Flying Machine # 1:

What would you name this flying machine?
_____________________________________________________________________

Draw a picture of the flying machine below:

How far did Violet go in this flying machine?

<table>
<thead>
<tr>
<th>Trial</th>
<th>Distance (cm)</th>
<th>Flight Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Circle the longest distance for this flying machine.

Flying Machine # 2:

What would you name this flying machine?
_____________________________________________________________________

Draw a picture of the flying machine below:

How far did Violet go in this flying machine?

<table>
<thead>
<tr>
<th>Trial</th>
<th>Distance (cm)</th>
<th>Flight Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Circle the longest distance for this flying machine.
**Flying Machine # 3:**

What would you name this flying machine?

____________________________

Draw a picture of the flying machine below:

How far did Violet go in this flying machine?

<table>
<thead>
<tr>
<th>Trial</th>
<th>Distance (cm)</th>
<th>Flight Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Circle the longest distance for this flying machine.

**The Winner**

Which of your flying machines carried Violet the farthest?

____________________________

What changes would you make to make it better? Draw and write your answer.

____________________________

____________________________
Captain Arsenio’s Next Project
The CD Hovercraft

STEP 1: Build a Hovercraft
Materials:
CD
Sports Bottle Cap
Permanent Marker
Marshmallow
Hot glue (For Teacher Use Only)

Procedure:
1. Use the markers to write your name on the shiny side of the CD.
2. Open and close your sports bottle cap.
3. Take your hovercraft and sport bottle cap to your teacher when you are ready for the glue.
4. Wait at least 10 minutes for the glue to cool and harden.
5. While you are waiting, draw a face on the marshmallow to represent Captain Arsenio.

STEP 2: Test the Hovercraft
Materials:
Assembled hovercraft
Balloon
Air pump

Procedure:
1. Pump up a balloon with 15 pumps of air and stretch the mouth of the balloon over the closed sports bottle cap.
2. Place your hovercraft on the ground and give it a light push. Record how far it moves in centimeters in the chart below.
3. Now open the cap and push it with about the same amount of force as you used in #2. Record how far it moves in centimeters in the chart below.

<table>
<thead>
<tr>
<th>15 Pumps of Air</th>
<th>Distance Traveled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap closed</td>
<td>cm</td>
</tr>
<tr>
<td>Cap open</td>
<td>cm</td>
</tr>
</tbody>
</table>

Did the hovercraft travel farther with the cap closed or open? ______________

Why do you think this happened? ________________________________
Hovercraft Designs – Part 1

Design a hovercraft that meets the following criteria:

1) Captain Arsenio is carried from “Here” to “There”
2) Captain Arsenio (the marshmallow) must stay aboard the hovercraft at all times

Your design must be designed using the following constraints:

1) The hovercraft is powered by the air of only one balloon
2) You must use only the supplies your teacher approves

Brainstorm and sketch your ideas below.
Hovercraft Designs – Part 2: Designing and Testing

Design #1

1. Draw a picture of this hovercraft design below.

2. Did it meet the criteria?
   ______ Captain Arsenio was carried from “here” to “there”
   ______ Captain Arsenio (marshmallow) stayed aboard the hovercraft at all times

3. Did it stay within the constraints?
   ______ The hovercraft was fueled by the air of only one balloon
   ______ You used only the supplies your teacher approved

3. How can you make it better (faster, smoother, or more exciting)?
   __________________________________________
   __________________________________________
   __________________________________________

Design #2

1. Draw a picture of this hovercraft design below.

2. Did it meet the criteria?
   ______ Captain Arsenio was carried from “here” to “there”
   ______ Captain Arsenio (marshmallow) stayed aboard the hovercraft at all times

3. Did it stay within the constraints?
   ______ The hovercraft was fueled by the air of only one balloon
   ______ You used only the supplies your teacher approved

3. How can you make it better (faster, smoother, or more exciting)?
   __________________________________________
   __________________________________________
   __________________________________________
Design #3

1. Draw a picture of this hovercraft design below.

2. Did it meet the **criteria**?
   
   ______ Captain Arsenio was carried from “here” to “there”
   ______ Captain Arsenio (marshmallow) stayed aboard the hovercraft at all times

3. Did it stay within the **constraints**?
   
   ______ The hovercraft was fueled by the air of only one balloon
   ______ You used only the supplies your teacher approved

3. How can you make it better (faster, smoother, or more exciting)?
   
   __________________________________________
   __________________________________________
   __________________________________________

Design #4

1. Draw a picture of this hovercraft design below.

2. Did it meet the **criteria**?
   
   ______ Captain Arsenio was carried from “here” to “there”
   ______ Captain Arsenio (marshmallow) stayed aboard the hovercraft at all times

3. Did it stay within the **constraints**?
   
   ______ The hovercraft was fueled by the air of only one balloon
   ______ You used only the supplies your teacher approved

3. How can you make it better (faster, smoother, or more exciting)?
   
   __________________________________________
   __________________________________________
   __________________________________________