

## Essential Question: How do living things inherit their genetic characteristics?

### Act 4: DNA, Chromosomes, and Mutations

**Purpose:** I can show how organisms transfer their genetic material to their offspring and that there can be mutations in this transfer which can cause long term problems.

**Part A – Instructions - Follow the DNA instructions and complete the activity below..**

*Person 1 DNA*

*Person 2 DNA*

**Part B Instructions:** A. Watch this vclip first! <https://www.youtube.com/watch?v=q8errsd4FE>

1. Cut out chromosomes with numbers &/or letters attached.
2. Glue matching (Homologous) chromosomes together upright.
3. Glue numbered chromosomes to the left and lettered chromosomes to the right.
4. Determine if your baby is a Male or Female & if there are any mutations.
- 45 Answer all questions on next page completely.

<b>1</b>	<b>2</b>	<b>3</b> Eye Color			<b>4</b>	<b>5</b>
<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>13</b>	<b>14</b>	<b>15</b>		<b>16</b>	<b>17</b>	<b>18</b>
<b>19</b>	<b>20</b>		<b>21</b> Trisomy 21?	<b>22</b>		<b>23</b> Boy or Girl Turner's Syndrome

**Blonde hair is not exclusive to Europeans. South Pacific Melanesians evolved a different gene for blonde hair!**

**Student Review:** 1-Below Standard, 2-Approaching Standard, 3-Standard, 4-Above Standard  
Use the scale to evaluate completeness & correctness of the job. Put score, Initial & date in boxes.

Score

Initial/Date

**Analysis Questions:**

1. Was the human a male or a female? Tell why do you think this is so. (Ensure you circle the proper sex on the form at the 23<sup>rd</sup> pair of chromosomes.)

2. Explain where each member of a pair of chromosomes comes from.

3. How many (total) chromosomes are normally present in a human? \_\_\_\_\_

4. How many chromosomes are present? \_\_\_\_\_ How many pairs? \_\_\_\_\_

5. How many chromosomes usually come from the: Male \_\_\_\_\_ Female \_\_\_\_\_

6. **Mutations:** If this human does not have the normal amount of chromosomes it has a mutation.

**7a. Extra Chromosomes:** If the sperm or egg gets an extra 21st chromosome the mutation is called Trisomy 21, or Down's Syndrome. This often leads to the child having mental impairments and often impairs growth. Downs births average in 1 of 700 births in the US.

**Does your human have Trisomy 21?** Yes \_\_\_\_\_ No \_\_\_\_\_

**7b. Missing a Sex Chromosome (X)** - Turner syndrome (TS) is a chromosomal condition that is caused by a missing or partial second 23<sup>rd</sup> (X) chromosome. The female has only one 23<sup>rd</sup> X chromosome, or one X & a part of one. This condition, caused by a random mutation, affects development in females. Turner Syndrome occurs in approximately 1 of 2000 live female births & approximately 10% of all miscarriages.

**Does your human have Turner's Syndrome?** Yes \_\_\_\_\_ No \_\_\_\_\_

8. **Determining Eye Color.** Look at the gene code (letters) written on the side of the 3<sup>rd</sup> pair of chromosomes. Each represents a plan, or "code" for the same type of protein. However there are variations in this code due to mutations over time. The code on each chromosome is called an "allele"

a. What is the code on each chromosome or your 3<sup>rd</sup> pair? \_\_\_\_\_

- If the alleles are **BB** or **Bb**, then the human has Brown, Green or Hazel eyes.
- If the alleles are **bb** then the human has Blue eyes.

b. What eye color does this human possess? \_\_\_\_\_