Fruit Works- Chapter 2 Experiment

In this experiment you will try to determine how much work a variety of fruits can do.

Read through all the steps of this experiment. Write an objective for the experiment. Look at the following ideas below and form your own objective.

* Using a slinky, we will find out if a banana can do more work than an orange.
* We will measure the work that fruit can do.
* We will find out if two bananas do more work than one.

Objective: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write a hypothesis for your objective. When writing your hypothesis thing of the following things to form your question.

* Compare how heavy one object is and how light one object is..
* Example: a banana is heavier than a lemon and will do more work.
* Example: The orange is lighter than the apple and will do less work.

Hypothesis:

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Materials:

Slinky

Several paper clips

1-2 apples

1-2 lemons or limes

1-2 oranges

1-2 bananas

Spring balance scale or food scale

Meter stick (or yardstick) or tape measure tape

1. Try to determine just by “weighing” each piece of fruit in your hands. Which piece will do the most work and which piece will do the least work on the spring that is the scale.

2. State your prediction as the hypothesis.

3. Next, weigh each piece of fruit on the balance or food scale

4. Record the weights in the following chart.

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| --- | --- |
| **Fruit** | **Weight (grams or ounces)** |
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5. Prepare the fruit for the experiment. Take a paper clip and stretch one side out to make a small hook like you did in Experiment 1. You might want to tape the hook to the fruit. Place the hook in one of the pieces of fruit.

Repeat for each different kind of fruit.

6. Next, take the slinky and hold it up to the level of your chest. Allow 10-15 coils to hang below your hand. You will have to hold most of the slinky in your hand. It might work best to attach the slinky to a fixed ledge of some sort. Just make sure the slinky is free to extend and does not contact any other surface and that the slinky is at the same distance from the floor each time.

7. Measure the distance from the floor to the bottom of the slinky with the tape measure. Record your results below.

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| --- |
| **Distance from floor to slinky with no fruit attached** |
|  |

8. Take a piece of fruit with a hook in it and attach it to the end of the slinky. Hold the slinky at the same height as in Step 6 with the same number of coils hanging below your hand. Allow the slinky to be pulled down by the fruit.

(If the distance is too short (that is, the fruit ends up touching the ground) reduce the number of coils used and re-measure the distance to the floor before and after each fruit. You may want to have them test the heaviest fruit first.

9. Use the tape measure to measure from the end of the slink to the floor. Record your results in the following chart in the ***Distance floor to slinky (with fruit)*** column.

10. Repeat step 8 and 9 with different kinds of fruit. Record your results each time.

Results:

Note: In this experiment weight and mass are being used interchangeably, even though they are not the same thing. Technically, when we weigh something we are measuring its mass times the force of gravity.

1. In each row of the Distance Floor to Slinky (No Fruit) column, write the distance you recorded in Step 7. Then subtract this distance from each of the distances you recorded in the Distance Floor to Slinky (With Fruit) column. This gives you the distance the Slinky was extended by each piece of fruit.

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| --- | --- | --- | --- |
| **Fruit** | **Distance**  **Floor to Slinky**  **(With Fruit)** | **Distance**  **Floor to Slinky**  **(No Fruit)** | **Distance Extended** |
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2. Calculate the work each piece of fruit has done. Record your answers in the following chart.

Work = distance x force

* Distance is the distance extended
* Force is the weight of the fruit

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| **Fruit** | **Work** |
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3. What would happen if you attached two pieces of the same kind of fruit to the Slinky? How much work would be done?

* Will two pieces of fruit create more or less work?

Prediction: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Test your prediction and calculate the work that was done by the two pieces of fruit. Record your data in the charts below.

* Weight 2 pieces of fruit
* Measure the distance to the floor with the slinky with no fruit
* Measure the distance to the floor with the slinky and two pieces of fruit.
* Subtract the Distance with the fruit and without the fruit to find the distance extended
* Work = distance x force
  + Distance is the distance extended
  + Force is the weight of the fruit

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| --- | --- | --- | --- | --- |
| **2 Pieces of Fruit** | **Weight** | **Distance: Floor to Slinky**  **(With Fruit)** | **Distance Floor to Slinky**  **(No Fruit)** | **Distance Extended** |
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| **2 Pieces of Fruit** | **Work** |
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Conclusion:

Draw some conclusion about your results and record them below.

* The banana did more work than the orange.
* Two bananas did four times the work of one banana.
* The slinky extended too far, and we could not measure the two pieces of fruit.
* The apple and orange weighed the same amount and did the same amount of work.

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