**Adrienne Deshaies**

**STARS Science**

**Tuesday, July 6, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  jeopardy template  rope  whiteboards and markers  2 rubber bands  Examples of hypotheses  6 stop watches  Hw sheets | | **Your Preparation**:  gather materials  Come up with example hypotheses  Review special procedures for going outside  Copy hw | | **Agenda (w/times)**:  Do Now (10 mn)  Teaching (10 mn)  Structured practice (10 mn)  Guided practice (20 mn)  closure (5mn) |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: Remind students of what a hypothesis looks like. Jeopardy with forming hypotheses from “maybe” statements first 2 rounds are group collaboration, after that individuals. | | | | |
| **Objective**: Today we will review how to form a hypothesis, and learn the difference between independent and dependent variables (time permitting). Introduce time measurement in preparation for next lab. | | | **Proving behavior**: *by…* developing a hypothesis and identifying variables in a mini-experiment | |
| **Purpose**: We are doing this because now it is time to start combining what we’ve learned about variables and hypotheses, so we can start getting a better understanding of how experiments work and start preparing to be able to design our own. | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** When we come up with a hypothesis about a lab, we are making a prediction about a *relationship* between two things. Define relationship (can use dating as an example). We are saying that – if there is a relationship between those two things (variables), changing one of them will cause the other to change too (boyfriend gets grumpy, girlfriend does too).  **See:** Incomplete statements on board…  **\*Do:** In pairs, think of completions to these statements (take 30 sec response time): amount of caffeine you drink might be related to\_\_\_. How hard you push on the accelerator in your car might be related to \_\_\_\_\_\_\_. How often you fall asleep in science class might be related to \_\_\_\_\_\_\_. | | | |
| Step 2: | **Say:** The difference between the two related things is that, in an experiment, we control one of them and the other one changes on its own. The one that we control and measure is the INDEPENDENT variable, and the one that changes in response is called the DEPENDENT variable.  **See:** Two students come up and hold taught each side of a rope. Lets say that student A and student B are the two variables we’re looking at, and we think that there might be a relationship between A’s actions and B’s response. Let’s see if we’re right (I move A to the side and B gets pulled along). Which one of them am I controlling? Which one gets pulled along helplessly? Which one depends on the other?  **\*Do:** Take 1 mn in groups to think up how you could test for a relationship between the heat of your stove and how fast your scrambled eggs cook. Write it on your whiteboards, and underline the variable you control (the independent one). | | | |
| Step 3: | **Say:** Once we know our variables, it is easy to put our prediction into a formal hypothesis.  **See:** Call two volunteers. I give them each a rubber band. Student A is going to hold this one loosely and pluck it, and Student B is going to pull the other as tight as s/he can and pluck it. Point to the rubber band that will have a higher note when plucked.  **\*Do:** Individually, one your white boards, identify the two variables we think are related in this case. Can we put this into a hypothesis form? | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time: 2 mn  Materials:  Group Size: all | **Example 1** Read an example of a simple experiment. Write in large letters on the board both variables. Class, point to the variable I control. Point to the variable that changes in response. Point to the independent variable. Point to the dependent. | | | |
| Time: 1 mn  Materials:  Group Size: all | **Example 2** Write a hypothesis on the board. Call one volunteer to circle the independent in blue and the dependent in red. Class, show me with your thumbs, what do we think about her/his answer? | | | |
| Time: 3mn  Materials: whiteboards  Group Size: 2-3 | **Example 3** Write two variables on board: “# of people pushing a stopped car,” and “how fast the car rolls.” In groups of 2-3, take 3mn to decide which of these variables you could control more easily, and write an idea for how you would test the relationship between them. | | | |
| Time: 2mn  Materials: whiteboards  Group Size: 1 | **Example 4** Now individually, on your whiteboard, write up a hypothesis involving the relationship between the two variables from the last exercise. Take 2 mns. | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  Get into groups of 3 or 4. Each pair gets a stop-watch. I explain experiment. We take 5 mn inside to identify the variables we are testing and come up with a hypothesis. Then we go outside – one partner will time the others as they complete 10 throws with 1. a soccer ball, 2. a dodge-ball, 3. a balloon. Rotate until everyone has had a chance to time/record. | | | **Criteria for Mastery:** Students correctly identify dependent and independent variables, and come up with reasonable hypotheses. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:** Worksheet with practice taking “maybe” statements, identifying variables/relationships, and putting them in hypothesis form. Final problem is an explanation of tomorrow’s lab (cars on ramps). Students identify the variables and come up with a hypothesis about how ramp-height will affect car speed. A bonus question - table with times and distances - will prompt students toward thinking about how rate is calculated. | | | | |
| **Closure** | | | | |
| **Explain Closure:** Exit ticket – write one thing you understand really well in this class so far, feel like you have mastered, and one thing you still feel iffy on and need to practice more. Reminder that Friday is our first quiz, if you have questions, seek me out at lunch this week or call me. | | | | |

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**STARS Science**

**Wednesday, July 7, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  3-4 dotcars  Wooden planks (3-4)  Equal-sized stackers (books, blocks…) ~12  3-4 stop watches  data recording tables | | **Your Preparation**:  Run-through of lab  Prepare data table  Review procedures for working outside (1 strike, we’re in) | | **Agenda (w/times)**: 55 mn  Do Now (5 mn)  Teaching/lab prep (10mn)  Lab (25 mn)  Lab debrief |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: On board is a word problem: a car traveled part of its journey at 34 mph, then the next part at 51 mph, and finally the rest at 43 mph - find the *average* speed of the car over the course of its whole journey, showing your steps on your white board. One person with a right answer comes up to explain how they did it, I fill in holes as needed. What does the word average mean? | | | | |
| **Objective**: *Today you will be able to…* accurately measure the time it takes an object to travel a certain distance.  Test a hypothesis you came up with!  Identify variables in an experiment | | | **Proving behavior**: *by…* using stop watches to get time readings on experiment trials.  Averaging the times from different trials.  Complete the “cars on ramps” lab to test the hypotheses we came up with yesterday. | |
| **Purpose**: *We are doing this because…* we have already learned how to measure distance, and one we learn how to measure time, we will get to the most important part of our unit – learning how to calculate velocity. This lab will also move us into the next section of the scientific method – experimenting – as we will be changing variables and seeing how it supports or doesn’t support our hypotheses. | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** In this experiment, we are going to be sending mini-cars down wooden planks, and timing how long it takes them. There will be three phases of the experiment, and each one will have 3 trials (what do I mean by trials?)  **See:** I draw a diagram on the board: phase one = plank propped with one book, phase two = two books…  **\*Do:** On your whiteboards, write down what the dependent and independent variables are in this experiment (which are we changing? Which are we measuring?) | | | |
| Step 2: | **Say:** Since there are three people in your group, for each of the 3 phases we will rotate between three positions: car starter, timer, data recorder. Make sure the same person starts off the car for all 3 trials of the same phase.  **See:** I show one example of a trial, and how times should be recorded.  **\*Do:** Go outside and do the lab | | | |
| Step 3: | **Say:** Once we are back inside – Each individual should have all the data from all the trials, so take a minute to copy that from your team mates. By yourselves, take a minute to average the times for the three trials for each phase.  **See:** on board I make a graphic organizer about which three numbers to average  **\*Do:** Students average their times from the lab (3 sets of 3 times) | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time:  Materials:  Group Size: | **Example 1**  N/a | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  For the next 3-4 class days, one person will be assigned to time us on how fast we come in at the beginning of class, sit down, and get quiet. They will then present the data to the class, and we will all average it to find out how fast/slow we are on average. | | | **Criteria for Mastery:**  Every student can accurately average a set of times from different trials. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:** Worksheet with practice identifying independent and dependent variables, and practice taking averages. Come up with a list of 5 different things we might have used as an independent variable in this lab, instead of ramp height, that might reasonably have affected how long it took the cars to reach the bottom. | | | | |
| **Closure** | | | | |
| **Explain Closure:**  Exit ticket – Whip-share, one skill you think you improved or something you feel you understand more after this lab today. | | | | |

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**Thursday, July 8, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  symbol cards  Whiteboards/ markers  Youtube of roadrunner  guided practice ws’s  Hw copies | | **Your Preparation**:  prepare materials  get stopwatches from shed  Prepare hw | | **Agenda (w/times)**: 55 mn  Do Now = 5 mn  Teaching =10 mn  Structured Practice = 10 mn  Guided practice = 20 mn  Review and closure = 10 |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: Each person has a sticker-label with a numeric expression or sign on it: (“distance=5,” “rate = 25,” time = 5,” “feet,” “feet per minute,” “minutes,” “x,” “\_” “+,” “/.” As a class, they need to work together to see how fast they can arrange themselves into an equation that makes sense, complete with units. At the end, they should have an example of the rate equation. | | | | |
| **Objective**: *Today you will be able to…*  Use the rate equation to calculate speed of a moving object. | | | **Proving behavior**: *by…* arranging the rate equation to solve for the speed of an object when given its distance and time. | |
| **Purpose**: *We are doing this because…* Speed is something we can’t measure directly, unless we have a speedometer or a radar gun. But if we can measure the distance and time, we will now know how to get the speed too! | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** The rate equation is: D = R\*T. You can remember it by taking the word DIRT, and turning the I sideways into an equals sign. You can also make sure you have it correct by looking at just the units of these three variables  **See:** On board: ft = (ft/mn)\* mn. The mn’s cancel out, and you get ft=ft, which is true, so you know you’ve got the equation in the right order.  **\*Do:** I show a youtube of a roadrunner. This bird is one of the fastest on the planet. Its speed is clocked at 50 mph. In this video, lets say it ran for an hour and a half (1.5 hr). With a partner, plug these numbers into the rate equation and solve for the bird’s distance. | | | |
| Step 2: | **Say:** In order to solve for the bird’s speed, however, we need to rearrange the equation so that speed is isolated on one side.  **See:** VIP of isolating a variable.  **\*Do:** I need two volunteers (popsickle sticks) to come up here and rearrange our Do Now equation so that rate is by itself on one side, and the equation still makes sense. You can use the signs and symbols that we left out the first time. Give them 1 mn. (I write final equation on board) Now I need two diff volunteers to come rearrange it so that time is isolated. | | | |
| Step 3: | **Say:** In our ramps lab yesterday, one of these three variables (d, r, t) did not change at all throughout the three different trials. The other two changed each time we changed the ramp height. I call a popsickle stick and someone comes up to circle the controlled variable (d). Another one of these variables got bigger as we made the ramps higher and higher (student called on to come circle rate). The final variable got smaller as we made the ramps higher (student circles t)  **See:** Variables are circled in different colors.  **\*Do:** | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time: 1 mn  Materials: whiteboards  Group Size: 2 | **Example 1:** I draw on board – this penguin runs at a speed of 33 m/s for 30 sec before being devoured by a hungry dragon. How far did he run before meeting his doom? | | | |
| Time: 1mn  Materials: wb’s  Group Size: 2 | **Example 2:**  This Breakthrough student was about to miss her bus, which was 20ft away and was leaving in 30 seconds. How fast would she have to run to make it on time? | | | |
| Time:  Materials: wb’s  Group Size: 1 | **Example 3:** This pirate ship was sailing at 25 mph to reach land, 5 miles away. A storm was due to hit in 15 mns. Did the ship escape the storm? | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  WS involving more practice with the rate equation. | | | **Criteria for Mastery:**  Students can successfully plug in two variables to solve for the third. | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:** Calculate the average speed for each trial of your cars and ramps experiment (I explain why it is average speed). Go back to your ideas from last night’s hw about what other variables we might have manipulated – for each one, come up with a formal hypothesis about how the cars’ speeds might have changed. | | | | |
| **Closure** | | | | |
| **Explain Closure:** Reminder that tomorrow is our first test. Have students come up with list of everything we’ve learned and compile a study-list. Come get help from me/call if you are struggling!!! | | | | |

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**Friday, July 7, 2010**

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| **Getting Yourself Ready** | | | | |
| **Materials**:  Quiz copies  weekly prizes | | **Your Preparation**:  Write quiz | | **Agenda (w/times)**: 30 mn  Do Now = 5-7 mn  Quiz = 20 mn max  Ticket drawing = 2 mn |
| **Getting Your Students Ready** | | | | |
| \***Do Now**: Everyone comes to the board and writes a lingering question or something they need clarified still. Everyone sits down. First, take a toll of others who have the same question. Second, is there another classmate who understands it and can help? Third, if there is an area where more than one person is confused, I lead a brief review of it. | | | | |
| **Objective**: *Today you will be able to…*  Show me what you know and what you still need to work on! | | | **Proving behavior**: *by…*  taking your first quiz about what we’ve learned in this class | |
| **Purpose**: *We are doing this because…*  I need to know how well you are understanding what we’ve been doing. If there is something you have been struggling with, I hope you have let me know before now either by calling or speaking out when we go over the homework. Otherwise, if you have been paying attention in class and trying hard on the hw, these Qs shouldn’t be a problem for you. | | | | |
| **Teaching** | | | | |
| Step 1: | **Say:** You will have 20 mn max to finish this quiz (it is not very long), there are 1-2 questions about every topic we have covered so far. Make sure to put your name on it.  **See:**  **\*Do:** The quiz. | | | |
| **Practice** | | | | |
| \***Structured Practice** (3-4 additional examples led by teacher with gradually quickening pace, helping students approach automaticity by manipulating time, materials, and group size) | | | | |
| Time:  Materials:  Group Size: | **Example 1**  **n/a** | | | |
| \***Guided Practice** (the proving behavior of the objective monitored by the teacher) | | | | |
| **Assignment: (from proving behavior)**  n/a | | | **Criteria for Mastery:**  10 questions, each question worth 2 pts (1 for correct process/showing work, 1 for correct answer) = 20 pts  15 or less is below proficient, student needs more practice  16/20 is proficient  17 or more is excellent | |
| Independent Practice (Homework) | | | | |
| **Explain Homework:**  NO HW! | | | | |
| **Closure** | | | | |
| **Explain Closure:** Weekly ticket drawing! Have a good weekend! | | | | |