**Analysis Document**

**Learning Goals** – Students will learn that all living organisms are able to maintain homeostasis. These will be taught in the four content areas of: Science, Math, Language Arts and Social Studies. Students will understand the relationship between structure and function of organs and organ systems.

**Needs Analysis –**

**The Utah State Biology Core: Standard #3 states:**

Students will understand the relationship between structure and function of organs and organ systems.

I will give a pretest on organs and organ systems to assess the background knowledge of students taking Biology.

**Learner Analysis**

Demographics –

* + 10th – 12th grade students enrolled in general High School Biology.
  + Three classes of Biology taught on the Block Schedule. Each class period lasts about 84 minutes.
    - 1st period - 22 males and 12 females;
    - 4th period - 23 males and 12 females;
    - 8th period - 20 males and 15 females.
* Through analysis of data from *Data Dashboard,Skyward, and use of* student surveys, found the following information about my students.
* **CRT test data from last Science CRT -** Proficiency level of 3 or 4 is considered sufficient mastery of course content.
* **PLAN test Data –** The PLAN test is administered to sophomores, (10th grade) students and is considered a “practice” ACT test. It is scored the same way as the ACT. The Science portion of the test (Science Reasoning) requires a benchmark of 24 or above. The goal is for students to be at or above benchmark for all four areas tested. Benchmark for English is 18, Reading is 21, Math is 22 and Science is 24. The following data identifies current Biology students at or above benchmark or below benchmark. Since in Biology we do many labs that are math based I looked at both the math and science scores on the PLAN test.

Current grade distribution - 1st period

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Quarter | 90% and above | 80% -89% | 70%-79% | 60% - 69% | 59% and below |
| 1 | .36 | .33 | .15 | .9 | .9 |
| 2 | .39 | .15 | .17 | .12 | .15 |

Current grade distribution - 4th Period

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Quarter | 90% and above | 80% -89% | 70%-79% | 60% - 69% | 59% and below |
| 1 | .40 | .16 | .09 | .21 | .03 |
| 2 | .36 | .30 | .10 | .10 | .13 |

Current grade distribution - 8th Period

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Quarter | 90% and above | 80% -89% | 70%-79% | 60% - 69% | 59% and below |
| 1 | .47 | .20 | .20 | .06 | .06 |
| 2 | .33 | .31 | .19 | .14 | .03 |

**The information on the table below was obtained from *Data Dashboard*.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Classes** | **M/F ratio** | **Overall GPA** | **Science CRT (last one taken) Proficiency level** |
| **1st Period Biology** | **26 males**  **9 Females** | **15 3.0+**  **9 2.0-2.99**  **8 1.0-1.99**  **3 below 1.0** | **9 - Level 4 substantial**  **12 - Level 3 Sufficient**  **2 – Level 2 Partial**  **0 – Level 1 Minimal**  **12- N/A** |
| **4th Period**  **Biology** | **22 males**  **12 Females** | **16 – 3.0+**  **9 2.0 – 2.99**  **7 1.0 – 1.99**  **3 below 1.0** | **24 - Level 4 substantial**  **1 - Level 3 Sufficient**  **3 – Level 2 Partial**  **0 – Level 1 Minimal**  **8- N/A** |
| **8th Period Biology** | **20 males**  **15 Females** | **21 – 3.0+**  **12 2.0 – 2.99**  **2 1.0 – 1.99**  **0 below 1.0** | **17 - Level 4 substantial**  **10 - Level 3 Sufficient**  **3 – Level 2 Partial**  **1 – Level 1 Minimal**  **4- N/A** |

All Biology Classes - PLAN test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Class | Total students taking PLAN test | At or above Benchmark Science | At or above Benchmark Math | Below Benchmark Science | Below Benchmark Math | Not tested |
| 1st Period | 26 | 8 | 12 | 18 | 14 | 6 |
| 4th Period | 32 | 8 | 13 | 23 | 18 | 2 |
| 8th Period | 33 | 5 | 13 | 28 | 20 | 2 |

Students on IEP/504 Plans.

1st period –

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Period | ELL | Youth in Custody | Health | IEP**/504** |
| 1st | 4 | 1 | 2 asthma 3 allergies 1 autism 1 neurological | 1 |
| 4th | 1 | 1 | 1 Drug allergy 4 asthma 1 diabetes 1 liver transplant 1 no colon | 1 ADHD |
| 8th | 1 | 0 | 4 asthma 1 drug allergy | 1 IEP -SpEd |

**Student Survey:** I surveyed all three of my Biology classes (110 students) with a 50 question survey. Responses below are the those I chose from the 50 asked, that I believe provided some interesting feedback about my students.

Students read statements and marked whether they **strongly agreed** with the statement, **agreed** with the statement, **neither agreed nor disagreed** with the statement, **disagreed** with the statement**,**or **strongly disagreed** with the statement. I calculated the percentage of students who strongly agreed or agreed and combined those percentages, I also combined the percentages of students who disagreed or strongly disagreed. I did not include the data for the answer “neither agree or disagree”.

|  |  |  |
| --- | --- | --- |
| **Questions** | **Strongly Agree/ Agree (%)** | **Strongly disagree/ disagree (%)** |
| Education is important to my family | 96 | 1 |
| Education is important to me | 96 | 3 |
| I do well in school | 84 | 3 |
| School is interesting to me | 91 | 4 |
| Doing well in school is important to my future success | 98 | 2 |
| My parents support my education | 97 | 1 |
| I am involved in extracurricular activities | 69 | 13 |
| My parents check Skyward often (once per week) | 79 | 10 |
| My parents expect me to talk to teachers and get extra help when I am not doing well in class(es) | 89 | 3 |
| My parents take away privileges if I do not do well in classes | 61 | 11 |
| My friends work hard in school | 68 | 11 |
| I am motivated to do well in school | 86 | 5 |
| I rarely miss school | 81 | 4 |
| I have never had to attend Hawk Study Hall to make up a NG | 72 | 24 |
| I am interested in Science | 44 | 25 |
| I do well in my science classes | 57 | 7 |
| I believe doing well in science is important | 65 | 7 |
|  |  |  |
| I am curious and like to study and learn things about nature and the world around me | 61 | 19 |
| I would consider a career that has a strong emphasis on Science (medicine, engineering, etc.) | 52 | 7 |
| I am only taking science because it is a required class | 58 | 33 |
| I will probably take more science classes that what are required for graduation | 39 | 40 |
| I like to read science fiction | 35 | 48 |
| I like to watch science programs such as documentaries or nature shows on TV even when they aren’t assigned | 38 | 30 |
| I like to spend time in nature; camping, hiking, or other outdoor activities | 78 | 7 |

The second part of the survey was about technology and students responded by answering **yes** or **no**.

Table 2

|  |  |  |
| --- | --- | --- |
| **Question** | **Yes (%)** | **No (%)** |
| I have a cell phone for my own use | 89 | 11 |
| I use my cellphone to research information that will help me learn | 54 | 46 |
| Most of my friends have cell phones | 91 | 9 |
| I have access to a computer in my home for doing homework and projects | 88 | 12 |
| I have my own computer (laptop, desktop) | 37 | 63 |
| I have and iPad or similar device for my personal use | 44 | 56 |
| I check Skyward often and am aware of my grades | 73 | 27 |

**Task Analysis : Per Utah State Science (Biology) core.**

Students will understand the relationship between structure and function of organs and organ systems.

Objective 1: Describe the structure and function of organs.

* Diagram and label the structure of the primary components of representative organs in plants and animals
  + Heart – heart muscle tissue, valves and chambers
  + lung – trachea , bronchial tree, alveoli
  + leaf- veins, stomata, stem, xylem, phloem, cambium, root, root tip, root hairs,
  + skin – layers, sweat glands, oil glands, hair follicles
  + ovaries – ova, follicles, corpus luteum
  + Testes – epididymis, vas deferens
  + Information processing – nervous system, endocrine system
* Describe the function of various organs
* Relate the structure of organs to the function of organs.
* Compare the structure and function of organs in one organism to the structure and function of or organs in another organism.
* Research and report on technological developments related to organs.

Objective 2 : Describe the relationship between structure and function of organ systems in plants and animals.

* Relate the function of a organ to the function of an organ system
* Describe the structure and function of various organ systems
  + Digestion
  + Respiration
  + Circulation
  + Protection and support
  + Nervous
  + Endocrine
  + Reproductive
* Examine the relationships of organ systems within an organism and describe the relationship of structure to function in the relationship.
* Relate the tissues that make up organs to the structure and function of the organ.
* Compare the structure and function of organ systems in one organism to the structure and function in another organism.
  + Chicken to sheep digestive system
  + 2, 3, and 4 chamber hearts
  + fern and peach reproductive systems
* Compare the structure and function of organ systems in one organism to the structure and function in another organism (e.g., chicken to sheep digestive system; fern to peach reproductive system).

**Context for Instruction:**

The lessons outlined in this thematic unit are designed to be taught to General Biology students, enrolled in Biology at Alta High School. Biology is a core science course and is a lab based science course. Three science courses are required for high school graduation in the state of Utah. Two of the three courses must be core science courses. Students earning their credits for Biology will complete the requirement of completing one core science credit.

**Resources:**

Teacher desktop computer

Desktop computer for student use

Document camera

Video projector

Audio enhancement

Smart clickers

Computer laser printer

Computer color inkjet printer

Various and sundry lab equipment – microscopes, dissection materials, test tubes, hot plates, beakers, chemicals etc.

Copier machines in school

Paper and school supplies

Video/DVD player

**Delivery methods:**

Lecture and note-taking : Students need to learn to take notes. I have them use Cornell Method notes, and submit the notes at the end of the unit to be graded.

Small group discussion: Students who normally are reluctant to share what they know or are learning, or opinions, are often more willing to share in small group settings. It also gives students who have learned concepts an opportunity to teach others, helping them and the students they are helping to teach.

Class Discussion: This is the way I can assess what students have learned, what they don’t understand, and what to do to bridge that gap.

Lab work: Biology is a Lab science so by doing labs, students learn the process of science, follow a procedure, how to test a hypothesis (either given by me or supplied by the student ), measure results, present their data and draw conclusions.

Using models: Models help teach students how things work. They use models to learn complicated scientific concepts and processes.

Reading text: An important skill in any class is learning to read the materials of the class. Students need to learn how to find information and how to learn from reading their Biology book. This skill will be important to be “college ready”.

Primary Source reading: Biology students need to learn to read research documents that are not found in textbooks. This is an important skill on any standardized tests such as ACT or SAT

Research: Students need to learn how to research topics using technology, and non-technology resources. They need to know how to write reports about research and how to extrapolate critical information from these sources.

Worksheets: Worksheets can be a fun and organized way to learn. They are a type of formative assessment that can help in diagnosing learning gaps or seeing that learning has taken place.

Videos: Reinforcement of learning, teaching concepts that aren’t easily taught through other media.

Website: biofunhardman.weebly.com

Tutorials: For re-teaching, or remediation when needed. These are also good for differentiated instruction.

SMART clickers: Quizzes, formative assessments, surveys.