in your classroom or school?

Next, have the students make thumbprints using washable ink or watercolor paint. Have the students work in pairs as they compare and contrast their fingerprints using a magnifying glass. The children can compare the size of their fingerprints, the individual whorl, or swirling patterns, the looping patterns made by the impressions, and the arch diameters.

You can make a clever bulletin board of classroom poster by making a "Guess Who" title and displaying the fingerprints along with clues to their identity. The clues can be written in riddle form, such as, "I am tall, I like to run fast, and my birthday is in the same month as Halloween. Who am I?" The answers can be written on the back of the cards, folded under, or on an answer key.

Whisper Down the Lane

This is a simple activity that should illustrate to the children that written instructions are accurate. Choose a child to write down three directions in order. An example might be, "touch your nose, hop three times, and turn around twice." Have the student whisper the three directions to one student, who will whisper the directions to another, passing the instructions in this way to the rest of the class. When the message has reached the entire class, have them perform the three tasks in order when you give a signal. The children will laugh at each other when they see that they are not all doing the same thing. Now have another child come up with her own list of three directions, and write them on the board. Hopefully, the children will be more successful with these written directions. Try to increase the level of difficulty by adding more instructions to the list.

Finish by discussing why a written list is accurate. Children should be able to develop the idea that a written list can be read and understood by all those trained to do so. Because the list is written down, those who need to use the list do not need to rely on their memory. Also spend some time here discussing communication in general. How did the children feel when they were unsure of what they were supposed to do? Why is clear communication important? Who needs to be a good communicator? Be sure to discuss ways for everyone to be better communicators in the classroom, and at home.

The Gathering of the David Bernsteins

This story, written by Johanna Hurwitz, is about third grader David Bernstein, who has three other Davids in his class. He longs for a unique, exotic, name. When his teacher assigns a book report, promising extra credit for "fat books," David chooses the fattest book he can find-the Manhattan phone book. Therein he finds seventeen David Bernsteins. As David's birthday approaches, he decides he wants to meet all the David

Bernsteins in New York City. He invites all seventeen to his birthday party. Seven David Bernsteins accept the invitation, and the eight Davids enjoy dinner together. They agree that it's what you do, not your name, that makes you a unique person.

After reading the story, think about the things that the class has learned about genetics and heredity. Make a classroom chart that lists two general categories that pertain to the David Bernsteins. The first list will show the "genetic David Bernstein." This list will include things such as eye color, hair color, number of fingers and toes, etc. The second list is the "individual David Bernsteins." This list will include occupation, schooling, type of clothes and hobbies. Discuss ways in which the students are like all these David Bernsteins, and ways in which they are different.

Clothespins and Donuts

Read the following story to the class, and then use the patterns to cut out lots of red, yellow, green, and blue clothespins and act out the story. This activity illustrates how only a few elements, (nucleotides), are needed to produce many combinations.

Story DonutArama makes twenty kinds of donuts. The donuts are so good that people come from all over to buy these donuts. Each customer wants to have exactly the donuts that are his or her favorite. But sometimes the donut clerk made mistakes.
At first, the clerk tried shouting the donut orders to the kitchen staff, but that resulted in too many mistakes. Written orders didn't work either, because the kitchen staff couldn't read the clerk's handwriting. Then someone thought up the idea of using clothespins hung on a pulley to transmit the orders to the kitchen.

The clothespins came in four colors. The donuts came in twenty flavors. The question was to figure out a way for the four colored clothespins to represent the twenty varieties. So the clerk worked out a code.

He first tried using combinations of two colors of clothespins. But he realized that this would not be enough combinations to code the the twenty flavors of donuts. But a three clothespin code using the four colors of the clothespins would produce more combinations than he needed! So he and his staff worked out and memorized a code. Red + blue + yellow = jelly; yellow + red + green = chocolate, and so on until each of the twenty flavors had a code. As the clerk took the orders he put the correct color pattern on the pulley. In the kitchen, the decoder read the code, and then hung the proper donut on the hook next to it. The packager took the donuts off the hook and put the donuts in their proper place in the box. From that point on, things worked wonderfully. Also, the cook in the kitchen was able to develop new flavors of donuts, because there were many combinations of clothespins that could still be used! [4]

A Celebration of Life!

OBJECTIVES

-We are alike in many ways, and some of the things we have in common are crucial to our existence as a species.
-We are different in many ways, and some of those things are those which we chose; others are characteristics we inherited.
-We can learn how to be happy for the things we are that we can't change, and to also appreciate unchangeable differences in others.

-We may want to improve or change something about us, and through practice and planning, we can do just that.
-We can learn to help others be better people by using strategies that encourage us to see others more positively.

KEY VOCABULARY: physical trait, feeling characteristic, behavior, compare.

ACTIVITIES

1-“Physical-Behavior Trait Chart,” encourages the children to be more objective in their judgements of themselves and others.
2-“Do Boys and Girls Think Differently?” is a activity which asks students to respond to a series of 10 questions about boys and girls.
3-“Hands Down!” is a comparison activity which looks at finger-length differences between boys and girls.
4-“What Things Can We Be?” unrolls colorful streams of “Traits and Trys” which illustrate the difference between a recipe for life and a recipe for pro-social behavior.
5-“Wonder Woman” is the story of Jackie Joyner-Kersee and the effort she puts into being her best. Written be sports journalist Joy Duckett Cain, this story demonstrates the perfect marriage of the inherited and developed self.

Do Boys and Girls Think Differently?

Teacher dialogue: “Now that we have been talking and reading about how we are all alike and how we are often different, we are going to do an experiment. This experiment will get us thinking about the differences between boys and girls and how much we know about each other. But before we answer the questions, I want us to read them to ourselves and make a few predictions. How many students think that boys will score better on this test? How many students think that girls will score better on this test? Now, quietly take the test yourself.”

At this point, after the children have taken the test, have them pass their test to a neighbor for scoring. The answers are as follows:

Men-1,2,5,7,8,9,10

Women-3,4,6

“Obviously, the better you scored, the more you know about differences between girls and boys. Are these differences genetic, or are they ideas that are learned during life?”

Teacher note: The results in this informal survey are a product of x-linked color-blindness, the increased incidence of gout in males, and other sex-dependent genetic differences. For more background on these traits, refer to selections from the bibliography. [5]

GENDER DIFFERENCE TEST

1. Who sleeps more?M F
2. Whose eyes can’t see the color red? M F
3. Whose forehead is more likely to feel warm? M F
4. Whose brain will recover faster from a stroke? M F
5. Who is more likely to hiccup? M F
6. Whose thumb is more likely to ache when it rains? M f
7. Who is more likely to complain of a painful toe? M F
8. Who is more likely to gasp for air in the bedroom? M F
9. Who is more likely to wake up in the middle of the night with a pain in the stomach? M F
10. Who has more red blood cells? M F

Hands Down!

Teacher: “Now we are about to do an experiment that demonstrates a small but surprising difference between boys and girls. We know that we are what we look like, and how tall or short we are, because of the genes we inherited from our parents. Let’s take a close look at our hands. There is a gene that causes the index finger to be shorter than the ring finger. This gene happens to be dominant in boys. Therefore, many boys have this trait. I will draw a straight line on the blackboard, and I will ask for some volunteers. (Make sure everyone has a chance to do this activity.) Put your ring finger (the one next to the pinky) against this line. If you are a girl, your index finger (the one next to the thumb), will probably reach above the line. If you are a boy, your index finger will probably not touch the line, because it is shorter. Try this experiment out with your family at home. Make a chart that displays the results of your experiment!

Here are some other interesting differences between boys and girls.

-At birth, most boys are larger than girls, and they have larger hearts, lungs, and brains.
-At birth, most girls are more mature than boys, with a more highly developed nervous system. Girls also have a faster heartbeat.
-Female infants are more interested in colors; male infants are more interested in patterns.
-Girls stop growing before boys, boys continue to grow until they are older.

Think about other ways that you notice boys and girls to be different. Do you think these differences are genetic? [6]

Activities

Wonder Woman

Written by Joy Duckett Cain, this is the story of Jackie Joyner-Kersee, who gained fame during the 1988 Olympics. She set records in the heptathlon and the longjump. The article describes her journey from growing up in a poor neighborhood in East St. Louis, to becoming a world-class athlete. This is a story not only of dedication and hard work, but of dedication to community, for Ms. Joyner-Kersee speaks regularly before young audiences and works to establish a community sports center in her hometown.

As you read and discuss the story with your class, think about the things which prepared Jackie Joyner-Kersee for greatness. Was she born with special skills? Or did she just become an especially great athlete? Did she become famous because she was named after the wife of a president?

A heptathlon consists of seven different events. Have each student in your classroom think of seven things they are good at. These can be anything, including academics, sports, artistic or musical ability, or social skills. Help each learner recognize those skills by making a “gold medal” to wear. On the front of the medal, students write: “(name)-hepthalon winner!” On the back, each student lists the seven personal accomplishments in which he or she excells! End the session with a classroom sharing of talents and ideas. This builds tolerance, appreciation, and respect for others.

Notes

1. Portions of this activity have been adapted from Maton, et. al. *Heredity, the Code of Life* , Prentice Hall, Englewood Cliffs, N.J., 1993.

2. Activity adapted from Hoagland, Mahlon and Bert Dodson. *The Way Life Works* , Times Books, New York: 1995.

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1995.

4. Activity adapted from Hoagland, Mahlon and Bert Dodson. *The Way Life Works* , Times Books, New York: 1995.

5. Adapted from an activity in Kincher, Barbara Jonni. *Psychology for Kids* , Free Spirit Pub. Minneapolis: 1995.

6. Adapted from an activity from Kincher, Jonni. *Psychology for Kids* , Free Spirit Pub., Minneapolis: 1995.

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O'Neill, Mary, *Lisa's Fingerprints,* H.B.J., New York: 1993.

This is a poem that celebrates uniqueness from a child's point of view.