Genetics and Reproduction Test Review Sheet

<table>
<thead>
<tr>
<th></th>
<th><strong>Sexual Reproduction</strong></th>
<th><strong>Asexual Reproduction</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Parents</td>
<td>2 Parents</td>
<td>1 Parent</td>
</tr>
<tr>
<td>Characteristic of offspring</td>
<td>Similar to parent</td>
<td>All offspring identical to parent and one another</td>
</tr>
<tr>
<td>Advantage</td>
<td>Allows for genetic variation, creates species able to adapt to new environments</td>
<td>Happens faster, no need to find a mate</td>
</tr>
<tr>
<td>Disadvantage</td>
<td>Takes longer, have to find a mate</td>
<td>No genetic variation, organisms can be wiped out by a single disease</td>
</tr>
<tr>
<td>Variation of genetic offspring</td>
<td>Genetically diverse</td>
<td>No genetic variation or diversity</td>
</tr>
</tbody>
</table>

What type of reproduction is shown in the pictures above? Asexual Reproduction

All offspring created through this process are **Identical** to the parent and contain NO **Genetic** variation.
Fill in the blanks using the word bank below

<table>
<thead>
<tr>
<th>Recessive</th>
<th>Phenotype</th>
<th>offspring</th>
<th>Homozygous</th>
<th>Dominant</th>
<th>Identical</th>
<th>Heterozygous</th>
<th>Genotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heredity</td>
<td>Sexual</td>
<td>Asexual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The **Dominant** gene masks the effects of the **Recessive** gene. The genetic makeup of an organism is its **Genotype** which expresses an organism’s appearance known as the **Phenotype**

**Heredity** is the passing of traits from parent to offspring through **Sexual** reproduction. All prokaryotes undergo **Asexual** reproduction in which all offspring are **Identical** to the parent. BB represents a **homozygous** genotype while Bb represents a **Heterozygous** genotype.

If tall (T) is dominant over short (t), complete the following:

Write the Genotypes:
- Homozygous Dominant = **TT**
- Homozygous Recessive = **tt**
- Heterozygous = **Tt**

If black fur (B) is dominant over white fur (b), complete the following

Write the Phenotypes:
- **BB = Black Fur**
Bb = Black Fur
bb = White Fur

In pea plants, the allele for green for green pods (G) is dominant over the alleles for yellow pods (g). The table below shows the phenotypes of the offspring produced from a cross of two plants with green pods.

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Number of Offspring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Pods</td>
<td>20</td>
</tr>
<tr>
<td>Yellow Pods</td>
<td>5</td>
</tr>
</tbody>
</table>

Total Offspring = 25

a. Calculate what percent of the offspring produce yellow pods.
   20%

b. Calculate what percent of the offspring produce green pods.
   80%

c. What is the genotype of the offspring with yellow pods?
   gg

d. What are the possible genotypes of the offspring with green pods?
   GG Gg

e. How can you tell if a trait is dominant or recessive just by looking at the number of offspring?
   The dominant trait appears majority of the time. The trait that appears more often on individual offspring is the dominant trait.

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**SpongeBob Genetics**

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho).

   TT Ho  Bb He  DD Ho  Ff He  tt Ho  dd Ho
   Dd He  ff Ho  Tt He  bb Ho  BB Ho  FF Ho

2. Determine the phenotype for each genotype using the information provided about SpongeBob. Yellow body color is dominant to blue.

   YY Yellow Body  Yy Yellow Body  yy Blue Body

   Square shape is dominant to round.

   SS Square  Ss Square  ss round

3. SpongeBob SquarePants recently met SpongeSusie Roundpants at a dance. SpongeBob is heterozygous for his square shape, but SpongeSusie is round. Create a Punnett square to show the possibilities that would result. Square shape (R)  round shape (r)
A. List the possible genotypes and phenotypes for their children.

- **Rr** → Square
- **rr** → round

B. What are the chances of a child with a square shape? 50%

C. What are the chances of a child with a round shape? 50%

<table>
<thead>
<tr>
<th>R</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rr</td>
<td>rr</td>
</tr>
</tbody>
</table>

4. For each phenotype, give the genotypes that are possible for Patrick.

- A tall head (T) is dominant to short (t).
  - Tall = **TT** or **Tt**
  - Short = **tt**

- Pink body color (P) is dominant to yellow (p).
  - Pink body = **PP** or **Pp**
  - Yellow body = **pp**

5. Patrick met Patti at the dance. Both of them are heterozygous for their pink body color, which is dominant over a yellow body color. Create a Punnett square to show the possibilities that would result if Patrick and Patti had children.

<table>
<thead>
<tr>
<th>P</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>PP</td>
</tr>
<tr>
<td>p</td>
<td>Pp</td>
</tr>
</tbody>
</table>

A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with a pink body? 75%

C. What are the chances of a child with a yellow body? 25%

Use the diagram to the left to answer the following questions.

- All eukaryotic (1) **Cells**
  - contain a (2) **Nucleus**
    - which is the brain of the cell. Within the
  - (2) **Nucleus** there are (3) **Chromosomes**
    - There are a total of 46
  - (3) **Chromosomes** inside the
  - (2) **Cell**
  - (3) **Chromosomes** are made of
  - (4) **DNA**. A sequence of
  - (4) **DNA** make up a gene.
True (T) or False (F):

T All the cells in your body have the same identical DNA
T My DNA is different than your DNA
F Prokaryotes undergo sexual reproduction