GEAR-UP MATH AND SCIENCE ANGRY BIRDS© SUMMER CAMP 2012

DO YOU LOVE PLAYING ANGRY BIRDS©?

Come join your friends for a hands-on technology summer camp, create and test your own Angry Birds© game using Algebra II and Physics.

Session Information

Who: Incoming 11th Grade Math and Science Students

When: Summer 2012

Where: High School Campus

Registration through GEAR-UP Coordinator

Contact Information: _____

Teachers at each school should provide:

Amount	Materials	Yes
	Projector and screen	
1	Teacher's computer with TI-Nspire & navigator software	
5	Tables for gym activity	
	Gym and bleachers (if available)	
	TI-inspire/TI-navigator	
2	Rolling chairs (eg desk chairs) of equal height	
	Ipads- Gear Up	
6	Spring Scales (any size)	
5	Basketballs	
50	Pencils	
10	Meter Sticks	
10	Rulers	
10	Scissors	
10	Stopwatches	
	Markers	
	Colored Pencils	
10	Motion Probes (if available)	
1	Digital Camera	
15	2L Empty Soda Bottles	
2	Bicycle Pumps	
3	Heavy books (eg textbooks)	

Consumable Material

Amount	Material
2 rolls	duck tape
2 rolls	scotch tape
2 rolls	masking tape
50 sheets	cardstock paper colored
50 sheets	constuction paper
150 sheets	lined notebook paper
250	water balloons
2pcks- 40	9" helium balloons
10	Small clear cups per camp
10+	Large clear cups per camp
200 ft	Twine
6	Glue sticks
18+	12oz cups
40	Straws

Each camp will be provided with their own set of consumable materials before their camp begins. Check with your Gear-Up coordinator.

Materials in Kit

Amount	Material	Camp 1	Camp 2	Camp 3
5 ropes	10 ft rope			
1	25 ft measuring tape			
1	Small Bucket			
5-40ft	40 ft thin rope			
4	Rubbermaid Bottle (1PT.)			
2	Toy cars (hands size)			
2	Air needle			
20 doz	Mardi Gras beads			
1	6 inch toy rubber man			
10 pcs	Wood for centripedal force			
10 pcs	1 ft of 1/2 in pvc pipe			
10	Water bottle launcher			
2	Rocket launchers			
5	Plastic toy rockets			
13- 3yds	3 yards of vinyl tubbing			
50	BB's			
4	Rubber stoppers			

Please inventory kit Thursday PM of week 1!
The Gear-Up coordinator will deliver it to the next campus.

Angry Birds Day 1 Schedule

150 minute lesson plan

Activity #	Description	Time needed	Materials
1	Ice Breaker: See Appendix	5-20 minutes	Depends on Ice Breaker
2	Paper Airplane Activity	90 minutes	Area: Cafeteria and Gym 2 people will set up the 4 types of paper, copies of the designs, markers, tape, glue sticks, scissors, measuring tape, and stopwatches. Count from 1-10 so that the students will be assigned in groups of 5. Float to different groups to keep them on task and see their progress.
3	Centripetal Force	45-60 minutes	Distribute the string, cups, and stockwood. Float to different groups to keep them on task and see their progress.
4	End-of-Day Reflection	5 minutes	Reflection Wall

Angry Birds 5E Lesson Plan

Day: 1, Activity 2

Topic/concept: Paper Airplanes using Engineering Design Process

Duration: 60-90 minutes

Materials:
Area: Gym and Cafeteria with 14 Round Tables to work at.
    Materials are in the instructions

TEKS/SEs:
§112.39. Physics, Beginning with School Year 2010-2011 (One Credit).
(c) Knowledge and skills.

    (2) Scientific processes. The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:

        (B) know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;
        (E) design and implement investigative procedures, including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness;
        (F) demonstrate the use of course apparatus, equipment, techniques, and procedures, including multimeters (current, voltage, resistance), triple beam balances, batteries, clamps, dynamics demonstration equipment, collision apparatus, data acquisition probes...etc.
        (H) make measurements with accuracy and precision and record data using scientific notation and International System (SI) units;
        (I) identify and quantify causes and effects of uncertainties in measured data;
        (J) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs;
        (K) communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports; and
        (L) express and manipulate relationships among physical variables quantitatively, including the use of graphs, charts, and equations.

    (3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:
        (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;
        (B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;

Angry Birds 5E Lesson Plan

Lesson objective(s)
Today students will be able to:
Calculate average speed using distance and time.
Use the Engineering Design Process/Scientific Method to design airplanes

Differentiation strategies to meet diverse learner needs:
The paper airplanes have different levels of difficulty so the students can choose which ones they want to use. Also, they will be working in groups so the students can help each other out.

ENGAGEMENT
Icebreaker: Blanket Name Game
Students will separate into 2 teams and a huge blanket will be held up(like a screen) in between the two teams. Each team needs to choose one person to stand at the blanket. When the teams are ready the blanket will be lowered and the two students that went up will have to identify the opposing team's player that was on the other side of the blanket. The first person to shout it out "wins" the round. The team that won the round will get to steal that person to bring them to their team. The object of the icebreaker is to get the opposing team to just one person by himself.

EXPLORATION
Students will hypothesize on what materials and design would be best. They will have to decide as a team which three types of paper they will try out.

EXPLANATION
For Teacher's steps see the other sheet title "Day 1 Activity 1 Instructions".

ELABORATION
Ask them what they learned and how they can apply it to other real life scenarios. (driving, a car, throwing a ball...)

EVALUATION
Competitions
1.Which plane went the furthest?
2. Which plane went the fastest?
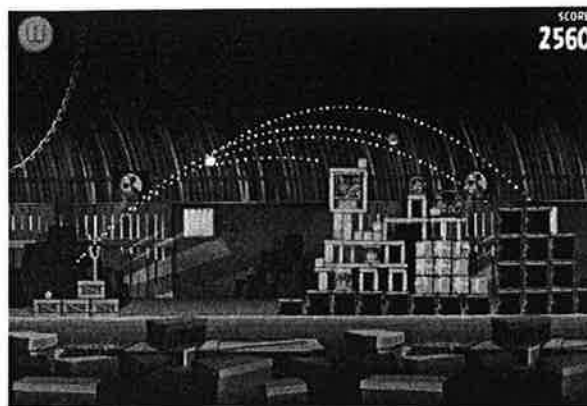3. Which plane went the straightest?
4. Which group had the coolest design?
Bonus: Which group can land the plane in the hula hoop?

Angry Birds: Modeling Quadratic Functions

Student Activity Sheet

Day 1

1. Open the file on your TI-Nspire named Angry Birds.tns

For problems 1-3, use the sliders to fit the graph to the path of the angry bird. The path is the shape of a quadratic function $(f(x) = a(x-h)^2 + k)$, called a **parabola.**

1. Using the first slide, manipulate the sliders for a and k to fit the parabola.

   $a =$ _____
   $k =$ _____
   $f(x) =$ _____ (Graph your function for f(x) to make sure it models the graph).

   How does the value of a affect the graph?

   How does the value of k affect the graph?

2. Using the second slide, manipulate the sliders for a ,k and h to fit the parabola.

   $a =$ _____
   $k =$ _____
   $h =$ _____
   $f(x) =$ _____ (Graph your function for f(x) to make sure it models the graph).

   How does the value of h affect the graph?