EDC 365E/UTS 360: Project-Based Instruction

PBI Unit Project Milestone 4

**Formative Assessment 1**

**Overview of the Assessment**

In the benchmark over graphing linear equations, there are two formative assessments for both days. The first day is the worksheet they work on must be completed by the end of class. This lets the teacher know where every student is in their thinking, and it is not taken for a grade. The second day the teacher chooses a group that had an error in their activity to present their work. This allows the teacher to see if the class knows how to do the activity, because if they don’t catch the error then you know the students need to continue to work on this topic.

**Target Objectives**

This assessment target the following objectives:

* Identify domains and ranges of functions
* Determine functional relationships from data
* Explain why data is a linear function

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This assessment is aligned with following TEKS:

* Algebra 1

(1) Foundations for functions. The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways. The student is expected to:

(A) Describe independent and dependent quantities in functional relationships;

(B) Gather and record data and use data sets to determine functional relationships between quantities;

(D) Represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and

**Formative Assessment 2**

**Overview of the Assessment**

In the investigation over graphing plant growth data, there is opportunity for formative assessment in picking up the students activity sheets. On the sheet the students have to explain their reasoning for why they think one fertilizer is better than others. From this written explanation you can estimate where your students are in their understanding of the concept and make adjustments accordingly.

**Target Objectives**

This assessment target the following objectives:

* Identify domains and ranges of functions
* Determine functional relationships from data
* Explain why data is a linear function

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This assessment is aligned with following TEKS:

* Algebra 1

(1) Foundations for functions. The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways. The student is expected to:

(A) Describe independent and dependent quantities in functional relationships;

(B) Gather and record data and use data sets to determine functional relationships between quantities;

(D) Represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and

**Formative Assessment 3**

**Overview of the Assessment**

This formative assessment is during the investigation about the best fertilizer and seeds, and what is most cost efficient. The students will have already chosen in previous investigation a best fertilizer, but now they will be discussing in groups what is the most cost efficient, in that what the best fertilizer for the price is. We will discuss full class the reasoning for the choice of fertilizer they pick. This type of discussion allows the teacher to hear the student’s justifications, and also the classes’ reaction to those explanations. From this the teacher gets to observe the students and it lets the teacher make adjustments to future schedule, or jump into discussion and correct mistakes.

**Target Objectives**

This assessment target the following objectives:

* Understand mathematical terms and their applications in science.
* Verbally describe linear functions through their experimental findings.

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This assessment is aligned with following TEKS

* Algebra 1

(1)(E) Interpret and make decisions, predictions, and critical judgments from functional relationships.

(2)(C) Interpret situations in terms of given graphs or creates situations that fit given graphs; and

(D) Collect and organize data, make and interpret graphs make decisions and critical judgments in problem situations.

**Formative Assessment 4**

**Overview of the Assessment**

In the benchmark lesson introducing quadratics, the 5E lesson type makes formative assessment easily accessible throughout the lesson. When the whole class comes back together for discussion of the activity it allows for the teacher to see students misconceptions and struggles over the topic.

**Target Objectives**

This assessment target the following objectives:

* Identify what a quadratic function looks like.
* Analyze graphs of quadratic functions.

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This lesson addresses the following TEKS:

Algebra 1

(9) Quadratic and other nonlinear functions. The student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions. The student is expected to:

(D) Analyze graphs of quadratic functions and draw conclusions.

**Formative Assessment 5**

**Overview of the Assessment**

In the investigation about population growth and food production, the teacher leads a group discussion over the activity, asking students to present their findings and getting other students to participate in discussion. During this time the teacher can call on different students to see their knowledge of the topic.

**Target Objectives**

This assessment target the following objectives:

* Analyze graphs of quadratic functions.

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This lesson addresses the following TEKS:

Algebra 1

(9) Quadratic and other nonlinear functions. The student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions. The student is expected to:

(D) Analyze graphs of quadratic functions and draw conclusions.

**Formative Assessment 6**

**Overview of the Assessment**

An exit ticket will be administered at the end of the Mendelian genetics section. It will focus on Punnett squares. This exit ticket will provide information for next day’s investigation. It will also get students thinking about the relationship that Punnett squares have to math. I will use the feedback to decide what needs to be reinforced before the students can proceed with the investigation. A bell ringer will also be administered at the beginning of Investigation Part 1b to make sure students are ready for “tougher” problems.

**Target Objectives**

This assessment target the following objectives:

* Students will review the main idea
* Students will show their understanding of what a Punnett square is.
* Students will make mathematic connections to the Punnett square model, i.e., percentages.
* Students will give an example of what they could use a Punnett square for
* Students will analyze the advantages/ disadvantages of Mendian Genetics

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This assessment is aligned with following TEKS:

**§112.34. Biology, Beginning with School Year 2010-2011**

(c) Knowledge and skills.

(2) Scientific processes. The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(G) Analyze, evaluate, make inferences, and predict trends from data; and

(H) Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to:

(A) Identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA;

(D) Recognize that gene expression is a regulated process;

(F) Predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance;

**Exit Ticket:**

What kind of information can you find from Punnett squares?

Give an example of a Punnett square application

What kind of mathematics can you get from a Punnett square? How is this usefull?

Make a Punnett square, write all the appropriate information:

* Two heterozygous white (brown fur is recessive) rabbits are crossed.

**Bell Ringer**

**Answer the following question to the best of your ability. Show your work:**

1. What are the possible offspring of the following crossing:

Homozygous rose without thorns (tt) *×* Heterozygous rose with thorns (Tt)?

1. Yellow seeds are dominant over green seeds in pea plants. Fill in the Punnett square and determine the expected genotypic and phenotypic ratios from crossing homozygous recessive and homozygous dominant parents.

Genotype:

Phenotype:

**Formative Assessment 7**

**Overview of the Assessment**

Students will answer questions that are exit- ticket like, but they will do it in a think- pair- share manner. Students will be given time to answer the questions on their own and then to come together in small groups and share their answers. After this one person from each group will show one the rest of the class how to do one of the problems. Each problem given focuses on the key ideas of the Benchmark lesson.

**Objectives**

Students will be able to:

* Make predictions about populations using the Hardy- Weinberg equation
* List the five factors influencing H-W.
* List the H-W equations and describe what they mean
* Use previous knowledge to integrate H-W and natural selection together.

**Alignment with Texas Essential Knowledge and Skills (TEKS)**

This lesson addresses the following TEKS:

**§112.34. Biology, Beginning with School Year 2010-2011**

(c) Knowledge and skills.

(2) Scientific processes. The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(G) Analyze, evaluate, make inferences, and predict trends from data; and

(6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to:

(A) Identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA;

(D) Recognize that gene expression is a regulated process;

(F) Predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance;

(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:

(C) Analyze and evaluate how natural selection produces change in populations, not individuals;

(D) Analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

**Think Pair Share:**

1. What conditions are necessary for populations to remain in Hardy-Weinberg equilibrium?
2. What can be predicted by using the Hardy-Weinberg equation?
3. Why is phenotypic variation necessary for natural selection and sexual selection?
4. Answer the following problem:
5. Within a population of butterflies, the color brown (B) is dominant over the color white (b). And, 40% of all butterflies are white. Given this simple information, which is something that is very likely to be on an exam, calculate the following:
   1. The percentage of butterflies in the population that are heterozygous.
   2. The frequency of homozygous dominant individuals.

**Formative Assessment**

There is opportunity for formative assessment throughout every lesson. When students are working on group work the teacher can make their way around the room asking questions and observing students work. This also allows for the teacher to know where their students thinking is and where that teacher can scaffold their students along.