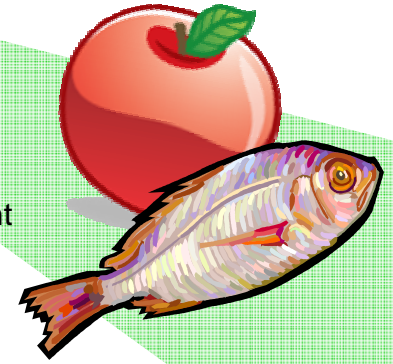


# Passing It On



**QUESTION:** How are inherited characteristics passed from parent to offspring?

**MATERIALS:**

- allele sacks
- allele sets (7)
- gumdrops - green and black
- map pins
- marshmallows
- push pins - green and blue
- scissors
- toothpicks - plain
- toothpicks - red and green

**PROCEDURE:**

1. Cut up the allele sets and put a set of each small, lettered, paper tile into a different allele sack.
2. Look over the two bug models provided on the Parent Characteristics sheet. Model A is Mom and Model B is Dad. Record the characteristics of each bug in the Data section.
3. You are going to see what the offspring of these two parent bugs will look like. Pick two alleles to determine body type. The first allele picked is from the Mom, the second allele picked is from the Dad. Record the alleles picked from each parent. Record the new “Baby’s” genotype and then its phenotype. The Genotype and Phenotype chart below will help.

**HINT:** *IF A PARENT HAS THE DOMINANT TRAIT, IT CAN PASS ON EITHER A DOMINANT TRAIT OR A RECESSIVE TRIAT TO ITS OFFSPRING. BUT IF A PARENT HAS THE RECESSIVE TRAIT, IT CAN ONLY PASS A RECESSIVE TRAIT ONTO ITS OFFSPRING.*

|                            |                      |
|----------------------------|----------------------|
| SS or Ss = 3 body segments | ss = 2 body segments |
| RR or Rs = red antennae    | rr = green antennae  |
| CC or Cc = curly tail      | cc = straight tail   |
| LL or Ll = 3 pairs of legs | ll = 2 pairs of legs |
| BB or Bb = blue nose       | bb = green nose      |
| GG or Gg = green feet      | gg = black feet      |
| EE or Ee = 2 eyes          | ee = 3 eyes          |

4. Continue this process for each trait to see what alleles will be inherited by the baby. Be sure to record the genotype and phenotype for each trait.
5. Once you have designed you new baby bug by completing your data table, you can pick out the necessary parts to build your new bug. Use toothpicks to hold the head and body segments together, and as legs to attach the feet to the body.

## LS – Activity #30

DATA:

| TRAIT                   | ALLELE FROM MOM | ALLELE FROM DAD | BABY'S GENOTYPE | BABY'S PHENOTYPE |
|-------------------------|-----------------|-----------------|-----------------|------------------|
| Number of body segments |                 |                 |                 |                  |
| Antennae color          |                 |                 |                 |                  |
| Tail shape              |                 |                 |                 |                  |
| Number of leg pairs     |                 |                 |                 |                  |
| Nose color              |                 |                 |                 |                  |
| Foot color              |                 |                 |                 |                  |
| Number of eyes          |                 |                 |                 |                  |

### QUESTIONS:

1. What process of cell division insures that an offspring inherits half its genetic information from one parent and the other half from the other parent?
2. What is the difference between dominant and recessive inheritance?
3. What is the difference between a gene and an allele?
4. What is the difference between phenotype and genotype?

## LS – Activity #30

5. Suppose a female bug with red antennae mates with a male bug with green antennae and produces several offspring, one of which has green antennae. What is the genotype of the female bug? Use the Punnett square below to help you find the answer.

|  |  |
|--|--|
|  |  |
|  |  |

6. Do any of the new models look exactly like the parents? Explain.
7. Complete the chart below to discover the ratio of the two forms of each trait.

| TRAIT               | Dominant # | Dominant % | Recessive # | Recessive % |
|---------------------|------------|------------|-------------|-------------|
| Body segments       |            |            |             |             |
| Antennae color      |            |            |             |             |
| Tail shape          |            |            |             |             |
| Number of leg pairs |            |            |             |             |
| Nose color          |            |            |             |             |
| Foot color          |            |            |             |             |
| Number of eyes      |            |            |             |             |

## Parent Characteristics



### Model A ("Mom")

- red antennae
- 3 body segments
- curly tail
- 2 pairs of legs
- green nose
- black feet
- 3 eyes



### Model B ("Dad")

- green antennae
- 2 body segments
- straight tail
- 3 pairs of legs
- blue nose
- green feet
- 2 eyes

**LS – Activity #30**

**PASSING IT ON #1 – BODY SEGMENTS**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |
| S | S | S | s | s | s |

**LS – Activity #30**

**PASSING IT ON #1 – ANTENNA**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| R | R | R | r | r | r |
| R | R | R | r | r | r |
| R | R | R | r | r | r |
| R | R | R | r | r | r |
| R | R | R | r | r | r |
| R | R | R | r | r | r |
| R | R | R | r | r | r |

**LS – Activity #30**

**PASSING IT ON #1 – TAIL**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| C | C | C | c | c | c |
| C | C | C | c | c | c |
| C | C | C | c | c | c |
| C | C | C | c | c | c |
| C | C | C | c | c | c |
| C | C | C | c | c | c |
| C | C | C | c | c | c |

**LS – Activity #30**

**PASSING IT ON #1 – PAIRS OF LEGS**

|   |   |   |  |  |  |
|---|---|---|--|--|--|
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |
| L | L | L |  |  |  |

**LS – Activity #30**

**PASSING IT ON #1 – NOSE**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| B | B | B | b | b | b |
| B | B | B | b | b | b |
| B | B | B | b | b | b |
| B | B | B | b | b | b |
| B | B | B | b | b | b |
| B | B | B | b | b | b |
| B | B | B | b | b | b |

**LS – Activity #30**

**PASSING IT ON #1 – FEET**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| G | G | G | g | g | g |
| G | G | G | g | g | g |
| G | G | G | g | g | g |
| G | G | G | g | g | g |
| G | G | G | g | g | g |
| G | G | G | g | g | g |
| G | G | G | g | g | g |

**LS – Activity #30**

**PASSING IT ON #1 – EYES**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| E | E | E | e | e | e |
| E | E | E | e | e | e |
| E | E | E | e | e | e |
| E | E | E | e | e | e |
| E | E | E | e | e | e |
| E | E | E | e | e | e |
| E | E | E | e | e | e |