Lesson Title: Genetics of Glofish

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Subject: Genetics Overview

Date: 5/7/13

Length: 1 hour

Purpose of the Lesson: This lesson and worksheet provide a general review of genetics at a 7th grade science level. It will integrate terminology of genetics; introduce Punnett squares and the development of Glofish

Materials:

Power point

Worksheet

Visual Aids- provided in the power point

Procedure

The teacher will present the power point until the dihybrid cross portion. This power point will provide students with the knowledge to complete the worksheet.

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For each of the genotypes below, determine the phenotype.

|  |  |
| --- | --- |
| *Stripped (P) fish are dominant to Spotted (p) Fish*  PP \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Pp \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  pp \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | *Brown eyes (B) are dominant to blue eyes (b)*  BB \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Bb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  bb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *Normal fin (R) is dominant to Long Fin(r)*  RR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Rr \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  rr \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |

2. For each genotype, indicate whether it is heterozygous (HE) or homozygous (HO)

|  |  |
| --- | --- |
| AA \_\_\_\_  Bb \_\_\_\_  Cc \_\_\_\_  Dd \_\_\_\_ | Ee \_\_\_\_  ff \_\_\_\_  GG \_\_\_\_  HH \_\_\_\_ |

3. For each phenotype, list the genotypes.

|  |  |
| --- | --- |
| *Striped (P) is dominant to Spotted (p).*  \_\_\_\_\_\_\_\_\_\_\_\_ straight  \_\_\_\_\_\_\_\_\_\_\_\_ straight  \_\_\_\_\_\_\_\_\_\_\_\_ curly | *Pointed heads(r) are recessive to round heads (R)*  \_\_\_\_\_\_\_\_\_\_\_\_ pointed  \_\_\_\_\_\_\_\_\_\_\_\_ pointed  \_\_\_\_\_\_\_\_\_\_\_\_ round |

4. For each cross, indicate the which type of inheritance pattern is being expressed (Dominant, recessive, codominant, or incomplete dominance)

a. If normal fin is dominant to long fin and progeny have long fins. \_\_\_\_\_\_\_\_\_

b. If a red fish and a blue fish are crossed, and some progeny are different shades of purple. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Set up the square for each of the crosses listed below. The fish trait being studied is Striped pigment pattern (dominant) and Spotted pigment pattern (recessive). Put the genotypes of the gametes in the shaded boxes and the genotypes of the progeny in the white boxes.

**Pp x pp**

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

What percentage of the offspring will be striped? \_\_\_\_\_\_\_\_\_\_\_

**Pp x Pp**

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

What percentage of the offspring will be striped? \_\_\_\_\_\_\_\_\_\_\_

**PP x Pp**

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

What percentage of the offspring will be striped? \_\_\_\_\_\_\_\_\_\_\_

**Answer Key**

1. For each of the genotypes below, determine the phenotype.

|  |  |
| --- | --- |
| *Striped (P) fish are dominant to Spotted(p) Fish*  PP  **Striped**  Pp  **Striped**  pp  **Spotted** | *Brown eyes (B) are dominant to blue eyes (b)*  BB  **Brown**  Bb  **Brown**  bb  **Blue** |
| *Normal fin (R) is dominant to Long Fin(r)*  RR  **Normal Fin**  Rr   **Normal Fin**  rr    **Long Fin** |  |

2. For each genotype, indicate whether it is heterozygous (HE) or homozygous (HO)

|  |  |
| --- | --- |
| AA  **HO**  Bb  **HE**  Cc **HE**  Dd  **HE** | Ee **HE**  ff   **HO**  GG  **HO**  HH  **HO** |

3. For each phenotype, list the genotypes. (Remember to use the letter of the dominant trait and homzygous or heterozygous genotypes)

|  |  |
| --- | --- |
| *Striped(S) is dominant to Spotted(s).*  \_\_\_**SS**\_\_\_\_\_\_\_\_\_ straight  \_\_\_**Ss**\_\_\_\_\_\_\_\_ straight  \_\_\_**ss**\_\_\_\_\_\_\_\_\_ curly | *Pointed heads(r) are recessive to round heads (R)*  \_\_\_\_\_**rr**\_\_\_\_\_\_\_ pointed  \_\_\_\_\_**Rr**\_\_\_\_\_\_\_ round  \_\_\_\_\_**RR**\_\_\_\_\_\_\_ round |

4. For each cross, indicate the which type of inheritance pattern is being expressed (Dominant, recessive, or codominant)

a. If normal fin is dominant to long fin and progeny have long fins. \_\_\_**Recessive**\_\_\_\_\_\_

b. If a red fish and a blue fish are crossed, and some progeny are different shades of purple. \_\_\_**Incomplete dominance**

5. Set up the square for each of the crosses listed below. The trait being studied is Striped GloFish (dominant) and Spotted Fish (recessive)

**Pp x pp**

What percentage of the offspring will be striped? \_\_\_\_**50%**\_\_\_\_\_\_\_

**Pp x Pp**

What percentage of the offspring will be striped? \_\_\_\_\_**75%**\_\_\_\_\_\_

**PP x Pp**

What percentage of the offspring will be striped? \_\_\_\_\_\_**100%**\_\_\_\_\_