mM Meiosis/ Gamete Formation at a Glance(approximately 4-5 traditional class days):

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| Seg | Model Move | Est Time  (min) | Overview | Resources | What did we figure out? |
| 1 | **P🡪Q** | 20 | We are presented with a phenomenon of twin sisters from the same biological parents, who look nothing alike. We ask, are they really twins? | * M Doodle Sheet | We observed a phenomenon of twin sisters who look nothing alike and reviewed some glossary terms. |
| 2 | **Q🡪M** | 10 | To help us make sense of this curious phenomenon of fraternal twins looking nothing alike, we ask: How exactly does the hereditable information get from the parents to the offspring? We then collect initial model ideas. | * M Doodle Sheet | We posted our initial ideas for how hereditary material is passed from parents to offspring. |
| 3 | **Q🡪M** | 80 | Now that we have some idea that DNA (chromosomes) are involved with helping to pass on information, we use a pipe cleaner activity to figure out how to make gametes and a viable baby. | * M Doodle Sheet * M 03 Heredity Kits * M 03 Making Babies template | We made a baby! We figured out how to make gametes and combine them to make a viable baby. We recorded our “rules” for making a baby and now have an almost complete working model for Gamete Formation. |
| 4 | **M🡪Q** | 15 | We use our model to help us reason about why meiosis is so important. | * M Doodle Sheet | We figured out that sexual reproduction does require special haploid cells so that when the male and female gametes come together they make an organism with a complete (diploid) set of chromosomes. We also have a better understanding that sexual reproduction helps with variation. |
| 5 | **M🡪 P** | 15-60 | We now use our model to figure out how gamete formation increases variation through random assortment and crossing over. | * M Doodle Sheet * M 05 Crossing over reading and activity (optional) * M Crossing over activity cut out (optional) | Meiosis contributes to variation in several ways. It provides gametes for sexual reproduction. During the formation of gametes, there is a random assortment of chromosomes and at one-point pairs of chromosomes swap sections. |
| 6 | **M🡪Q** | 25 | We use our model to answer and discuss the challenge questions: In general, who has the possibility of sharing the most genetic traits: Parent/ Child or Sibling/Sibling? | * M Doodle Sheet * M Making babies template * M 06 Challenge Question Handout | A parent and sibling can only ever share ½ of their genetic traits, however, siblings have the possibility to share almost all or almost none of their traits. |
| 7 | **M🡪P** | 30-45 | Assessment. We now use our model to explain the Lucy and Maria phenomenon. | * M Doodle Sheet * M 03 Making Babies template * Heredity Kits * Assessment Handout | We have used our model for Gamete Formation to explain, in detail, how twins can look nothing alike and how non-twin sibling can look so much alike. |
| 8 | **M🡪P** | Varies | We talk about race and whether there is a biological basis to the concept of race. | * “Concepts of Race not Grounded in Genetics” Article * Summary Protocol Handout | Through a reading and guided discussion, we figured out that there is no scientific and genetic basis to the concept of race in the human species and that all human beings share 99.9% of their DNA due to common ancestry. |