LAB MANUAL

INTERACTIVE SCIENCE GONE CRAZY

WONDERWORKS™

LET YOUR IMAGINATION RUN WILD !

A collection of labs and classroom activities that align with the Tennessee State Standards using interactive exhibits found inside WonderWorks.

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WonderWorks
Lab Manual 2010

If life is a journey, then school is the transportation and WonderWorks is the fuel for the voyage. With Science-grade specific standard alignment, WonderWorks is your one-stop educational field trip.

This is the 3rd edition of the Lab Manual. This is part of our commitment to educators to help facilitate the learning of our next generation of leaders.

These lessons are aligned with state standards and our exhibits. There are also data collection cards for individual use or for class use. In addition, there are coloring sheets for those students who may be interested.

If you have any questions or for ideas for how to implement some of these ideas in your classroom please contact the Educational Manager at 865-868-1815 or schools@wonderworkstn.com

We look forward to working with each of you in the future.

Please note that all of our lesson plans have many curriculum components. They all address the scientific method, scientific inquiry, testing hypothesis, collecting data, and models for representing the true object.

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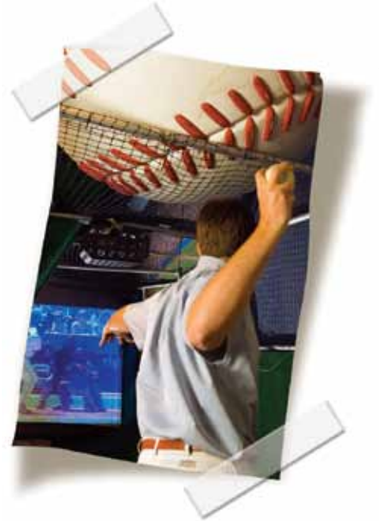
Table of Contents

*For use with Data Collection Card

Velocity Ball



Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How to calculate central measures of tendency
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically cannot travel as far as objects that are lighter
- The more muscles are used, they better they perform
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Central Measures of Tendency
- Effects of gravity
- Understanding a push/pull can move an object
- Measuring with non-standard units
- Force and motion
- Muscular system
- Safety procedures
- Newton's Laws

Materials:
- Velocity Ball Exhibit
- Data Collection Card

Procedures:
The student will throw the ball at least once, at the most three times. The exhibit will at first offer them a selection of 7 famous batters to choose from. Once they select one, then they will have to press 'start.' The batter will appear on the screen and then the student will attempt to throw the ball where the batter would hit it. The screen will tell the student the success of their pitch and the speed. If the student only throws the ball once, then they need to write the score on their data collection card, if the student throws it more than once, then they need to write the highest score on their card. Once back in the classroom the discussion needs to include graphing the students speed and then using the graph to determine the central measures of tendency. Measuring the speed of a ball with Miles Per Hour (MPH) is not a standard form of measurement such as feet and inches. MPH is a non-standard form of measurement. The class also needs to discuss why some students can throw faster than others based on their size or athletic ability and what would happen if students practiced throwing balls everyday, would it increase their speed. There are also certain safety procedures that need to be followed when participating in this exhibit. Balls can only be thrown in one direction in a certain space. Throwing the balls carelessly could result in injury. If we lived on a planet without any gravitational pull, what would be the result if a ball was thrown? In addition, how much force has to be exerted to make the ball travel a certain distance. How accurate is this exhibit as a model for representing how it would be to throw an actual baseball in a baseball game and what other factors would come into play.

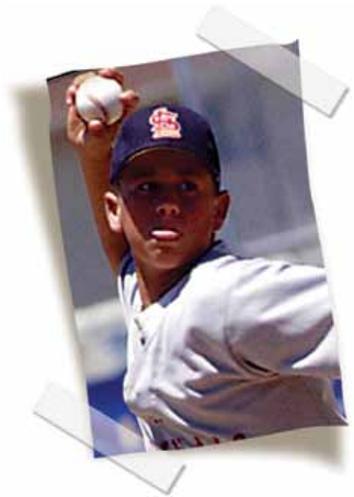
Independent Practice:
The exhibit is completely independent.

Assessment:
- The student will write their outcome on their post-teaching card
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in collecting and throwing the balls. They may also need assistance with choosing a batter and starting the exhibit. They may also need help with writing the speed down on their data collection card.

Extensions (Gifted Students):
If gifted students are successful in throwing pitches, then they can write down all the speeds and use the central measures of tendency to write down the mean on their data collection card, and then find the median and the mode.

Generalization to other Subjects:
Collecting empirical data and measurement can be generalized to math.



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How High Can You Jump?

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How to calculate central measures of tendency
- The varying speeds at which objects travel and the affect gravity has on objects
- That individuals that weigh more typically cannot jump as high as individuals that are lighter
- The more muscles are used, the better they perform
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Central Measures of Tendency
- Effects of gravity
- Understanding a push/pull can move an object
- Measuring with non-standard units
- Force and motion
- Muscular system
- Safety procedures
- Newton's Laws

Materials:
- How High Can You Jump? Exhibit
- Data Collection Card

Procedures:
The student will stand on the pad and wait for the directions on the screen which tell them to jump. The directions will tell them to wait for green, and then it will proceed to count down from 3 to 1. Once the countdown is complete, then they jump. The screen will tell them how high they were able to jump. Once back in the classroom the discussion needs to include graphing the student's height they were able to jump and then using the graph to determine the central measures of tendency. Measuring the height they were able to jump is not a standard form of measurement. The class also needs to discuss why some students can jump higher than others based on their size or athletic ability and what would happen if students practiced jumping everyday, would it increase their ability to jump higher. There are also certain safety procedures that need to be followed when participating in this exhibit. Jumping when not used to jumping could result in injury. If we lived on a planet without any gravitational pull, what would be the result if a person was to jump? In addition, how much force has to be exerted to be able to jump a certain height. How accurate is this exhibit as a model for representing how it would be to jump during an actual basketball game while trying to make a basket and what other factors would come into play such as trying to jump around other players.

Independent Practice:
The exhibit is completely independent.

Assessment:
- The student will write their outcome on their post-teaching card
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in knowing where to stand. They may also need assistance with watching the screen and knowing when to jump. They may also need help with writing the height down on their data collection card.

Extensions (Gifted Students):
If gifted students are successful in jumping, then they can write down all the heights after 3 times and use the central measures of tendency to write down the mean on their data collection card, and then find the median and the mode.

Generalization to other Subjects:
Collecting empirical data and measuring can be generalized to math.

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Rock Climbing Wall

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That individuals that weigh more typically will have a more difficult time pulling themselves up versus individuals that are lighter
- The more muscles are used, the better they perform
- Proper safety procedures need to be followed when following certain procedures
- Problem solving for which step to take next
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Understanding a push/pull can move an object
- Force and motion
- Muscular system
- Safety procedures
- Simple Machines
- Problem Solving
- Newton's Laws

Materials:
- Rock Climbing Wall

Procedures:
The students will have to weigh at least 40 pounds. The students will wear a harness and a helmet and will be attached to a belay descending device via a belay strap. This device will slow the participants descent. Using various points imbedded in the wall, the students will attempt to climb to the top of the wall and ring the bell. Once back in the classroom the discussion needs to discuss why some students have an easier time pulling themselves up than others based on their size or athletic ability and what would happen if students practiced pulling themselves up everyday, would it make it easier to pull themselves up on this exhibit. There are also certain safety procedures that need to be followed when participating in this exhibit. Students need to ensure that they are properly harnessed before they begin climbing the wall. Problem solving skills are necessary to determine which step to take next. If we lived on a planet without any gravitational pull, what would be the result if a person was to try to pull themselves up? In addition, how much force has to be exerted to be able to pull them up? How accurate is this exhibit as a model for representing how it would be to actually pull yourself up when climbing a cliff or when trying to do a pull up in PE class. Also, what other factors would come into play when you trying to pull yourself up if you were not harnessed or did not have proper equipment? Would the results be the same? Would it be more scary?

Independent Practice:
After putting their safety equipment on, climbing the wall is completely independent other than the anchor line attached to the students.

Assessment:
- Observation of the student with the exhibit and their success at trying to reach the top and ring the bell
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with putting their harness and other equipment on. They may also need physical assistance with a push to get started.

Extensions (Gifted Students):
This exhibit is challenging without any extensions, however, they may want to try it with a weighted backpack on.

Generalization to other Subjects:
Problem solving generalizes to all subject areas.

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Robotic Arms

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will be more difficult to lift versus objects that are lighter
- The more muscles are used, the better they perform
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Understanding a push/pull can move an object
- Force and motion
- Muscular system
- Simple Machines
- Newton's Laws

Materials:
- Robotic Arms Exhibit

Procedures:
The student will attempt to use the robotic arms to build a tower with a minimum of two blocks. Operating the controls will demonstrate how the brain has to send messages to varying parts of the body anytime any task needs to be accomplished. In addition, observation of the way the robotic arm works is a great tool for the mechanism of prosthetic arms. In addition, this exhibit allows the basic understanding for a push or pull to move an object, and for every action there is an equal and opposite reaction. If the students are able to build a multiple block tower, it allows them to observe that parts make up the whole. This exhibit requires problem solving as to which blocks should go on the bottom, middle, top, etc. What would happen to the blocks if there was no gravity on Earth? Would an individual be able to build a building? If the robotic arm accidently hits the blocks that have been built, then it was a force acting on a object.

Independent Practice:
The exhibit it completely independent.

Assessment:
- Observation of the student's ability to stack blocks
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with operating the controls.

Extensions (Gifted Students):
Gifted students can attempt to stack more than two blocks.

Generalization to other Subjects:
Problem solving generalizes to all subject areas

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Pulley Seat

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That individuals that weigh more typically will have a more difficult time pulling themselves up versus individuals that are lighter
- The more muscles are used, the better they perform
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Understanding a push/pull can move an object
- Force and motion
- Muscular system
- Safety procedures
- Simple Machines
- Newton's Laws

Materials:
- Pulley Seat Exhibit

Procedures:
The student will try to pull themselves up on each of the three pulley seats. It is important for the teacher to point out to the students that the complexity of the process is variant upon the number of pulleys. Once back in the classroom the discussion needs to discuss why some students have an easier time pulling themselves up than others based on their size or athletic ability and what would happen if students practiced pulling themselves up everyday, would it make it easier to pull themselves up on this exhibit. There are also certain safety procedures that need to be followed when participating in this exhibit. Students need to ensure that they are buckled in before they begin pulling. If we lived on a planet without any gravitational pull, what would be the result if a person was to try to pull themselves up? In addition, how much force has to be exerted to be able to pull themselves up. How accurate is this exhibit as a model for representing how it would be to pull yourself up when climbing or when trying to do a pull up in PE class. Also, what other factors would come into play when you trying to pull yourself up when standing instead of sitting. Would the results be the same?

Independent Practice:
The students need to attempt to pull themselves up, however, they may need some assistance buckling themselves in.

Assessment:
- Observation of the student with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with pulling themselves up and buckling themselves in.

Extensions (Gifted Students):
Gifted students can attempt to design a 4-pulley system using weights and string.

Generalization to other Subjects:
Muscular system discussion can generalize to Physical Education classes.

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Air Cannon

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will not travel as high as lighter objects
- That certain muscles need to be used to pull the rope to get the ball to go in the air
- For every action, there is an equal and opposite reaction.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Cause and Effect
- Understanding a push/pull can move an object
- Force and motion
- Muscular system
- Simple Machines
- Problem Solving
- Newton's Laws

Materials:
- Air Cannon Exhibit

Procedures:
The students will pull the cord at least twice to see how high they can send the tennis ball. The students need to discuss the weight of the cord and how challenging it can be to pull it hard enough to achieve maximum height of the tennis ball. Once back in the classroom the discussion needs to include on muscular strength and how an adult would have an easier time pulling and releasing than a child. The students need to discuss strategies for pulling that could increase effectiveness such as using two students instead of one or sitting instead of standing while pulling. If we lived on a planet without any gravitational pull, what would be the result if a person tried to pull the rope, or would the ball stay suspended? The class needs to discuss the use of a pulley system, and how by pulling the rope, it leads to the projection of another object. If an individual was to strengthen their pulling muscles by working out, would this increase the ease of pulling the rope?

Independent Practice:
The exhibit is independent .

Assessment:
- Observation of success of exhibit operation
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with pulling the cord.

Extensions (Gifted Students):
Gifted students may pull it twice to observe if they could get it to go higher the second time.

Generalization to other Subjects:
Problem solving generalizes to all subject areas.

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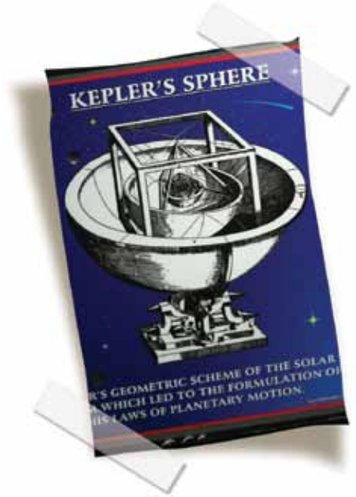
Coin Orbiter



Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will travel downhill at a faster weight than objects that weigh less
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Understanding a push/pull can move an object
- Force and motion
- Simple Machines
- Newton's Laws

Materials:
- Coin Orbiter Exhibit

Procedures:
The students will 'load' a penny and observe the length of time it takes to get to the bottom and the motion and direction at which it travels. The students will follow the same procedure for a nickel, dime, and quarter and observe the difference in travel speeds and duration. Once back in the classroom the discussion needs to include why some coins travel at a different speed than other coins. If we lived on a planet without any gravitational pull, what would be the result if a person was to try to roll the coins in this exhibit, would they roll at all? In addition, why does minimal force have to be exerted in order for the coins to move downhill? An inclined plane helps remove the resistance of an object moving downhill. How accurate is this exhibit as a model for representing how it would be to roll another object downhill? Also, what other factors would come into play when you trying to roll yourself downhill? Generally, if something is trying to roll downhill on an uneven surface then it will not roll with such ease as a level plain.

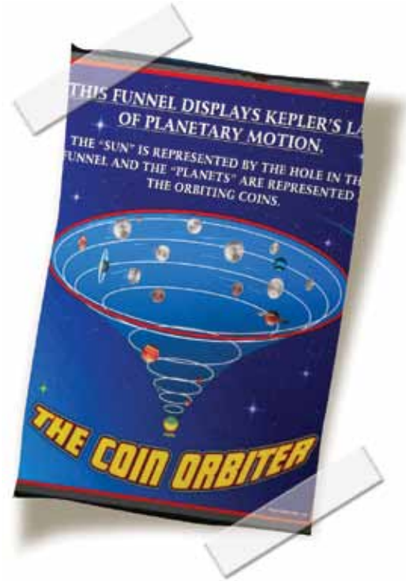
Independent Practice:
Although the exhibit can be done completely independent, it may prove beneficial to have several students observe the exhibit.

Assessment:
- Participation/observation in the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance differentiating between the values of coins.

Extensions (Gifted Students):
Gifted students can try two coins of the same amount and determine if the results were the same.

Generalization to other Subjects:
Values of money can generalize to math.



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Are You a Risk Taker?

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How to calculate central measures of tendency

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Central Measures of Tendency

Materials:
- Are you a Risk Taker? Exhibit
- Data Collection Card

Procedures:
The student will answer all 20 questions as accurately as possible based on personal feelings or experiences. The questions are true or false. After all questions are complete, they place their hand on a sensor, called a burner, and it will light up a category which they fall under based on their answers. The categories for risks are high, medium, and low. They need to write down the level of risk on their data collection card. Once the students return to the classroom they can discuss the levels of risks and how accurately the exhibit, as a model, represents their true level of risk. The students also need to discuss what would happen if they had changed their answers, would the outcome vary that much. In addition, collecting the rating can be linked to a class graph of the other students in the class which can be tied into central measures of tendency such as mean, median, and mode.

Independent Practice:
The exhibit is completely independent.

Assessment:
- The student will write their outcome on their post-teaching card
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need the questions read to them and assistance with writing the outcome on their card.

Extensions (Gifted Students):
Have students change their answers to attempt to come up with a different score.

Generalization to other Subjects:
Answering questions to determine unspecified outcome will generalize to all subject areas. Collecting empirical data can be generalized to math for central measures of tendency.

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Safe Crackers

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How probability can factor into everyday situations
- How patterns can be calculated in real world examples .

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Patterns
- Probability

Materials:
- Safe Crackers Exhibit

Procedures:
The students will be presented with three different choices of safes to 'crack.' They will have the first safe that has a 1, 2, and 3. There are 6 possibilities with 3 numbers to cracking the safe. The students will have to try varying combinations of the 3 numbers until they are able to crack the safe. The second choice has a 1, 2, 3, and 4. By adding the 4th number, the students can identify that the number of possibilities went from 6 to 24. The students may want to try varying combinations of the 4 numbers to see if they could crack the safe. The third safe has a 1, 2, 3, 4, and 5. The students can now identify that by adding the 5th number the possibilities went from 24 with 4 numbers up to 120 with 5 numbers. The students may want to attempt to crack the safe, but it may take an extended amount of time. The class can discuss how accurate of a model this is for true safes, and how bank robbers who are successful figure out combinations. In addition, by the three safes that are provided, can a pattern be set by how many possibilities there are per added number?

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in keeping up with possibilities that were already unsuccessfully attempted.

Extensions (Gifted Students):
Gifted students can determine how many possibilities there would be if there were 6 numbers instead of 5.

Generalization to other Subjects:
Problem solving generalizes to all subject areas. Probability generalizes to math.

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One In A Million

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How probability can factor into everyday situations
- How patterns can be calculated in real world examples.

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Patterns
- Probability

Materials:
- What are the Odds? Exhibit

Procedures:
The students are presented with a long clear 'tube' that contains 1,000,000 small beads. The beads are broken down into color. The tube contains 888,889 red beads, 100,000 yellow beads, 10,000 orange beads, 1,000 white beads, 100 green beads, 10 black beads, and 1 purple bead. By the several colors and their proportion being identified, this allows students to understand probability visually. This allows for students to have a visual picture if a certain number of individuals are a varying nationality or suffer from some illness, this exhibit allows for this to be put into a visual perspective.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in color identification if they struggle with this concept.

Extensions (Gifted Students):
Gifted students could figure out the ration if there were 500 brown or 2000 pink.

Generalization to other Subjects:
Problem solving generalizes to all subject areas. Probability generalizes to math.

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What Are The Odds?

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon vthe input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How probability can factor into everyday situations
- How patterns can be calculated in real world examples

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Patterns
- Probability

Materials:
- What are the Odds? Exhibit

Procedures:
The students will be asked to 'roll' the dice by pushing a button. The exhibit has 2 dice that are 'rolled.' The class discussion needs to include what are the odds of rolling a 2 if you roll a die 1 time. What if you roll a die 3 times, what are the odds of rolling a 2? In addition, since there are two dice, what are the odds of rolling a 2 or a 12 if you rolled them three times? In addition, what is the sum that you are most likely to get if you roll the dice three times? This entire exhibit allows the class to determine probability with a simple task such as rolling dice. In addition, you can ask students where individuals are likely to roll dice and where these odds would be important.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in adding up the sum of the dice and counting the dots.

Extensions (Gifted Students):
Gifted students can determine how many times two die would have to be rolled in order to increase the odds of a 2 or a 12.

Generalization to other Subjects:
Problem solving generalizes to all subject areas. Probability generalizes to math.

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Space Weight

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How to calculate central measures of tendency
- How much they weigh at each location
- Mass and density
- Objects in the sky
- Affects of gravity on weight

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Central Measures of Tendency
- Measuring with non-standard units
- Mass and density
- Objects in the sky
- Effects of gravity

Materials:
- Space Weight Exhibit
- Data Collection Card

Procedures:
The students will step up on the scale and write down their weights for the Earth, Moon, and Mars. Weight being identified at various places helps students understand that there are different places in the sky, but also that their body does not change but their weight does. The scale only gives pound measurements, but the students can elaborate this by converting to metric units once they are back in the classroom. A graph can be made for each location of how much each student weighs in each location. From the graph developed in the classroom, the teacher can then determine the central measures of tendency. The class also needs to discuss mass and density and why they do not change even though your weight changes. What affect does gravity play in the weight differences? Are the weights different because there is less of a gravitational pull on the moon and Mars then on Earth?

Independent Practice:
The exhibit is completely independent.

Assessment:
- The student will write their outcome on their post-teaching card
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in writing down their weights on their data collection cards and may need assistance on where to stand.

Extensions (Gifted Students):
Gifted students can determine the 'Earth' weight of an object and then using the ratio of their weight; determine the objects weight at the other places as well.

Generalization to other Subjects:
Measuring with non-standard units and central measures of tendency can generalize to math.

Cosmic Discovery

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- Objects in the sky – stars, planets, galaxies
- That speed can be measured in another unit besides Miles Per Hour
- Different vehicles travel at different speeds

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Objects in the sky
- Measuring in non-standard units
- Planets
- Patterns in the night sky

Materials:
- Cosmic Discovery Exhibit

Procedures:
The students will have several choices as far as destination and vehicle. The students can travel to the moon, Mars, Saturn, Proxima Centauri (the closest star), and Epsilon Eridani (a nearby galaxy). They then choose their form of transportation either automobile, bullet train, Boeing 747, Voyager, or Starship. Then they 'plan their trip.' The computer will tell them how long, sometimes in years, it would be to arrive at their destination. This allows students to understand the distance that is involved when discussing planets and stars that they may not have otherwise understood. The students also have the opportunity to participate in a space fact or fiction test. This test helps them understand what truly is reasonable in space and what is not. This can lead to different travels in space, and whether or not space travel is truly something that can be accomplished in their life time. The class can also discuss whether this exhibit is an adequate representation for the time it would take to travel in space.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in reading the information and manipulating the controls effectively.

Extensions (Gifted Students):
Gifted students can choose another planet not listed and plan the trip with the vehicles.

Generalization to other Subjects:
Inquiry can generalize to all subjects. Measurement can generalize to math.`

Space Information Center

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- Objects in the sky – stars, planets, galaxies
- Different vehicles travel at different speeds

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Objects in the sky
- Measuring in non-standard units
- Planets

Materials:
- Space Information Center Exhibit

Procedures:
The students will have the opportunity to choose from four options on the main menu such as Early Manned Spaceflights, Modern Spaceflights, To The Moon, and Our Solar System and Beyond. Each main selection offers a quiz on these areas. This exhibit allows for class discussion on space flight, and accomplishments due to the space program. In addition, discuss the completion that was ongoing during that time between the Russians and the Americans. The questions also help make students aware of how discrimination was not as much as a factor between males and females, or African Americans considering all have been in space. The space program also makes students aware of another variation of science exploration and research.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in reading the information and manipulating the computer effectively.

Extensions (Gifted Students):
With the first female in space being Russian, gifted students can research who the first American female was in space.

Generalization to other Subjects:
Inquiry can generalize to all subjects.

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Space Update

Objectives:
The students will understand:
- vHow to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- Objects in the sky such as stars, galaxies, and clusters
- Planets and their information such as rotation, tilt, weather, history, moons, composition, size, etc

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Objects in the sky-stars, galaxies, clusters, etc.
- Solar Weather
- Planets
- Patterns in the night sky

Materials:
- Space Update Exhibit

Procedures:
Students will initially choose from four categories of information—Astronomy, Sky Tonight, Solar System, and Space Weather. **Space Update Astronomy** asks them to choose from stars, clusters, galaxies, or deep space. This allows them to learn about stars other than our sun, and galaxies other than the Milky Way. **Space Update Sky Tonight** gives them the opportunity to determine what the sky will look like in reference to star patterns, as well as to see what the sky looked like on previous days as well. **Space Update Solar System** gives them the opportunity to learn about all the planets, their composition, their location, size, rotation, history, temperature, and tilt. This allows the students to understand that not all planets are arranged like Earth, and that the further the planet is from the sun, the colder it is, and that Earth is strategically placed to not be too hot or too cold. **Space Update Weather** gives students the opportunity to understand the forecasts on the Sun, Earth, and other planets, introducing them to solar flares and their consistency. Participation in this exhibit can be transitioned to the classroom where the discussion can include knowledge that they knew previously, knowledge that they learned, and knowledge that they wanted to learn, but were not able to locate.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in reading the information and manipulating the controls effectively.

Extensions (Gifted Students):
Gifted students can do a graph of the similarities and differences of the planets in relation to Earth.

Generalization to other Subjects:
Inquiry can generalize to all subjects.

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Sound Lab

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How sound can be a form of energy
- How the body processes sound

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Brain synapses to the ears
- Sound Energy

Materials:
- Sound Lab Exhibit

Procedures:
Students will sit in the sound labs, one student per seat for 6 total. Once the door closes then the lights will go out and the speaker will begin to explain how we need both ears in order to hear where sounds are originating and how the brain processes sounds with both of our ears. It then demonstrates how it would be with only one ear. The exhibit then begins to illustrate this with a story simulating a trip to a haunted mansion. This exhibit is a lesson on sensory deprivation and how your remaining senses are enhanced, which is a good indicator of how individuals who are blind hear the world. It also demonstrates how sound can be a form of energy. The class can also discuss transfer of electrical energy to operate the exhibit. Class discussion can also lead to how an individual with use of only one ear would hear things, and how if an individual is not listening intently that they miss vital information.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test.

Modifications (Special Education Students):
Special education students may need assistance with where to sit.

Extensions (Gifted Students):
Gifted students may want to draw a picture of what they heard happening.

Generalization to other Subjects:
Proper hearing and listening skills apply to all subject areas.

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Floor Piano

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How sound can be a form of energy
- Music Theory

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Sound Energy

Materials:
- Floor Piano Exhibit

Procedures:
Students have the opportunity to either play 'Twinkle, Twinkle Little Star' or 'Hush Little Baby.' The floor piano has the keys labeled as per their musical name. In order to play the song, the students have to correctly match the note on the piano with the note name on the page. This is an extremely difficult task because stepping on the notes is not the origination of the sound, but the sensors as to proper body placement. The Floor Piano is an example of how our ears process different sounds differently. This exhibit also helps with realization of the difficulty of playing an actual piano.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with the letter identification and tracking the match between the piano and the book.

Extensions (Gifted Students):
Gifted students may want to attempt to come up with a different song once they hear the pitches from the other songs.

Generalization to other Subjects:
The Floor Piano generalizes to music class. Also, letter identification is applicable in all subject areas as well as problem solving.

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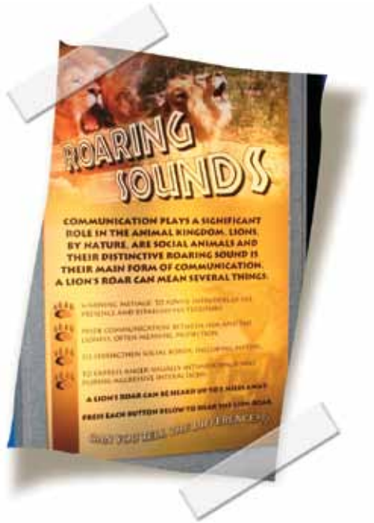
Roaring Sounds



Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How sound can be a form of energy
- Animal adaptations to their environment
- Genetic similarities among species

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Sound Energy
- Animal Adaptations for their environment
- Genetic Similarities

Materials:
- Roaring Sounds Exhibit

Procedures:
Students can choose one of four variations of a lion's roar. The choices are Warning Roar, Social Bonding, Mating Roar, and Anger Roar. Hearing the various choices allows for the students to understand how animals communicate intonation the same as humans. Also, how our ears process different sounds differently and sounds are all around us. Also, transfer of electrical energy for exhibit operation. Students can also understand that, regardless of lion families, they all communicate the same. It is important to also discuss how accurate of a model this is as representing how lions actually communicate.

Independent Practice:
The exhibit is completely independent.

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in reading the choices.

Extensions (Gifted Students):
Gifted students can research what other animals also have varying communication styles.

Generalization to other Subjects:
Inquiry can generalize to all subjects.

EDUCATION PROGRAMS BY

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Hurricane Hole

Objectives:
The students will understand:
- Collecting data and determining outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- Varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will not travel as far as a heavier object
- That certain muscles need to be used to maintain their position
- The significance of natural disasters and the damage they can cause
- The transfer of energy and that a push or pull can move an object
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force

Standards Assessed:
- Scientific Method
- Scientific Inquiry
- Models for Representation
- Cause and Effect
- Muscular system
- Safety Procedures
- Natural Disasters and their effect
- Understanding a push/pull can move an object
- Collecting Data
- Testing Hypothesis
- Effects of gravity
- Force and motion
- Problem Solving
- Newton's Laws

Materials:
- Hurricane Hole Exhibit

Procedures:
Students will stand in the Hurricane Hole exhibit and experience hurricane force winds which can lead to an in-class discussion about the effects of natural disasters and their affect on the ground, buildings, and erosion. In addition, this exhibit will allow discussion of transfer of energy and what allows the fan to operate. The students can also discuss that a push or pull can move any object, but that wind can cause a 'pushing' action. Students also need to be aware of appropriate safety procedures in case of a hurricane and also safety procedures to follow when participating in the exhibit. The class can discuss the reality of how it would really feel in a hurricane versus being in the 'Hurricane Hole.' Although this exhibit is a 'ride' in WonderWorks, how would it actually feel to be standing outside while a hurricane was occurring? Is the exhibit a true model of the actual event? How would the exhibit be different if we lived on a planet with no gravitational pull? What makes the exhibit work? Discuss electricity and transfer of energy to how the exhibit operates. Do stronger people have an easier time supporting themselves during the duration of the exhibit? Are children more affected than adults?

Independent Practice:
The exhibit is independent; up to 5 students can participate simultaneously

Assessment:
- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need physical assistance getting in and out of the exhibit.

Extensions (Gifted Students):
Ask gifted students what level hurricane winds the ride simulates.

Generalization to other Subjects:
Safety procedures are applicable in all subject areas.

EDUCATION PROGRAMS BY

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Natural Disasters

Objectives:
The students will understand:
- Collecting data and determining outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will not travel as far as lighter objects
- The significance of natural disasters and the damage they can cause
- The transfer of energy and that a push or pull can move an object
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Cause and Effect
- Understanding a push/pull can move an object
- Force and motion
- Problem Solving
- Safety Procedures
- Newton's Laws
- Natural Disasters and their effect
- Safety Procedures

Materials:
- Natural Disasters Exhibit

Procedures:
Students will have the opportunity to choose from the four options of 'Wild Weather,' 'Man Made Catastrophes,' 'Extreme Disasters,' and 'Quakes and Blazes.' Each area has a quiz regarding these areas. It would save on time if you have 2 students per computer to answer the questions. These questions will help the students understand the forms of natural disasters and the damage they can cause to life and property. This also helps student understand that gravity is a factor when natural disasters occur and that the majority of the damage is caused because objects are thrown around or knocked over. This exhibit can lead to discussions of proper safety procedures to follow in case of each of the various natural disasters such as go downstairs during a tornado or in a bathtub with a mattress over you or not standing near a tree during a lightening storm, etc. Students also need to understand that if something is 'thrown' during a natural disaster, that inevitably Newton's Law will take effect and gravity will bring the object back down. This is similar to cause and effect.

Independent Practice:
The exhibit is independent; however, up to 5 individuals can participate simultaneously.

Assessment:
- Observation of participation in exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with reading the questions.

Extensions (Gifted Students):
Gifted students can determine what was the natural disaster that caused the most fatalities before 1940.

Generalization to other Subjects:
Safety procedures are applicable in all subject areas.

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Quake Café

Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- Varying speeds at which objects travel and the effect gravity has on objects
- That objects that weigh more typically will not travel as far as lighter objects
- That certain muscles need to be used to maintain their position
- The significance of natural disasters and the damage they can cause
- The transfer of energy and that a push or pull can move an object
- That for every action, there is an equal and opposite reaction
- The direction of the force vector is the is the same as the direction of the acceleration vector
- That every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it, and that gravity acts as an external force
- What fault line is located in Tennessee

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Effects of gravity
- Cause and Effect
- Understanding a push/pull can move an object
- Force and motion
- Muscular system
- Problem Solving
- Safety Procedures
- Newton's Laws
- Fault lines
- Natural Disasters and their effect

Materials:
- Earthquake Café Exhibit

Procedures:
Students will ride in the Earthquake Café and experience a 6.0 level earthquake which can lead to an in-class discussion about the effects of natural disasters and their affect on the ground, buildings, and erosion. The students can also discuss that a push or pull can move any object, but that wind can cause a 'pushing' action. Students also need to be aware of appropriate safety procedures in case of an earthquake and also safety procedures to follow when participating in the exhibit. The exhibit also explains the history of the Richter scale. The class needs to discuss appropriate safety procedures in case of an earthquake, also there are safety procedures that are addressed while participating in the exhibit. Although this exhibit is a 'ride' in WonderWorks, how would it actually feel to be sitting at a restaurant while an earthquake occurred? Is the exhibit a true model of the actual event? How would the exhibit be different if we lived on a planet with no gravitational pull? What makes the exhibit work? Discuss electricity and transfer of energy to how the exhibit operates. Do stronger people have an easier time supporting themselves during the duration of the exhibit? Are children more affected than adults?

Independent Practice:
The exhibit is independent; however, up to 8 individuals can ride simultaneously.

Assessment:
- Observation of participation in exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may want to ride between two students to aid in support if needed.

Extensions (Gifted Students):
Ask gifted students what level on the Richter scale the ride simulates.

Generalization to other Subjects:
Safety procedures are applicable in all subject areas.

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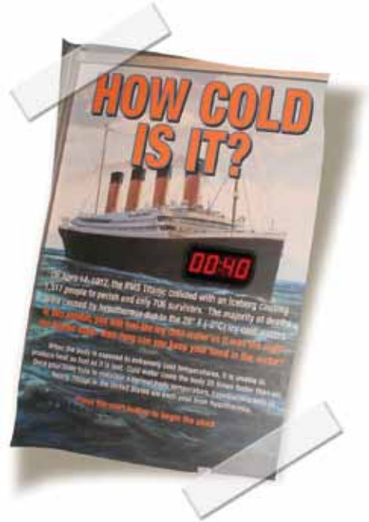
Titanic Hole



Objectives:
The students will understand:
- Collecting data and determining outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- The significance of natural disasters and the damage they can cause
- Time can be measured as well as length and distance
- History of the Titanic

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Cause and Effect
- Safety Procedures
- Measuring in non-standard units
- History of the Titanic
- Natural Disasters and their effects

Materials:
- Titanic Hole Exhibit

Procedures:
Students will begin the timer and place their hands in the water, which is the equivalent temperature of the water when the Titanic sunk, and see how long they can keep their hand in the water. Once they have completed the exhibit, they will write down the length of time they were able to sustain their hand in the water. Once back in class, the data can be graphed to determine measures of central tendency of mean, median, and mode for the classroom. Measuring time is just another way to measure something other than just distance and speed. The class also needs to discuss what safety procedures could have been followed to prevent the sinking of the Titanic, and was their actually something wrong with the structure of the ship? In addition, what makes us unable to keep our hand in the water for such a short amount of time and would individuals who live in colder temperatures have a higher tolerance for the water? How long would an individual be able to survive in water at this temperature? Is sticking your hand in freezing water the same as being stuck in the water during that time? Is this exhibit a good model for the actual event?

Independent Practice:
After putting their safety equipment on, climbing the wall is completely independent other than the anchor line attached to the students.

Assessment:
- Observation of the student with the exhibit and their success at trying to reach the top and ring the bell
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance with putting their harness and other equipment on. They may also need physical assistance with a push to get started.

Extensions (Gifted Students):
This exhibit is challenging without any extensions, however, they may want to try it with a weighted backpack on.

Generalization to other Subjects:
Problem solving generalizes to all subject areas.

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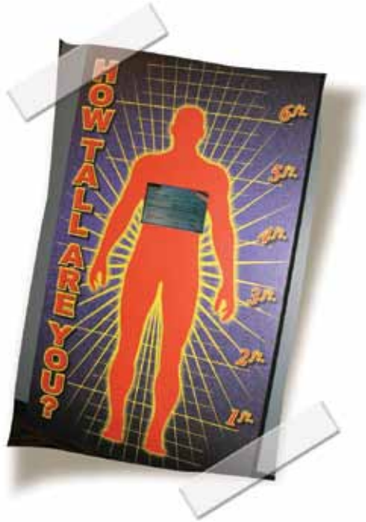
How Tall Are You?



Objectives:
The students will understand:
- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypotheses
- How to calculate central measures of tendency

Standards Assessed:
- Scientific Method
- Collecting Data
- Scientific Inquiry
- Testing Hypothesis
- Models for Representation
- Central Measures of Tendency
- Measuring with non-standard units
- Genetic differences

Materials:
- How Tall Are You? Exhibit
- Data Collection Card

Procedures:
Students will stand on the floor pad so that it can determine how tall they are. Once their height is determined the students will write down their height in both metric and standard units on their data collection card. Once back in the class it needs to be discussed about standard and non-standard units and why they differ and why they exist. In addition, how is this exhibit modeled after something more non-computerized, such as the measurement they use at a doctor's office. A graph needs to be developed of the varying heights of the students in the classroom and use central measures of tendency to determine the mean, median, and mode of the heights in the classroom. The class can also lead a discussion why student's heights differ due to genetics.

Independent Practice:
The exhibit is completely independent.

Assessment:
- The student will write their outcome on their post-teaching card
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):
Special education students may need assistance in writing down their heights on their data collection cards and may need assistance on where to stand.

Extensions (Gifted Students):
Gifted students may work on converting heights of other objects based on their height and their metric unit height.

Generalization to other Subjects:
Measuring with non-standard units and central measures of tendency can generalize to math.

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Student Name	Risk Taker	Titanic	Velocity Ball	Height-Standard	Height-Metric	Space Weight-Earth	Space Weight-Moon	Space Weight-Mars	Jump

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

NAME:______________________________

ARE YOU A RISK TAKER? Level __________

TITANIC HOLE Amount of time ___________

VELOCITY BALL Lowest ____ Highest______

HOW TALL ARE YOU? Standard ___ Metric___

SPACE WEIGHT Earth ___ Moon ____ Mars____

HOW HIGH CAN YOU JUMP? ___________

WonderWorks Test

1. How fast can a baseball hit by a bat travel? ________________________
2. The all time record for how high a person jumped is __________________.
3. How tall is Mount Everest? _______________________
   How many days does it take for the greatest mountaineers to climb it? _______________________
4. What do the robotic arms simulate? ______________________
5. In the Air Cannon exhibit, lifting transfers what type of energy? _____________________
   When the ball falls, it is like _____________________ energy?
6. How fast can a coin travel in the coin orbiter? ___________________________
7. What category—low, medium, or high—will most risk takers fall under? _______________________
8. How many combinations are possible using 4 numbers? _________________________
9. Why are your chances of winning the lottery so slim? _____________________________________
10. What is the most likely sum to occur when rolling a pair of die? _____________________
11. Why do you weigh less on the moon than you do on Earth? ______________________________
12. Are there any species that can survive deep space? _____________________________________
13. After the sun, what is the nearest star to the Earth? _____________________________________
14. What is the orbital period of the Earth? ____
15. What is it called when the brain processes sound from both ears? _________________________
16. On the floor piano, where does the sound originate from? ________________________________
17. How far can a lion's roar be heard? ______________________________________
18. In what direction do hurricanes north of the equator rotate? ______________________________
19. Since the 1940s, which natural phenomena has caused the most fatalities in the USA? ________
20. What major fault line runs through Tennessee? ____
21. On what date did the Titanic sink? ___________________________________
22. What is the non-standard form of measurement used in the "How Tall Are You?" exhibit?_____

WonderWorks Test

Answer Key:

1. 20 mph

2. 10 feet

3. 29,028 feet, 3 days

4. Prosthetic arms

5. Potential, kinetic

6. 50 mph

7. Medium

8. 24

9. Because of the large number of other people playing

10. 7

11. Less gravitational pull

12. Yes, bacteria streptococcus

13. Proxima Centauri or Alpha Centauri

14. 365.24

15. Binoral fusion

16. Light sensor

17. 5 miles

18. Counter-clockwise

19. Lightning

20. New Madrid

21. April 14, 1912

22. Centimeters

WonderWorks Scavenger Hunt

1. What is the highest wind speed of a tornado?
   - ❑ 100mph
   - ❑ 200mph
   - ❑ 300mph

2. Which country suffers the most from tornado occurrences?
   - ❑ United States
   - ❑ Canada
   - ❑ Mexico

3. How fast are the winds in a in the Hurricane Hole?
   - ❑ 55mph
   - ❑ 65mph
   - ❑ 75mph

4. On the Saffir-Simpson Scale, what is the level of the Hurricane Hole?
   - ❑ Level 1
   - ❑ Level 2
   - ❑ Level 3

5. Name the sense that you are most likely to lose if hit by lightning?
   - ❑ Sight
   - ❑ Taste
   - ❑ Hearing

6. What would you do if a lightning storm hits while you're in an open field?
   - ❑ Run for shelter
   - ❑ Crouch position
   - ❑ Under a tree

7. How hot is lightning?
   - ❑ 3x as hot as the sun
   - ❑ 5x as hot as the sun
   - ❑ 7x as hot as the sun

8. How fast can you throw a baseball? _____
   Answers will vary

9. What magnitude is the earthquake in WonderWorks?
   - ❑ 4.0 Richter Scale
   - ❑ 5.0 Richter Scale
   - ❑ 6.0 Richter Scale

10. When rolling a pair of dice, which sum is most likely to occur?
    - ❑ 5 ❑ 7 ❑ 9

11. What percentage of the world's water is drinkable?
    - ❑ 1%
    - ❑ 5%
    - ❑ 10%

12. Why do dolphins swim in circles while they sleep?
    - ❑ to prevent drowning
    - ❑ to avoid predators
    - ❑ inability to float

13. What type of activity does the left side of your brain control?
    - ❑ Logical
    - ❑ Intuitive
    - ❑ Subjective

14. Name the scientist that discovered 3 laws of planetary motion?
    - ❑ Kepler
    - ❑ Newton
    - ❑ Einstein

15. Which animal sound can you hear at a distance of 5 miles?
    - ❑ Dolphin
    - ❑ Lion
    - ❑ Chimpanzee

16. How much time will it take to travel to Saturn using a Boeing 757?
    - ❑ 100 years
    - ❑ 141 years
    - ❑ 75 years

17. Why are you able to lie on a "Bed of Nails" without getting punctured?
    - ❑ They are not real
    - ❑ There are too many
    - ❑ Not enough pressure

18. Which planet has a sunset every 10 hours?
    - ❑ Jupiter
    - ❑ Mercury
    - ❑ Neptune

19. What is a 'simple machine'?
    - ❑ drill
    - ❑ chainsaw
    - ❑ pulley

20. How many days does it take professional climbers to climb Mt. Everest?
    - ❑ 3 days
    - ❑ 5 days
    - ❑ 7 days

21. Who holds the NBA record for the most free throws?
    - ❑ Karl Malone
    - ❑ Michael Jordan
    - ❑ Larry Byrd

22. What major fault line runs through TN?
    - ❑ New Madrid
    - ❑ San Andreas
    - ❑ Mid-Atlantic

23. In a class of 23, what are the changes of 2 people sharing the same birthday?
    - ❑ 2/23
    - ❑ 1 out of 2
    - ❑ 50%

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