Preparing to Teach

Portfolio

Exemplary

Student 0336885

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

Preparing to Teach Portfolio

Rubric Cover Sheet

Name: [redacted] **Student ID:** 0336885 **Date:** 12/15/2008

Program/Major: Technology Education-BS
Student Teaching Tech Educ

Implemented Lesson Plan Rubric ☐

Reflection Essay Rubric ☑

Disposition Self-Evaluation Complete ☑

Disposition Faculty Evaluation Complete ☑

This candidate is ☑ Recommended ☐ Not Recommended for student teaching

Department Chair's Signature

Date 3/10/09

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
CANDIDATE DISPOSITION SELF-EVALUATION FORM

Preparing to Teach Portfolio

Name: [redacted] ID #: 0336885

Telephone #: [redacted] E-mail: [redacted]

Teacher Preparation Program: Secondary Education Major/Concentration Technology Education

Assess the extent that you have demonstrated the identified attribute/behavior since your admission into the teacher preparation program. Rate yourself 1 (rarely) to 4 (almost always) for each item.

		Rarely	Sometimes	Frequently	Almost Always
1.	Seek feedback from multiple perspectives and make appropriate adjustments *(Self-Reflection)*	1	2	(3)	4
2.	Self-monitor progress *(Self-Reflection)*	1	2	(3)	4
3.	Upgrade knowledge and skills regularly *(Lifelong Learning)*	1	2	3	(4)
4.	Take initiative and am self-motivated *(Lifelong Learning)*	1	(2)	3	4
5.	Manifest respect toward students *(Advocacy for Children and Youth)*	1	2	(3)	4
6.	Advocate for the well-being of students in schools *(Advocacy for Children and Youth)*	1	2	(3)	4
7.	Manifest sensitivity to the needs and values of diverse learners *(Respect for Diversity)*	1	(2)	3	4
8.	Establish rapport and communicates well with diverse audiences *(Respect for Diversity)*	1	2	(3)	4
9.	Demonstrate strong communication skills *(Collaboration)*	1	(2)	3	4
10.	Use feedback constructively *(Collaboration)*	1	2	(3)	4
11.	Demonstrate good organization skills *(Professional Work Characteristics)*	1	(2)	3	4
12.	Complete work in timely manner *(Professional Work Characteristics)*	1	2	(3)	4

Signature of Candidate: Michael T. Daly Date: 1/7/2009

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
CANDIDATE DISPOSITION [redacted] EVALUATION FORM

Preparing to Teach Portfolio

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Signature of Candidate: [redacted] Date: 3/15/2009

COOPERATING TEACHER

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
IMPLEMENTED LESSON PLAN SCORING RUBRIC

Preparing to Teach Portfolio

Name: [redacted] ID #: [redacted]

Telephone #: 401.623.8033 E-mail: [redacted]

Teacher Preparation Program: Secondary Education Major/Concentration Technology Education

Assess the extent that the candidate has addressed the following Rhode Island Beginning Teacher Standards in the implemented lesson plan. Rate the candidate's performance 1 (an area of weakness) to 4 (an area of strength) for each Standard.

		Weakness	Developing	Competence	Strength
1.	The implemented lesson plan reflected an understanding of central concepts, structures, and tools of inquiry of the discipline the candidate taught. *(RIBTS 2)*	1	2	(3)	4
2.	The implemented lesson plan reflected an understanding of how children learn and develop. *(RIBTS 3)*	1	2	3	(4)
3.	The implemented lesson plan reflected an understanding of how students differ in their approaches to learning. *(RIBTS 4)*	1	2	(3)	4
4.	The implemented lesson plan provided evidence of students developing critical thinking, problem solving, and performance skills. *(RIBTS 5)*	1	2	3	(4)
5.	The lesson plan was implemented in an appropriate learning environment where positive social interaction, active engagement in learning, and self-motivation were evident. *(RIBTS 6)*	1	2	3	(4)
6.	The candidate used effective communication in implementing the lesson plan such that students explored, conjectured, discussed, and investigated new ideas. *(RIBTS 8)*	1	2	(3)	4
7.	Formal and informal assessment strategies were integrated in the lesson plan to support student learning. *(RIBTS 9)*	1	2	3	(4)

Comments:

Signature of Reviewer [signature] Date 04.10.2009

Preparing to Teach Portfolio

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6. Reflection Essay

[redacted]

[redacted]

1/6/2009

Preparing to Teach Portfolio

Implemented Lesson Plan

For my implemented lesson I am utilizing one during my secondary practicum for a robotics class. These students require knowledge on engineering, problem solving, design, and programming. This lesson was a presentation lesson followed by the students designing and then building. I utilized powerpoint to display large images for the students to follow along with. This lesson was important in getting the students to recognize and utilize the proper names of the parts of their vex robotics kit. During this lesson students would be meeting content standard 8 : develop an understanding of the attributes of design. I would be meeting RIBTS 5: use tasks that engage students in exploration, discovery, and hands-on activities.

At the completion of this lesson students were expected to be able to identify the names and uses of parts within their kits, to describe how a clutch works to protect the motor in their kits, and to plan for and design a lifting arm for their robot to the required specifications laid down. To meet these objectives I used a powerpoint containing images and descriptions of all the parts within their robotics kits. We talked about the parts as we named them and identified them in the presentation. This provided a visual learners with a means to recognize the parts. I did not use a handout during this presentation. This would have been helpful for the students to have information about the parts on hand. The main part of the lesson walked through all the different parts and finished with a part on the clutch. This met the second objective that the students needed to met in this lesson. This presentation went well. The students were paying attention, and following along. I had them read certain parts of the presentation to make sure they were engaged and to give them some ownership on the information. They

provided feedback on the parts as we went along, describing how they had used the parts so far.

Directly following the lesson students were required to plan for a build challenge. This challenge requires them to utilized the information from the lesson to accomplish the goal. Before putting together any parts these students are required to draw out their intended design. This is an engineering requirement that requires them to careful design and problem solve instead of just trial and error until they get the desired affect. While the students were designing I allowed them to have their kits in front of them to help with the visual process of putting those parts down on their design. This part of the lesson went really well. I observed the students as they designed their ideas and helped them with ideas if they were stuck. They needed to use problem solving techniques to decide how to use their parts and where to place the arm.

This lesson was going well but we noticed that it was taking the students far too long to come up with ideas and a design. After utilizing one class period where the students failed to complete the drawings, we back stepped and had the students copy a design that was given to them. They saw a finished robot with lifting arm, and needed to copy this design onto graph paper, and then build it utilizing their own kits. This worked much better as the students did not get stuck trying to implement designs that would have taken far longer than the alloted time for this lesson.

Throughout the lesson I was carefully listening for the students to use to knowledge given in the presentation. They were to be using the correct names for parts

and needed to be able to describe how a part functioned. I checked with a few of the students about this information and most knew it. Assessment for this lesson was based on the drawing that was to be submitted and me hearing them utilizing the correct vocabulary. At the end of the first class after the presentation I wrapped up the lesson with a recap of the presentation. I asked them questions such as the three ways to identify fasteners, and asked them to identify parts that I was holding. These worked out well for assessing their learning.

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
IMPLEMENTED LESSON PLAN SCORING RUBRIC

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Name: [redacted] ID #: 0336885

Telephone #: [redacted] E-mail: [redacted]

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Comments:

Signature of Reviewer [signature] Date 04.10.2009

Unit Title: VEX
Grade Level: 9-12

Name of Lesson/Topic: Vex Hardware / Building Test Arm.

Introduction: This lesson identifies the names of the parts, uses and how they work for the students. They use this to design and build and articulating arm for squarebot to then test torque.

Lesson Goal: Students will be able to design and build an articulating arm for squarebot using the parts available inside their kits.

Instructional Objectives:

Students will be able to:

1. Identify the names and uses of parts within their kits.
2. Describe how a clutch protects the motor.
3. Plan for and design a lifting arm for their square-bot to required specifications.

PPT & quiz & quick description & function

Design on graph paper

Focus Questions:

Fasteners:

Why do we need them?
How do we identify screws and bolts (3 ways)?

Body:

Can we modify these parts? (Bars and beams that have divots on the edges can me modified. The bars must be cut in even increments of four holes.)
How Do we use gears to

switches

How do they work? (Analog and digital inputs)

Tools

How do we use them?

Microcontroller and Remote Control

Motor, Clutch and Servo

How do they work?
Why do the motors need a clutch?
How does the clutch work?
Is there a difference between a motor and a servo, what is it?

servo has a stop. limited rotational motion.

Standards Achived:

STL (Standards for Technological Literacy)
Standard 8. Students will develop an understanding of the attributes of design.

RIBTS (Rhode Island Beginning Teacher Standards)
Standard 5.
Teachers create instperformance skills.
5.5 use tasks that engage students in exploration, discovery, and hands-on activities.

Foundation Questions: (the "what is" questions)

What are the reasons we use washers?
What is the function of the clutch?

Essential Questions:

Concept Discovery:
Ex.
Are the students able to plan and design an addition to their robot when presented with the challenge?

Teacher Preperation:
Review the material covered in the fasteners powerpoint.
Make copies of the handout for the lesson that includes instructions for building the lifting arm.

LESSON DELIVERY:

Content Outline:

I. Fasteners
   a. Bolts and Screws
      i. Bolt – Externally threaded fastener held by a nut
      ii. Screw – Externally threaded fastener that mates threaded hole or forms its own.
      iii. Methods of identification.
         1. Thread Pitch – The measure of threads per inch on a fastener. (ex. 8-32 = # or diamerter over pitch, #8-32 threads per inch)
         2. Length
         3. Head Types
      iv. Motor screws vs. Body screws (6-32 motor, 8-32 body)
   b. Collars and set screws
   c. Head Drives
   d. Nuts
   e. Washers

1/4-20

f. Standoffs / Threaded Beams

II. Body
   a. Chassis Bumper
   b. Chassis Rail
   c. Long Bar
   d. Long angle bar
   e. Gusset
   f. Used to strengthen joints, or attach adjustable parts.
   g. Bearing Block / Flat
      i. Used to provide mounting for an axel on the body.
   h. Lock plate
      i. Mates with an axel.
   i. Gears
      i. Allow for conversion of the force from the motor.
      ii. Gear Ratio
         1. Describes the mechanical advantage gained from using the gears. Obtained by dividing the number of teeth on the driving gear, by the number on the driven gear.

III. Switches
   a. Bumper and limit switches

IV. Tools & Microcontroller & Remote
   a. Hex Driver
   b. Wrench

V. Motor, Clutch, and Servos
   a. Servo
      i. Rotates only 120 degrees, used for opening and closing a grabber, or lifting and arm.
   b. Motor
      i. Provides 360 degrees of rotation when connected to a shaft. Use to drive the robot, or rotate a part.
   c. Clutch
      i. Separates the motor from the axel when there is not enough torque provided by the motor to drive the axel or gears.

- what have you used gears for already?

Set Induction:

Can you name all of the parts that you have in your vex kits? quick 2 min quiz.

We are going to build an arm for your robot but first must talk about the parts and their functions.

Lesson Body:

Hopefully will not take more than 30-45 minutes, but may need longer. Maybe have a reference sheet as a handout? Will help in the future, and will be good for during the lesson.

Open with the powerpoint on fasteners.

Fasteners hold the parts of our robot together. They allow us to attach a motor to the body, attach the microcontroller to the body.

Types of Fasteners are screws, bolts, nuts, washers, standoffs.

There are 3 ways to identify screws and bolts

By, Thread Pitch, Length, and head type

BODY

What do we have for body parts?

Gears, bars, beams, bumper, rail

How do we control the robot?

Micro-controller

Remote Control

Motion

What do we have to provide motion to the robot?

Servos provide 120 degrees of motion. Are used to open and close a grabber, and more.

Motors provide continuous rotation. They can be used to drive the robot, provide full rotation of a part, or raise and lower a lifting arm

Servos and motors respond to joystick commands differently. Servos spin a max in each direction that the joystick points. Motors spin continuously in the same direction that the joystick is pointing until released.

The Clutch protects the motor from burning out the internal gears. It works by disconnecting the axel from the motor when there is less force (torque) available from the motor than required – called "slipping". When this happens you will hear a popping sound.

Challenge

We need to build an arm that we can attach to your robot (squarebot) that will be able to lift a desired amount of weight. To build this arm you may modify available beams and bars but you may only cut them at the divots on them.

Make sure that when cutting bars, you must cut them with an even number of holes in multiples of four. This makes them reusable.

We will use a motor to lift the arm (make sure there is a clutch on the motor). Do not use gears.

There should be a limit switch behind the bar to turn off the motor when the arm reaches a specified height. The switch should be adjustable in height.

Closure:

What are the three ways we can identify screws and bolts?

Length, Thread pitch, Head type

Assessment:

How & what?

SquareBot Arm Construction

The goal of this challenge is to plan and build an arm to attach to your robot. This challenge will require you to know the names of the parts and how they function.

Planning (40%)

Before you begin to build you must make a plan. Using graph paper sketch a 3-view drawing of your arm attachment added to your robot. This will be your design plan for the challenge. You may use the example as your design or design your own. Keep in mind that it needs to function the same as the example. You design should also look good.

Must include:
1 Limit Switch to stop the arm at its maximum height.
1 Motor to raise and lower the lifting arm.

When designing make sure that the wires from the motor and the limit switch will be able to reach the inputs and outputs on the vex controller.

Building (40%)

Using your design plan start construction of your attachment. When completed your attachment should look as described in your design plan. You are allowed to modify the bars and beams included with the kit to accomplish your design.

Testing (20%)

Using the programming cable, connect your robot to the PC and load the *default* code onto your robot. The motor should be plugged into motor output 2, and the limit switch should be in analog/digital 1. When the default code is loaded the **left** joystick on the remote control will control the lifting motor on the robot. Make sure nothing is plugged into the vex controller except the lifting motor and the limit switch.

Instructions

1. Turn on the vex controller and the remote control. Program the vex controller with the default code using the PC.
2. Using the Left joystick, press it to the right for 1 second to see if the lifting motor can lift the arm. If it works, press it to the right again until the arm presses the limit switch. The motor should shut off when this happens.
3. If both test were successful then congratulations!

Lever Law

Forces and Motion

A force can cause a body to move in two different ways, depending on the point of contact. A force applied to a body's center of mass will cause it to move translationally in space. Gravity, for example, always acts in this manner. On the other hand, a force applied to a point other than the center of mass may cause either translational or rotational motion, with the latter being more likely when the object is fixed in space at one point, like a lever with a fulcrum.

Torque

It is possible to measure the rotational influence that a force has on an object. This value, known as torque, is simply the product of the force and the lever arm, where the lever arm is the distance between the force and the center of mass.

$$t = F \times \ell$$

t = Torque (Newton-meters)
F = Force (Newtons)
ℓ = Lever Arm (meters)

Rotational Equilibrium and the Lever Law

If an object is not spinning about its center of mass, it is said to be in a state of rotational equilibrium. Since torque is a measure of the rotational influence on a body, the sum of the torques on an object in rotational equilibrium must be equal to zero.

In the case of a stable lever, where the fulcrum acts as the center of mass, we can determine that the torque generated on one side of the beam equals the torque generated on the opposite side.

$$t_1 = t_2$$

$$F_1 \times \ell_1 = F_2 \times \ell_2$$

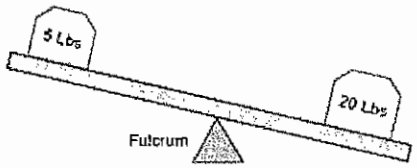
Therefore, a weak force far away from the fulcrum can counteract a stronger force closer to the fulcrum.

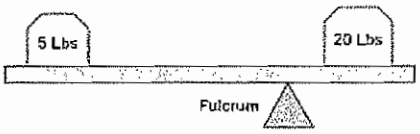
Example: Calculating Torque

t = Unknown
F = 12 Newtons
ℓ = 3.5 meters

t = 12 N x 3.5 meters

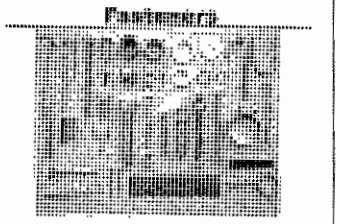
t = 42 Newton-meters





Vex Parts

- Fasteners
- Body Parts and Gears
- Control Parts (Transmitter, Receiver)
- Motors, Servos and Clutch



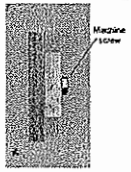
Fasteners

At the end of this lesson, you will be able to:

- Describe the difference between a bolt and a screw
- Describe the properties of a nut and bolt
- Identify various types of screws, bolts, nuts, washers and tell what they are used for
- Identify the drives used for torquing the heads of screws and bolts
- Identify standard thread pitch sizes and describe their benefits
- Explain how fasteners work

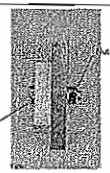
Machine screws

- A screw is an externally threaded fastener.
- They are designed to be put into a mating threaded hole or form its own thread.



Bolts

- A bolt is an externally threaded fastener designed to be held by a nut after it has gone through a hole.



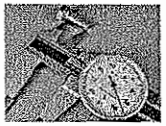
Identification of bolts and screws

Identification by pitch

Identification by pitch, or threads per inch:

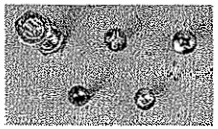
- The picture shows a bolt and the tool used to measure the bolt's pitch.
- A coarse thread (low number of threads per inch) has more clamping power and is faster to torque down, but can't be adjusted as finely.
- A fine thread (high number of threads per inch) can be more finely adjusted, but has less clamping power, and is slower to torque down.

Identification by length



One way to identify a screw/bolt is by its length. Pictured above is a dial caliper being used to measure the length of a bolt.

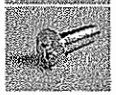
Identification by head type



Common head types are pictured above.

Head types

- *Allen head screw* - Allen head screws have more torquing power and are recessed into a counter bored hole.
- *Flathead screw* - Flat head screws have tapers that guide



Head types

- *Pan head screw* - Pan head screws have a small flat with a round top that can be slightly recessed into a counter bored hole.

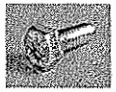
- *Button head screw* - Button head screws are round at the top so that they do not catch on anything.

Vex 8-32 button head

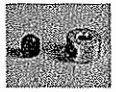
70	pcs	8-32 X ¼
28	pcs	8-32 X 3/8
	28 pcs	8-32 X ½
	14 pcs	8-32 X 3/4

Head types

- *Hex head screw* - Hex head screws can take a lot of torque and can be driven in and out with a socket type wrench.



- *Set screws* - Set screws are case-hardened and used to fasten pulleys and collars on shafts.

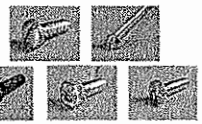


Vex Threaded Screw and Collar

The kit comes with 16 threaded screws and collars

Socket head drives and screw

- Drives are the slots, grooves, and holes on the bolt and screw heads that allow torque to be applied.



Socket head drives

- Socket head drives can take a large amount of torque.
- They have an internal hex shape.
- They can be driven by a socket wrench, or by an Allen wrench.

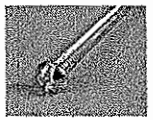
- Hex drives have an external hex shape and can also take a large amount of torque.
- They can be driven by a socket wrench.

Screw head drives 1

- Phillips drive - A Phillips drive is used to insert the screw.
- A Phillips drive is easier to locate than a standard drive.

- Slotted - A plane flathead screw driver is used to insert the screw.
- This is one of the most common types of drives.

Screw head drives 2



- *Phillips/slotted* - This versatile drive allows you to use either a Phillips or a slotted drive.

Nuts

Nylon insert lock nuts

Vire starter kits comes with 14

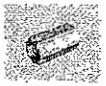
- Nylon insert lock nut - or a self locking nut eliminates the need for washers

Keps Nuts

- Keps Lock Nuts - these nuts have greater holding power and reduce assembly time.
- The Vex starter kit comes with 65 keps nuts

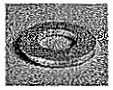
Coupling Nuts/Standoffs

- Coupling nuts or Standoffs - these nuts are used to provide clearance between parts.
- The Vex starter kit comes with:
  - 10 ½ inch
  - 8 1 inch
  - 4 2 inch
  - 4 3 inch



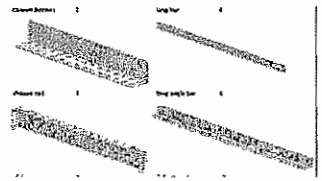
Washers

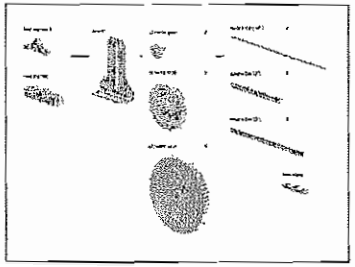
- Flat washers provide increased bearing surface for bolt heads and nuts and distribute the load over a larger area.



- Lock washers prevent a bolt or nut from becoming loose under vibration.

Body Parts





Modifying Body Parts

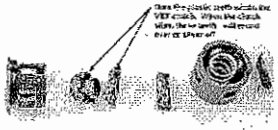
- The Bars and Beams may be cut to provide custom parts that fit your need.
- You must only cut them at the divots on the parts.
- The bars must be cut evenly in increments of four holes. This ensures that they are reusable.

Motor, Servo & Clutch

- The motor and servo provide the ability for controlled motion to the robot.
- The motor can rotate continuously 360 degrees
- The servo can only rotate 120 degrees.
- What are the best uses for these?

Clutch

- Protects the motor and servo from destroying their internal gears when overexerting themselves.



[redacted]
12/10/2008

Unit Title: Robotics - Rube Goldberg

Grade Level: 9-12

Name of Lesson/Topic: Simple Machines and Mechanical Advantage Review

Introduction: This lesson will review the concept of simple machines to make sure the students are familiar with what they are, how to apply them, and why to apply them (Mechanical Advantage)

Lesson Goal: Students will be able to recognize and build simple machines into their Rube Goldberg machines with some knowledge of mechanical advantage.

Instructional Objectives:

Students will be able to: (How will you get them to the goal?)

1. Recognize simple machines and their names
2. Describe the function of the simple machines
3. Explain how simple machines affect mechanical advantage.

Focus Questions:

What are simple machines?

How do simple machines help us?

How do we obtain mechanical advantage?

Standards Achived:

RIBTS (Rhode Island Beginning Teacher Standards)
2.4 incorporate appropriate technological resources to support student exploration of the disciplines.

Foundation Questions: (the "what is" questions)

What is , (simple machines)

What is mechanical advantage?

Essential Questions:

Concept Discovery:

[redacted]

Teacher Preperation:

Review simple machies. Get powerpoint ready. Prepare any physical examples. Have handouts printed for after discussion.

LESSON DELIVERY:

Content Outline:

http://www.ieee.org/portal/cms_docs_iportals/iportals/education/preuniversity/tispt/pdf/lessons/workmodel.pdf
http://library.thinkquest.org/CR0210120/index.html

Set Induction:

When building "things from nothing" and you need to transfer energy from one place to another you should think about using simple machines. Now we have been talking about them for a little bit, but lets review them before going to work today. Show some simple machines. Pass around samples. Talk about them as they are passed around.

Lesson Body:

What are simple machines? There are six simple machines
Lever (3 types), Inlined plane, wedge, screw, wheel & axel, and pulley

Ask the students if they can name them all. One student will write a simple machine on the board. There will be six students in total. (2min)
Once these students are up and after they have written this information on the board ask them to describe how the simple machine helps them do work. (10 - 15 minutes)
Explain that Compound machines are a combination of simple machines.

Mechanical Advantage
The simple machines help us do work by taking a force applied and applying it. Some can take this force and modify it to create a mechanical advantage. Mechanical advantage can be found by dividing the resistauce force (height, length of resistance arm), by the effort force (force applied).
With a pulley the mechanical advantage is the number of supporting ropes or lines in the chain of pulleys. (5 minutes)

How are we using these simple machines in our Rube Goldberg Machine? Is this a compound machine?

Display example in Rube Goldberg machine (This breaks down the energy transfer steps for better understanding)

[redacted]

Powerpoint Presentation "rubegoldber-energy transfer walkthrough.ppt"
During the presentation the students will read the descriptions and I will prompt them to explain the action to the best of their knowledge. (5 -10)
We will then quickly review ideas for using the simple machines in their projects. One example per group.

Closure:

Review main points. I will ask them to describe the simple machines again. Different people will do this. Utilize the rest of the class time to work on planning the building for your rube Goldberg machine. Plans should be finalized, so start gathering materials.

Assessment:

Gathered during the closing to see if they know the names. They have to use them in their machines so it will be known then if they know all the names

Lesson Outline

When building "things from nothing" and you need to transfer energy from one place to another you should think about using simple machines. Now we have been talking about them for a little bit, but lets review them before going to work today. Show some simple machines. Pass around samples. Talk about them as they are passed around.

Lesson Body:

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  Once these students are up and after they have written this information on the board ask them to describe how the simple machine helps them do work. (10 - 15 minutes)
- Explain that Compound machines are a combination of simple machines.
  Are our Goldberg machines compound machines?

  Mechanical Advantage
  The simple machines help us do work by taking a force applied and applying it. Some can take this force and modify it to create a mechanical advantage. Mechanical advantage can be found by dividing the resistance force (height, length of resistance arm), by the effort force (force applied).
  With a pulley the mechanical advantage is the number of supporting ropes or lines in the chain of pulleys. (5 minutes)

  Display example in Rube Goldberg machine (This breaks down the energy transfer steps for better understanding)
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  During the presentation the students will read the descriptions and I will prompt them to explain the action to the best of their knowledge. (5 -10)
  We will then quickly review ideas for using the simple machines in their projects. How are we using these simple machines in our Rube Goldberg Machine? One example per group.

Closure:

Review main points. I will ask them to describe the simple machines again. Different people will do this. Utilize the rest of the class time to work on planning the building for your rube Goldberg machine. Plans should be finalized, so start gathering materials.

Types of Simple Machines

There are four types of simple machines that form the basis for all mechanical machines:

Lever

Try pulling a really stubborn weed out of the ground. Using just your bare hands, it might be difficult or even painful. With a tool, like a hand shovel, however, you should win the battle. Any tool that pries something loose is a lever. A lever is an arm that "pivots" (or turns) against a "fulcrum" (or point). Think of the claw end of a hammer that you use to pry nails loose. It's a lever. It's a curved arm that rests against a point on a surface. As you rotate the curved arm, it pries the nail loose from the surface. And that's hard work! There are three kinds of levers:

- **First Class Lever** - When the fulcrum lies between the force arm and the lever arm, the lever is described as a first class lever. In fact many of us are familiar with this type of lever. It is the classic teeter-totter example - or a nail clipper.
- **Second Class Lever** - In the second class lever, the load arm lies between the fulcrum and the force arm. A good example of this type of lever is the wheelbarrow.
- **Third Class Lever** - In this class of levers, the force arm lies between the fulcrum and the load arm. Because of this arrangement, a relatively large force is required to move the load. This is offset by the fact that it is possible to produce movement of the load over a long distance with a relatively small movement of the force arm. Think of a fishing rod!

Inclined Plane

A plane is a flat surface. For example, a smooth board is a plane. Now, if the plane is lying flat on the ground, it isn't likely to help you do work. However, when that plane is inclined, or slanted, it can help you move objects across distances. And, that's work! A common inclined plane is a ramp. Lifting a heavy box onto a loading dock is much easier if you slide the box up a ramp--a simple machine.

Wedge

Instead of using the smooth side of the inclined plane, you can also use the pointed edges to do other kinds of work. For example, you can use the edge to push things apart. Then, the inclined plane is a wedge. So, a wedge is actually a kind of inclined plane. An axeblade is a wedge. Think of the edge of the blade. It's the edge of a smooth slanted surface. That's a wedge!

Screw

Now, take an inclined plane and wrap it around a cylinder. Its sharp edge becomes another simple tool: the screw. Put a metal screw beside a ramp and it's kind of hard to see the similarities, but the screw is actually just

another kind of inclined plane. How does the screw help you do work? Every turn of a metal screw helps you move a piece of metal through a wooden space.

Wheel and Axle

A wheel is a circular disk attached to a central rod, called an axle. The steering wheel of a car is a wheel and axle. The section that we place our hands on and apply force (torque) is called the wheel, which turns the smaller axle. The screwdriver is another example of the wheel and axle. Loosening a tight screw with bare hands can be impossible. The thick handle is the wheel, and the metal shaft is the axle. The larger the handle, the less force is needed to turn the screw.

Pulley

Instead of an axle, the wheel could also rotate a rope or cord. This variation of the wheel and axle is the pulley. In a pulley, a cord wraps around a wheel. As the wheel rotates, the cord moves in either direction. Now, attach a hook to the cord, and you can use the wheel's rotation to raise and lower objects. On a flagpole, for example, a rope is attached to a pulley. On the rope, there are usually two hooks. The cord rotates around the pulley and lowers the hooks where you can attach the flag. Then, rotate the cord and the flag raises high on the pole.

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
CANDIDATE DISPOSITION SELF-EVALUATION FORM

Preparing to Teach Portfolio

Name: [redacted] ID #: 0336885

Telephone #: [redacted] E-mail: [redacted]

Teacher Preparation Program: Secondary Education Major/Concentration Technology Education

Assess the extent that you have demonstrated the identified attribute/behavior since your admission into the teacher preparation program. Rate yourself 1 (rarely) to 4 (almost always) for each item.

		Rarely	Sometimes	Frequently	Almost Always
1.	Seek feedback from multiple perspectives and make appropriate adjustments *(Self-Reflection)*	1	2	(3)	4
2.	Self-monitor progress *(Self-Reflection)*	1	2	(3)	4
3.	Upgrade knowledge and skills regularly *(Lifelong Learning)*	1	2	3	(4)
4.	Take initiative and am self-motivated *(Lifelong Learning)*	1	(2)	3	4
5.	Manifest respect toward students *(Advocacy for Children and Youth)*	1	2	(3)	4
6.	Advocate for the well-being of students in schools *(Advocacy for Children and Youth)*	1	2	(3)	4
7.	Manifest sensitivity to the needs and values of diverse learners *(Respect for Diversity)*	1	(2)	3	4
8.	Establish rapport and communicates well with diverse audiences *(Respect for Diversity)*	1	2	(3)	4
9.	Demonstrate strong communication skills *(Collaboration)*	1	(2)	3	4
10.	Use feedback constructively *(Collaboration)*	1	2	(3)	4
11.	Demonstrate good organization skills *(Professional Work Characteristics)*	1	(2)	3	4
12.	Complete work in timely manner *(Professional Work Characteristics)*	1	2	(3)	4

Signature of Candidate: Michael T. Daly Date: 1/7/2009

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
CANDIDATE DISPOSITION [redacted] EVALUATION FORM

Preparing to Teach Portfolio

Name: [redacted] ID #: 0336885

Telephone #: [redacted] E-mail: [redacted]

Teacher Preparation Program: Secondary Education Major/Concentration Technology Education

Assess the extent that you have demonstrated the identified attribute/behavior since your admission into the teacher preparation program. Rate yourself 1 (rarely) to 4 (almost always) for each item.

		Rarely	Sometimes	Frequently	Almost Always
1.	Seek feedback from multiple perspectives and make appropriate adjustments *(Self-Reflection)*	1	2	3	4
2.	Self-monitor progress *(Self-Reflection)*	1	2	3	4
3.	Upgrade knowledge and skills regularly *(Lifelong Learning)*	1	2	3	4
4.	Take initiative and am self-motivated *(Lifelong Learning)*	1	2	3	4
5.	Manifest respect toward students *(Advocacy for Children and Youth)*	1	2	3	4
6.	Advocate for the well-being of students in schools *(Advocacy for Children and Youth)*	1	2	3	4
7.	Manifest sensitivity to the needs and values of diverse learners *(Respect for Diversity)*	1	2	3	4
8.	Establish rapport and communicates well with diverse audiences *(Respect for Diversity)*	1	2	3	4
9.	Demonstrate strong communication skills *(Collaboration)*	1	2	3	4
10.	Use feedback constructively *(Collaboration)*	1	2	3	4
11.	Demonstrate good organization skills *(Professional Work Characteristics)*	1	2	3	4
12.	Complete work in timely manner *(Professional Work Characteristics)*	1	2	3	4

Signature of Candidate: [signature] Date: 2/15/2009

COOPERATING TEACHER

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
REFLECTION ESSAY SCORING RUBRIC

Preparing to Teach Portfolio

Name: [redacted] ID #: 03768885

Telephone #: 401.623.8033 E-mail: mdaley-6885@ric.edu

Teacher Preparation Program: Secondary Education Major/Concentration Technology Education

Assess the extent that the candidate has demonstrated his/her knowledge of the following Rhode Island Beginning Teacher Standards in the Reflection Essay. Rate the candidate's performance 1 (an area of weakness) to 4 (an area of strength) for each Standard.

		Weakness	Developing	Competence	Strength
1.	The reflection essay demonstrated a broad base of general knowledge that the candidate has acquired. *(RIBTS 1)*	1	2	(3)	4
2.	The reflection essay demonstrated an in-depth understanding of the disciplines the candidates teach. *(RIBTS 2)*	1	2	3	(4)
3.	The reflection essay demonstrated an understanding of how children learn and develop. *(RIBTS 3)*	1	2	3	(4)
4.	The reflection essay demonstrated an understanding of how students differ in their approaches to learning. *(RIBTS 4)*	1	2	3	(4)
5.	The reflection essay demonstrated developing critical thinking, problem solving, and performance skills. *(RIBTS 5)*	1	2	(3)	4
6.	The reflection essay demonstrated an in-depth knowledge of an effective learning environment. *(RIBTS 6)*	1	2	(3)	4
7.	The candidate addressed in the reflective essay the importance of fostering collaborative relationships with colleagues and families to support students' learning. *(RIBTS 7)*	1	2	3	(4)
8.	The candidate used effective communication in the reflective essay to convey his/her message. *(RIBTS 8)*	1	2	3	(4)
9.	The candidate discussed the importance of using formal and informal assessment strategies to support student learning. *(RIBTS 9)*	1	2	3	(4)
10.	The candidate demonstrated reflective practice throughout the essay. *(RIBTS 10)*	1	2	(3)	4
11.	The candidate addressed ethical, legal and professional standards throughout the essay. *(RIBTS 11)*	1	2	3	(4)

Comments:

Signature of Evaluator: [signature] Date: 04.10.2009

[redacted]

[redacted]
1/6/2009
Reflection Essay
Preparing to Teach Portfolio

During my time at Rhode Island College I have taken numerous courses to prepare myself to be a teacher and many others to provide myself with a broad base of knowledge to bring to classroom(RIBTS 1). Some of the courses were designed to prepare me for what I would encounter in a school, while others were in the area of Technology Education in order to be a technology educator. Having a knowledge of the subject you are teaching is not the only important aspect of being a teacher. I have spent many hours working with students and children to help prepare myself for teaching. This has proven to be extremely helpful, but failed to prepare me for the real thing. My experience in teaching so far includes my educational values, and my professional experiences (Practicum work) at an elementary, Henry Barnard Elementary School, and secondary school, North Smithfield High School.

As an educator it is important to remember that everything you do should be to provide the student with the tools and information necessary to learn. When planning lessons I keep in mind that all students have different levels of learning (RIBTS 4). This requires me to differentiate my instructional techniques and assessment techniques to accommodate the different needs of students. Also, it is important for me to use different methods of instruction, such as lecture and inquiry based or discovery (RIBTS 6). These different techniques help the students to learn more effectively and retain more of the information from the lesson.

Maintaining a professional relationship with your students is very important. Students need to know that they can talk to their teacher about classroom problems and

other school issues. Maintaining open communication with the parents helps to keep them up to date with their child's learning and assignments. It is very helpful to these lines of communication in case there is ever any information that you need to tell them (RIBTS 7).

When teaching material to a student, you must always be thinking about how you will assess the students learning of the material. There are formal and informal methods of assessment such as written testing and essays, or discussions and oral tests. A teacher should use a mixture of all methods of assessment in grading their students. The grades should reflect the standards, or rubric areas that the student addressed when they were assessed. Standards are useful since they give teachers a common point of assessment (RIBTS 9).

My first experience with teaching students came during my elementary practicum at Henry Barnard Elementary School. I worked here for a semester with a second grade and a fourth grade class. I was responsible for designing lessons, preparing materials, and creating various types of assessment such as tests and activities that would require the students to utilize information from the lesson. This experience helped me to gain confidence in my teaching and working with children in a learning environment. During this time I utilized all of my learning within the technology education program to create lessons for the students that would give them the base of knowledge that they would need to excel in the area of technology education. During my time at the elementary school I did not foster any relationships with the other teacher

at the school. This is a regret of mine as it would have helped me to gain more information about the students that I was working with. My semester at this school was helpful in preparing myself for working with students, creating lessons, and teaching them to a class.

My second experience came during my secondary practicum at North Smithfield High School. The semester spent here prepared me for working with older students and how to create professional relationships with the students. Working with high school students was much different than I expected. I expected it to be hard for me to come in and get in front of them to teach lessons, but I was much more comfortable with working with them than I thought. Over the semester I presented a few lessons and helped out with other tasks that the classroom teacher needed. This particular technology education classroom runs a multimedia program that I am very well versed in. I was able to bring my personal background with video, audio, and graphics technologies to this classroom which helped during the semester. Working in a high school gives you the instructional opportunity of having discussions with the students and using the socratic method to teach new ideas that build upon concepts already learned. These discussion help the students to speak out with their ideas and solidify the open lines of communication that are there. These discussions have shown me how it is important to maintain a classroom management plan that defines how the students should respect each others ideas and speak out about their own. While working with the students I was careful to maintain a relationship with them that drew the line of teacher and student, making sure that there would be no confusion.

[redacted]

Throughout these semesters I feel that I improved in many ways as a teacher. I have gained more personal confidence in my teaching skills and much experience working with students of all age groups. I feel that I work better with older students but that may be due to my inexperience at the time of my elementary practicum. I have consistently heard that I need to be more confident when I am teaching lessons and know that it is something that I must work on. I have come a long way in this matter but there is always room for improvement. As a teacher you must always be learning and striving to better yourself. After all how can you teach practices that you do not hold yourself?