UNIT 3: BIOLOGY

BOOK 2: MUTATIONS & EVOLUTION

NAME: _______________  BLOCK:__________
Lesson 1.5 – Mutations

Mutations
- Up to this point, we have considered DNA molecules to be permanent structures, but in nature the DNA of organisms is __________________________
- Any change to the sequence of bases in a DNA molecule is called a _________________________
- These changes can be small, such as ________________, ________________, or ________________, or they can be large, causing ________________ and ________________ as big as ________________
- In most organisms the rate of mutation is extremely ______, perhaps as little as one or two changes per generation
- Mutation is incredibly important for evolution because it __________________________.
  These are the building blocks for evolution!

Effects of Mutations
- **Positive Mutation** = any mutation that ____________ the function of a gene by causing it to create a __________________________, and will give that organism an ________________ over other members of its species

antibiotic resistance makes bacteria immune to an antibiotic, an example of a positive mutation
- **Negative Mutation** = any mutation that __________ the function of a gene by causing it to create a __________________________ or a protein that does not perform its job, and will give that organism a ________________

- **Neutral Mutation** = any mutation that _______ __________________________ the function of a gene by causing it to create a protein that is ____________________________, provides its organism with ________________________________

**An Analogy:** If the gene was a sentence, and its function (meaning) was its protein: “The old dog sit.”

- Positive mutation: ___________________________. The sentence has improved function
- Negative mutation: ___________________________. The sentence has reduced function
- Neutral mutation: ___________________________. The sentence has identical function

**Sources of Mutations**

1. ________________________________
   - The protein that replicates DNA is ___________________________: it only makes 1 base pairing mistake for every 100,000 base pairs it copies, but across all 46 chromosomes this creates ________________________________
   - The same protein that replicated DNA fixes _________ of these mistakes by proofreading the new DNA strand as it goes, ________________________________

Cystic fibrosis is caused by a mutation in gene CFTR, an example of a negative mutation.

The ‘Spirit Bear’ is a mutant version of the black bear.
Other proteins look for these mismatches and repair them, removing almost all of the remaining base pairing mistakes, but ____________________________________________

DNA replication results in base pairing errors – approximately 1,200 which each copy – that can become mutations

2. ________________

□ _____________ and __________________ agents that can cause mutations are called ________________

□ ____________________________(alpha particles, gamma rays) and ______________
____________________ (X-rays, ultraviolet light) ______________ damage or ______________ su
________________________

□ ______________ such as benzene attach themselves to DNA and ________________

□ Measuring Radiation’s Effects

<table>
<thead>
<tr>
<th>Activity</th>
<th>Millirems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical yearly dose, all sources</td>
<td>360.60</td>
</tr>
<tr>
<td>Full set of dental X-rays</td>
<td>40.00</td>
</tr>
<tr>
<td>Chest X-ray</td>
<td>8.00</td>
</tr>
<tr>
<td>Flying round-trip from D.C. To Los Angeles</td>
<td>5.00</td>
</tr>
<tr>
<td>Living outside nuclear power plant for a year</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health risk</th>
<th>Expected life lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking a pack of cigarettes a day</td>
<td>5 years</td>
</tr>
<tr>
<td>Being 15 percent overweight</td>
<td>2 years</td>
</tr>
<tr>
<td>Working in construction</td>
<td>227 days</td>
</tr>
<tr>
<td>Working in nuclear plant (1,000 mrem/yr)</td>
<td>51 days</td>
</tr>
<tr>
<td>Typical annual background radiation dose (500 mrem/yr)</td>
<td>18 days</td>
</tr>
</tbody>
</table>
Heavy metals such as _____________________________ also damage DNA and interfere with DNA repair.

Some ________________ insert themselves into the DNA of the host cell, interrupting genes.

**Mutations and Cancer**

While some cancers are ________________, almost all of them are caused by ________________ ________________ that alter a cell’s identity and affect ________________

Agents that cause cancer, called ____________________________, are thus mostly mutagens.

Cancer mutations result in ____________________________, that can ____________________________

![Diagram](image)
1. Identify each of the following examples as a positive, negative, or neutral mutation:

<table>
<thead>
<tr>
<th>Example</th>
<th>Type of Mutation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Some plants carry a mutated gene that protects them from a fungus parasite called powdery mildew.</td>
<td></td>
</tr>
<tr>
<td>b. Some people are born with a mutated gene that prevents the cells in their throat and lungs from making normal mucus, as a result the thick mucus accumulates and clogs the lungs (cystic fibrosis).</td>
<td></td>
</tr>
<tr>
<td>c. The Spirit Bears of coastal British Columbia have a mutation that makes their fur white instead of black, but does not affect their survival.</td>
<td></td>
</tr>
<tr>
<td>d. Some people have a mutation that prevents the virus HIV from infecting their cells.</td>
<td></td>
</tr>
<tr>
<td>e. Some people have a mutation which causes blood protein involved in clotting to have a different shape, as a result they have internal and external bleeding (haemophilia).</td>
<td></td>
</tr>
</tbody>
</table>

2. Which of the following can result from a DNA mutation?
   A. The protein will no longer function.
   B. The protein will have reduced function.
   C. The protein will have improved function.
   D. All of the above can occur.

3. Which of the following correctly describes a mutation?
   A. a change in the base pair sequence of a DNA molecule
   B. a change in the proteins that wrap around the DNA molecule
   C. a change in the order of sugars and phosphates in a protein
   D. a change in the structure of a protein

4. A man is sitting outside of a restaurant on a park bench smoking a cigarette, reading the newspaper. Which of the following is a mutagen that he is exposing himself to?
   A. the newspaper
   B. the cigarette
   C. the oxygen he is breathing
   D. the park bench

5. The three kinds of mutations are called:
   A. neutral, negative, and carcinogenic
   B. positive, negative, and neutral
   C. mutagens, carcinogens, and mutations
   D. complete, incomplete, co-mutant
6. A woman breaks her arm riding motocross. After checking into the hospital, she waits in the emergency room and drinks a glass of water. Eventually the doctor identifies the break with an X-ray and casts the arm. Which of the following is a mutagen that she is exposing herself to?

A. the glass of water  
B. the hospital waiting room  
C. the chair she sits on  
D. the X-ray exam

7. Cancer results when mutations cause body cells to lose their identity and divide uncontrollably. Cancer is an example of

A. a negative mutation.  
B. a positive mutation.  
C. a neutral mutation.

8. A mutation in a gene that creates proteins which carry fat in blood was discovered in people living in a small village in northern Italy. Blood fat can accumulate inside the walls of blood vessels, blocking blood flow and causing heart attacks and strokes. The mutation greatly reduces the accumulation of fat inside the walls of blood vessels, and so is an example of

A. a neutral mutation.  
B. a negative mutation.  
C. a positive mutation.

9. A mutation which does not affect the function of the protein is called a

A. positive mutation.  
B. negative mutation.  
C. neutral mutation.

10. Cats in the American Curl breed have ears that curl upwards at the tips. This does not appear to affect their hearing in any way. This mutation is an example of

A. a neutral mutation.  
B. a positive mutation.  
C. a negative mutation.

11. The Huntingtin gene creates a protein which is found in many different body cells. In humans there is a mutant allele of this gene which results in a protein that kills many types of cells, especially brain cells. This mutation is an example of

A. a negative mutation.  
B. a neutral mutation.  
C. a positive mutation.
12. Identify the type of mutation below (substitution, addition, or deletion). Fill in the table.

<table>
<thead>
<tr>
<th>Original DNA Sequence:</th>
<th>TACACCTTGGCGACGACT</th>
<th>Type of Mutation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutated DNA Sequence #1:</td>
<td>TACATCTTGGCGACGACT</td>
<td></td>
</tr>
<tr>
<td>Mutated DNA Sequence #2:</td>
<td>TACGACCTTGGCGACGACT</td>
<td></td>
</tr>
<tr>
<td>Mutated DNA Sequence #3:</td>
<td>TACACCTTAGCGACGACT</td>
<td></td>
</tr>
<tr>
<td>Mutated DNA Sequence #4:</td>
<td>TACACCTTGGCGACTACT</td>
<td></td>
</tr>
<tr>
<td>Mutated DNA Sequence #5:</td>
<td>TACACCTTGGGACGACT</td>
<td></td>
</tr>
</tbody>
</table>

13. Look at the following sequence: THE FAT CAT ATE THE RAT. Delete the first H and regroup the letters in groups of three- write out the new groups of three. Does the sentence still make sense? What type of mutation is this an example of?
Lesson 1.6 – Darwin, Wallace, and Natural Selection

A Tale of Two Very Different Scientists

☐ Darwin (1809-1882) was born into a ___________ family, studying ________________________ and religion at Cambridge

☐ At _____ he was hired to join the ________________ as it travelled around the world, ____________________________ _________________ specimens

☐ Alfred Wallace (1823-1913) was from a ________ family, and after a few failed careers, inspired by Darwin, he became an ______________ in Brazil and southeast Asia

☐ Wallace collected ________________________________, including thousands of ________________, and began to think about ________________________________
Darwin and Wallace’s Observations (Reached Independently)

1. Organisms ___________________________ and ____________________________
   (sadly they did not yet know about Mendel’s work)

2. Within every population there is ___________________________
   ____________________________ of that population (caused by
   mutations creating new alleles)

3. Some variations affect an organism’s _______________________
   successful variations _______________ their chance of survival,
   and unsuccessful variations _______________ survival

4. Successful organisms ___________________________ and ___________________________,
   ___________________________________________________________________
   ___________________________________________________________________

The Theory of Natural Selection

☐ Wallace wrote to Darwin, and it turned out that Darwin had come to the _____________
   _____________________: a theory they named ___________________________

☐ Nature ‘selects’ – by allowing them to live and ________________ – organisms with
   ____________________________, and those alleles become _______________________
   ___________________________ in the population over time

☐ It is often thought of as “______________________________,” but this ignores the
   important role of _____________________ and _______________________________

☐ Natural selection is an important driving force of __________________
Selection Pressures on Natural Populations

- The ‘forces’ that drive natural selection, called ________________, include anything that affects the ________________:
  - ________________ between organisms of the ________________ for ___________ (food, habitat, and reproductive partners)
  - ________________ between ________________
  - Seasonal and long-term availability of ________________
  - Organisms introduced from other environments, called ________________, or ________________

Two different traits in a natural population of peppered moths

VS

Manchester at the end of the 19th century

melanic form was better camouflaged against sooty tree trunks and became more common in the late 19th century
Adaptation

☐ Every organism has a ‘job’ in its environment, which biologists call its _____________

☐ Natural selection leads to organisms _____________________________ in their niche, a process called ______________________

☐ Adaptations that allow organisms to be successful include ____________________________ inside of cells (___________________), _____________________________ to cells or organs (___________________), and _____________________________ in an organism’s response to its environment

A special kind of adaptation occurs when a ____________________________________________: the species evolves into ___________________________ to fill a ____________________________: the __________________ of a species

Example: 300 species of cichlid fish evolved from single ancestor that entered Lake Victoria, Africa, evolving to feed in different parts of the lake

Environmental Changes

☐ Natural selection and adaptation are ____________________ processes because environments _____________________________: mutations introduce __________________________, __________________________, and __________________________

☐ Natural selection is a remorseless process, organisms which cannot adapt to their environment for any reason face ____________________: the __________________ of a species
Charles Darwin developed the theory of evolution through a process called natural selection. This process of natural selection has 5 main principles:

1. Population has variations.
2. Some variations are favorable.
3. More offspring are produced than can survive.
4. Those that survive have favorable traits.
5. A population will change over time.

Read the following situations below and identify the 5 points of Darwin’s natural selection in complete sentences.

1) There are 2 types of worms: worms that eat at night (nocturnal) and worms that eat during the day (diurnal). The birds eat during the day and seem to be eating ONLY the diurnal worms. The nocturnal worms are in their burrows during this time. Each spring when the worms reproduce, they have about 500 babies but only 100 of these 500 ever become old enough to reproduce.

a. What worm has natural selection selected AGAINST? ____________________ FOR? ____________________

b. Darwin’s 5 points: Identify the 5 points in the scenario above.

1. Population has variations. __________________________________________________
2. Some variations are favorable. _______________________________________________
   _______________________________________________________________________
3. More offspring are produced than survive. ______________________________________
4. Those that survive have favorable traits. _________________________________________
   _______________________________________________________________________
5. A population will change over time. ___________________________________________
   _______________________________________________________________________

Assignment #6: Complete the following worksheet in the space provided below.
2) There are 3 types of polar bears: ones with thick coats, ones with thin coats and ones with medium coats. It is fall, soon to be winter. The temperatures are dropping rapidly and the bears must be kept warm, or they will freeze to death. Many of the bears have had ~2 cubs each but due to the extreme temperatures, many mothers only have one cub left.

   a. What bear has natural selection selected AGAINST? ______________   FOR? ______________

   b. Darwin’s 5 points: Identify the 5 points in the scenario above.

1. Population has variations. ............................................................
2. Some variations are favorable. ....................................................
3. More offspring are produced than survive. ...................................
4. Those that survive have favorable traits. ....................................
5. A population will change over time. ............................................

3) In ostriches, there are 2 types: ones that run fast and those that run slowly. The fast birds can reach up to 40 miles an hour. Jackals love to eat ostrich, and they can reach speeds of up to 35-40 miles per hour. A flock of ostrich will lay ~ 10 eggs (each mother only lays 1), but many rodents break into the eggs and eat the fetus before they hatch.

   a. Which ostrich has natural selection selected AGAINST? ______________   FOR? ______________

   b. Darwin’s 5 points: Identify the 5 points in the scenario above.

1. Population has variations. ............................................................
2. Some variations are favorable. ....................................................
3. More offspring are produced than survive. ...................................
4. Those that survive have favorable traits. ....................................
5. A population will change over time. ............................................
4) There are two types of rabbits: those that strictly eat grass and those that strictly eat berries and flowers. A drought occurs one year, and the plants have difficulty producing any extras (flowers, berries, etc.). They can only try and keep themselves green. The rabbits have had babies all year long but many are eaten by foxes or hawks. Due to the drought, many have starved to death.

a. What rabbit has natural selection selected AGAINST? ______________ FOR? ______________

b. Darwin’s 5 points: Identify the 5 points in the scenario above.

1. Population has variations. __________________________________________________

2. Some variations are favorable. _______________________________________________

3. More offspring are produced than survive. ________________________________

4. Those that survive have favorable traits. _________________________________

5. A population will change over time. ______________________________________

__________________________________________________________
Lesson 1.7 – Artificial Selection

Darwin and Pigeons

☐ Darwin was aware of how _____________________________________________________
for their own purposes because he was interested in ____________________________

☐ Pigeon breeders had selectively bred the ________________________________
(pigeon) into ________________________, some for racing, some for appearance, and some for meat

☐ They had done so by _________________________________ they were
____________________, such as the __________ of their feathers, and only breeding together the pigeons that
____________________________________

Artificial Selection

☐ The process of __________________________________________________ in _______________
______________ by ______________ which organisms __________ together is now called
________________________

☐ Artificial selection is similar to natural selection in that it is __________________________
and __________________ of organisms which __________________________ in the population

☐ Artificial selection also causes the alleles that are selected to become _____________________
in the population over time, causing the ________________________________
The important **difference** between the two is that the selection pressures in artificial selection are ____________________________ (i.e. they are artificial) rather than by the ________________________

**Animal Breeding**
- All domesticated animals – such as dogs, cats, sheep, horses, and cows – are the products of ____________________________ of artificial selection by ________________________
- ___________ were the first organism to be artificially selected by humans, perhaps as early as 36,000 years ago, using a population of Eurasian gray ____________ that is now extinct
Since that time we have domesticated other animal species for meat (__________), milk (__________), and physical labour (__________).

**Plant Breeding**

Almost all of the plant foods that we grow are also __________ organisms resulting from long periods of ________________.

__________ were probably the first plants to be domesticated by humans, around 12,000 years ago from Middle Eastern grasses.

Since then we have domesticated plants for their __________ (grains, rice, peas, beans), ________ (apples, oranges, berries), __________ (lettuce, spinach, kale), ________ (onions, celery), and __________ (carrots, beets).

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**Comparison of Wild and Domesticated Peaches**

- **Natural Peach, 4000 B.C.**
  - 64% edible flesh
  - Tastes earthy, sweet, sour, and slightly salty
  - 36% stone
  - Only found in China
  - 3 known varieties

- **Artificial Peach, 2014**
  - 90% edible flesh
  - Soft, edible skin
  - 10% stone
  - Grown in 13 countries
  - ~200 varieties
  - 100 mm diameter
  - 64 times larger
  - Almost produced 1% white flower
  - 8.9% water
  - 8.4% sugars
  - 8.6% other

---

*Image: wheat was domesticated about 12,000 years ago*
Modern Agriculture

Modern agriculture grows ______________________ of plants or animals of the ________ kind (called a __________________) in as __________________ as possible, using ______________________ do as much of the physical labour as possible.

This system is __________________________ and produces ________ food globally than is required (sadly distribution of the food is not equal), but has several disadvantages:

- ________________________________
in our crops and animal breeds means that they are vulnerable to the same ______________

- Crops and animals are selected for their ___________________________, not necessarily for their ____________________________ or __________________________

- Welfare of crops and animals is ____________ to how efficiently they can be grown
1.7 Worksheet: Artificially Selecting Dogs

OVERVIEW

1. You will learn how artificial selection can be used to develop new dog breeds with characteristics that make the dog capable of performing a desirable task.
2. You will begin by examining canine features and their functions.
3. Then, you will be given a scenario that describes the type of task you need a new breed of dog to perform.
4. Next, you will select two existing breeds you feel will most likely produce a successful new breed and determine the resulting offspring’s characteristics.

PROCEDURE

1. You will be trying to artificially select a new dog with certain traits by crossing two existing breeds. Look at your Ownership Card, and put you and your partner’s name on the card. Follow the directions given in Part 1, and complete it.
2. Next, look at your Dog Breeds Handout and review the descriptions given for each breed. Discuss this information with your partner and select two dogs that have the features most likely to produce a breed with the features you need. In Part 2 of your Ownership Card, write in the breed names and reasons for your selections.
3. Now, choose which dog will be the mother and which will be the father. Circle the gender of each under the breed name in Part 2 of your Ownership Card. Your breeding pair will produce 3 puppies and each puppy will have a chance of inheriting traits from either the mother or father.
4. You will use a penny to determine which trait is inherited by your puppy. Keep track using the Puppy Traits – Generation 1 table provided. You will fill in the Puppy #1 column. Flip the coin for each trait. Write in the trait that is inherited each time.
   • Heads = females (mother’s) trait is inherited
   • Tails = males (father’s) trait is inherited
5. Repeat step 4 again for Puppy #2 and again for the Puppy #3
6. Now, pick the puppy you feel would get you closest to your goal in another round of breeding. Record this puppy in Part 3 of your Ownership Card, and explain why you picked it.
7. After making your puppy selection, visit with a neighbouring group, and collect “trait” information for a puppy from that group’s you feel would most likely get you closer to your goal. Record these on the “Puppy Traits – Generation 2” handout. Circle the gender of each dog under the breed name in Part 3 of your Ownership Card.
8. Next, repeat steps 3, 4, and 5, except now use Puppy Traits – Generation 2 to record your data.
9. Pick the puppy from this second generation which you feel will provide a dog that can perform the assigned task, and draw this puppy on the last page, labelling the significant features of this animal.
**Assignment:** “You are a dog breeder. You have been contacted by a scientist who wants dogs that could be used to see and retrieve waterfowl (ducks and geese) from lakes in the area so the birds can be tagged and re-released. The birds are very skittish (scare easily) and must be retrieved unharmed and with a minimum amount of stress.”

**Part 1:** Desired Features of the New Breed

For each feature below, circle the desired form you ideally want your dogs to have. For features that you do not think will affect your breed’s ability to perform the given task, circle “any.”

<table>
<thead>
<tr>
<th>Physical Features</th>
<th>Desired Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td>above average</td>
</tr>
<tr>
<td>Sight</td>
<td>above average</td>
</tr>
<tr>
<td>Hearing</td>
<td>above average</td>
</tr>
<tr>
<td>Speed</td>
<td>above average</td>
</tr>
<tr>
<td>Endurance</td>
<td>above average</td>
</tr>
<tr>
<td>Strength</td>
<td>above average</td>
</tr>
<tr>
<td>Coat color</td>
<td>very dark</td>
</tr>
<tr>
<td>Hair length</td>
<td>long</td>
</tr>
</tbody>
</table>

**Behavioral Features**

<table>
<thead>
<tr>
<th></th>
<th>Desired Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainability</td>
<td>high</td>
</tr>
<tr>
<td>Disposition</td>
<td>vicious</td>
</tr>
<tr>
<td>Bark</td>
<td>very loud</td>
</tr>
</tbody>
</table>

**Part 2:** Dog breeds chosen to mate: __________________________ X __________________________ (Generation 1)

male or female  male or female  (circle)

Reason:

**Part 3:** Dog breeds chosen to mate: __________________________ X Neighbor’s Puppy (Generation 2)

male or female  male or female  (circle)

Reason:
## Dog Breeds

<table>
<thead>
<tr>
<th>Breed</th>
<th>Physical Features</th>
<th>Behavioral Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tally Collie</td>
<td>Smell: above average</td>
<td>Trainability: average</td>
</tr>
<tr>
<td>Floxich</td>
<td>Sight: average</td>
<td>Disposition: meek</td>
</tr>
<tr>
<td>Gootagan</td>
<td>Hearing: above average</td>
<td>Bark: average</td>
</tr>
<tr>
<td>Spalling</td>
<td>Speed: above average</td>
<td>Bark: very loud</td>
</tr>
<tr>
<td>Cruxtic</td>
<td>Endurance: below average</td>
<td>Disposition: meek</td>
</tr>
<tr>
<td>Horvisianer</td>
<td>Strength: above average</td>
<td>Bark: very loud</td>
</tr>
</tbody>
</table>

### Physical Features
- **Smell**: above average, average, above average, below average, average, above average
- **Sight**: average, average, average, average, average, average
- **Hearing**: above average, average, average, above average, average, above average
- **Speed**: above average, average, above average, above average, above average, above average
- **Endurance**: below average, average, above average, average, below average, below average
- **Strength**: above average, above average, average, below average, below average, below average
- **Coat color**: black, brown, white, white, brown, black
- **Hair length**: long, medium, long, short, medium, long

### Behavioral Features
- **Trainability**: average, average, high, high, low, high
- **Disposition**: meek, meek, vicious, meek, compatible, vicious
- **Bark**: average, very loud, average, very quiet, very loud, average
## Puppy Traits - Generation #1

<table>
<thead>
<tr>
<th>Physical Features</th>
<th>Puppy #1</th>
<th>Puppy #2</th>
<th>Puppy #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Speed</td>
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<tr>
<td>Endurance</td>
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<tr>
<td>Strength</td>
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<td></td>
</tr>
<tr>
<td>Coat color</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hair length</td>
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<td></td>
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</tbody>
</table>

**Behavioral Features**

<table>
<thead>
<tr>
<th>Behavioral Features</th>
<th>Puppy #1</th>
<th>Puppy #2</th>
<th>Puppy #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bark</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Puppy Traits - Generation #2

<table>
<thead>
<tr>
<th>Physical Features</th>
<th>Neighbouring Puppy Traits</th>
<th>Puppy #1</th>
<th>Puppy #2</th>
<th>Puppy #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td></td>
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Drawing of your Best Artificially Selected Puppy