**Name: Period:**

  **Alien Encounters!**

 *By Judy Jones (adapted for this lesson)*

Background: In the year 2050, an incredible discovery was made in the middle of a remote area of South America. It was an isolated area where a small population of Aliens had secretly established a village. The explorers who made the discovery immediately informed the organization known as Scientific Phenomena Over Our Fabulous Sphere (S. P. O. O. F. S). S. P. O. O. F. S. sent out their best scientists to collect DNA samples. (Yes, these aliens really did have DNA!) The scientists were able to sequence small fragments of DNA. After much work, they determined that the DNA represented 9 genes.

**Purpose**: In this activity, you will determine the traits of these discovered aliens by analyzing their DNA and determining the amino acid sequences of the resulting small protein fragments. Each fragment is associated with a particular gene and a specific alien characteristic (trait).

**Procedure**:

1. Put the DNA sequence for each gene in the proper location on your data sheet.
2. Transcribe the DNA for each gene into mRNA. Record those sequences.
3. Translate the mRNA into amino acids using the provided mRNA Codon Chart. Record the amino acid sequence for each gene.
4. Use the “Alien Genes” chart to determine the traits that are associated with each of your amino acids sequences and write those traits on the charts.
5. Using a blank piece of paper, sketch and color your alien, making sure to include all relevant (known) traits.

**DATA Tables for Alien Gene Analysis: NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Alien Number \_\_\_\_\_\_\_**

Is your alien hairless or hairy? Is your alien fat or skinny?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  GENE  | A |  |  GENE | B |
| DNA |  |  | DNA |  |
| mRNA |  |  | mRNA |  |
| Amino Acids |  |  | Amino Acids |  |
| Trait |  |  | Trait |  |

Does your alien have 4 legs or 8 legs? What size nose does your alien have?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  GENE  | C |  |  GENE | D |
| DNA |  |  | DNA |  |
| mRNA |  |  | mRNA |  |
| Amino Acids |  |  | Amino Acids |  |
| Trait |  |  | Trait |  |

Does your alien have antennae or not? What color skin does your alien have?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  GENE  | E |  |  GENE | F |
| DNA |  |  | DNA |  |
| mRNA |  |  | mRNA |  |
| Amino Acids |  |  | Amino Acids |  |
| Trait |  |  | Trait |  |

How many fingers does your alien have? Does your alien have a tail?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  GENE  | G |  |  GENE | H |
| DNA |  |  | DNA |  |
| mRNA |  |  | mRNA |  |
| Amino Acids |  |  | Amino Acids |  |
| Trait |  |  | Trait |  |

Does your alien have 4 eyes or 8 eyes?

|  |  |  |
| --- | --- | --- |
|  GENE  | I |  |
| DNA |  |  |
| mRNA |  |  |
| Amino Acids |  |  |
| Trait |  |  |

**Questions:**

1. Did you find any “identical” aliens in your group?
2. How does a single change in a nitrogen base alter the formation of a resulting protein?
3. If you knew a particular amino acid sequence, could you figure out the DNA for that sequence? Why or why not?

ALIEN GENES

This table shows the amino acid sequences for the various alien genes and traits.

|  |  |  |
| --- | --- | --- |
| Gene Letter | Amino Acid Sequence | Resulting Characteristic |
| A | Val-pro-ileu | Hairless |
|  | Tryp-pro-ileu | Hairy |
| B | Tryp-val-val | fat |
|  |  Ileu-ileu-ser | skinny |
| C | Ser-ala | 4 legs |
|  | Ser-ser | 8 legs |
| D | Pro-ser-phe-gly | Long nose |
|  | Gln-ser-phe-gly | Short nose |
| E | Lys-phe | No antennae |
|  | Lys-leu | 4 antennae |
| F | Pro-ala-ala | Blue skin |
|  | Pro-ala-asp | Red skin |
|  | Pro-ala-val | Yellow skin |
|  | Pro-ala-pro | Green skin |
| G | Gln-gln-asp | 10 fingers |
|  | Gln-gln-lys | 12 fingers |
| H | Gly-gly-ileu | tail |
|  | ala-gly-ileu | No tail |
| I | Ileu-asp-ala | 4 eyes |
|  | Ser-asp-ala | 8 eyes |

Name: Period:

**Alien Picture**

**Alien’s Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Alien’s Number \_\_\_\_**

**Trait 1:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Trait 6:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Trait 2:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Trait 7:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Trait 3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Trait 8:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Trait 4: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Trait 9:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Trait 5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Recovered Sequences = Alien Species #1

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C G A

GENE G: G T C C T C C T A

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #2

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C G G G

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #3

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C T A

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #4

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G G T A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C A A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #5

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C G A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #6

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C G G G

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #7

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C T A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #8

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C A A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #9

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C G A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #10

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C G G G

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #11

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C T A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #12

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C A A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #13

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C T A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #14

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C G G G

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #15

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C G A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #16

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C G A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #17

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C G G G

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #18

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C T A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #19

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C A A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #20

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C A A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #21

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C T A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #22

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C G G G

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #23

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C G A

GENE G: G T C G T C T T T

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #24

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C G A

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #25

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C G G G

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #26

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C T A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #27

GENE A: C A A G G A T A T

GENE B: T A T T A T A G C

GENE C: A G C A G G

GENE D: G G T A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C C A A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #28

GENE A: A C C G G T T A T

GENE B: T A T T A T A G C

GENE C: A G C C G A

GENE D: G G T A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C A A

GENE G: G T C G T C T T T

GENE H: C G C C C C T A T

GENE I: T A T C T A C G C

Recovered Sequences = Alien Species #29

GENE A: C A A G G A T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A A

GENE F: G G A C G C C T A

GENE G: G T C G T C C T A

GENE H: C G C C C C T A T

GENE I: A G C C T A C G C

Recovered Sequences = Alien Species #30

GENE A: A C C G G T T A T

GENE B: A C C C A A C A A

GENE C: A G C C G A

GENE D: G T C A G G A A A C C C

GENE E: T T T A A C

GENE F: G G A C G C G G G

GENE G: G T C G T C C T A

GENE H: C C C C C C T A T

GENE I: A G C C T A C G C