

# Genetics with Rebops

**Estimated Time: 60 minutes**

## SUMMARY

In this activity, students learn about the relationship between genes and inherited traits. Students learn how genetic information is passed from one generation to the next by creating pretend creatures called Rebops.

## WHAT YOU'LL LEARN

- How chromosomes are passed from parents to offspring
- How single gene inheritance works
- How alleles determine phenotypic traits

<p><b>Materials Used</b> (makes 3 Rebops)</p> <ul style="list-style-type: none"> <li>• Parent chromosome sheet</li> <li>• Envelope labeled “Mother” for chromosomes</li> <li>• Envelope labeled “Father” for chromosomes</li> <li>• 9 large marshmallows</li> <li>• 9 toothpicks</li> <li>• 12 colored push pins (or color toothpicks)</li> <li>• 12 clear or white push pins (or plain toothpicks)</li> <li>• 3 pipe cleaner halves</li> <li>• 6 pipe cleaner fourths</li> <li>• 1 green marker</li> <li>• 1 red marker</li> <li>• 1 marker of any color</li> </ul>	<p><b>Resources Used</b></p> <ul style="list-style-type: none"> <li>• Genetic Inheritance by BasicBiology.net: <a href="https://basicbiology.net/micro/genetics/genetic-inheritance">https://basicbiology.net/micro/genetics/genetic-inheritance</a></li> <li>• Reebops: A “Model” Organism for Teaching Genetic Concepts by BioEd Online: <a href="http://www.bioedonline.org/lessons-and-more/lessons-by-topic/genetics-and-inheritance/reebops-a-e2809cmodele2809d-organism-for-teaching-genetic-concepts/">http://www.bioedonline.org/lessons-and-more/lessons-by-topic/genetics-and-inheritance/reebops-a-e2809cmodele2809d-organism-for-teaching-genetic-concepts/</a></li> </ul>
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## WHAT TO DO

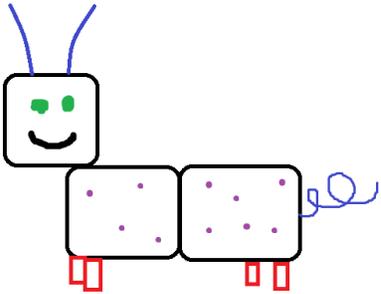
### Making Parent Rebops

1. Using the last page of this activity, cut out the alleles for the mother and father and place them in separate envelopes.
2. Open the envelope labeled “Mother” and lay chromosomes out with those containing allele pairs next to each other.
3. Use the documents in the resource section to assist in explaining that these slips of paper represent a few of the chromosomes that belong to the mother Rebop. Chromosomes are strands of DNA, which contain the genetic code for an organism.
4. Discuss that on these chromosomes lie genes, and they come in alternative forms called alleles. The various letters listed on the chromosomes represent the two forms of alleles that were given to the organism, one from each parent. Together those alleles are

expressed in what is called a phenotype, giving every organism their physical traits or appearance.

5. Use the key below to help figure out the mother's phenotype. She has a curly tail (Tt), green eyes (EE), white legs (ll), two antennae (Aa), and no spots (ss).
6. Now you can build the mother Rebop!!
7. To build a Rebop you use the toothpicks to connect the two body segments together, and another to connect the head. Place the four push pins in the marshmallows at the bottom as legs. Push the pipe cleaners in the marshmallows for the antenna and tail. Use markers to draw eyes and spots directly onto the marshmallows. (Refer to example picture below)
8. Repeat the steps above to make the "Father". He has a straight tail (tt), red eyes (ee), colored legs (LL), two antennae (Aa), and spots (Ss).
9. Now you have both parents made!!

Example Rebop:



Allele Key:	
TT or Tt = curly tail (curled ½ pipe cleaner)	tt = straight tail (straight ½ pipe cleaner)
EE or Ee = green eyes (green marker)	ee = red eyes (red marker)
LL or Ll = colored legs (push pins/toothpicks)	ll = white legs (push pins/toothpicks)
AA or Aa = 2 antennae (1/4 pipe cleaner)	aa = 1 antennae (1/4 pipe cleaner)
SS or Ss = spots (marker)	ss = no spots

### **Making Rebop Offspring**

1. To represent the random exchange of alleles during reproduction, randomly select one of each allele type from each parent and put them together to create the chromosome pairs for the Rebop offspring. Use the allele key above to find the genetic code for your new Rebop.
2. You can now create your Rebop baby!!
3. You can randomly select the parent chromosomes additional times to build as many offspring as you would like.

### **Extension**

1. You can build a nursery to house all of your Rebop babies and talk to the students about the differences and similarities between parents, offspring, and siblings. What are some similarities and differences in traits in your family? What about those of other family members or friends?
2. You can make several generations of Rebops by making a new set of parent chromosomes and “mating” those offspring with the offspring of the first set of parents.
3. For older kids, you can incorporate making punnett squares with the parent alleles to illustrate the probability of offspring genotypes and phenotypes.

### **TIPS**

- This is a fun, hands-on activity that can be used with all ages. With higher level kids, you can go into greater detailed discussions using technical terminology supported by the resource documents. For younger kids, assisting them in building the Rebop parents and babies without using technical terms is a fun way to illustrate that children get all of their physical traits from a combination of their biological parents' genes.

### Mother Chromosomes with Alleles

(Cut out all red chromosomes and put into an envelope labeled "Mother")

T  (tail)	t  (tail)
E  (eyes)	E  (eyes)
l  (legs)	l  (legs)
A  (antenna)	a  (antenna)
s  (spots)	s  (spots)

### Father Chromosomes with Alleles

(Cut out all green chromosomes and put into an envelope labeled "Father")

t  (tail)	t  (tail)
e  (eyes)	e  (eyes)
L  (legs)	L  (legs)
A  (antenna)	a  (antenna)
S  (spots)	s  (spots)