ADAM’S CUBE
6 PUZZLES IN 1

TO PLAY:

• Choose a puzzle side to play
• Arrange **ALL** 5 puzzles pieces within the polygon frame

You will earn **50** points for each puzzle side you complete

AIRPLANE DESIGN

The object:

Design a paper airplane that will land on the runway or as close to it as possible. Use any of the materials at this station.
ALL UPHILL

Roll both balls until they are resting at opposite edges of the puzzle at the same time.

300 Oxygen Units
BERNOULLI'S BRIDGE EXPERIMENT

MATERIALS NEEDED:
3 x 5 inch card
Short straw

QUESTION: What will happen when you blow air under the card?

PREDICTION: ____________________________________________________________

EXPERIMENT: Fold the card as shown below and place it about an inch from the edge of the table. Blow a steady stream of air through the short straw underneath the card.

OBSERVATION: What did you observe when you blew underneath the card? __________________________________________________________

CONCLUSION: (Hint: Where is the air pressure greater? Why?)

____________________________________________________________
**AT HOME CHALLENGE:**

**Prediction:** What will happen if you blow **above** the card?

____________________________________________________________

**Observation:** _____________________________________________

**Conclusion:** Why? __________________________________________

____________________________________________________________
DIZZY DANIEL EXPERIMENT

MATERIALS NEEDED:
Ping pong ball
2 Plastic cups
Ruler

QUESTION: What will happen to the ping pong ball when you blow over the cups?

PREDICTION: ________________________________

EXPERIMENT:
• Place two cups on the table, one in front of the other.
• Put a ping pong ball in the front cup.
• Get on your knees so your mouth is just above the cups.
• Holding the bottom of each cup, blow so the air is going across the top of each cup. Do not blow into the front cup.
• Try this 1-2 times.

OBSERVATION: What did the ping pong ball do? ____________________

**DATA COLLECTION: on following page**
DATA COLLECTION: Complete 4 trials of the experiment. Measure the distance between the bottom of each cup and record your data in the table below.

<table>
<thead>
<tr>
<th>Trials</th>
<th>Distance between cups</th>
<th>What did the ball do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial 1</td>
<td>1 inch</td>
<td>It jumped in / out of the cup. (circle one)</td>
</tr>
<tr>
<td>Trial 2</td>
<td>2 inches</td>
<td>It jumped in / out of the cup. (circle one)</td>
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<tr>
<td>Trial 3</td>
<td>3 inches</td>
<td>It jumped in / out of the cup. (circle one)</td>
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<tr>
<td>Trial 4</td>
<td>4 inches</td>
<td>It jumped in / out of the cup. (circle one)</td>
</tr>
</tbody>
</table>

CONCLUSION: What caused the ball to come out of the cup?  
(Hint: Where is the air pressure greater?)  

______________________________________________________

______________________________________________________

______________________________________________________
Focus Ring

Crew Members Required: 6

Materials:

• Roll of masking tape
• 6 lengths of string the same length
• Ball that will rest on the roll of tape without falling through the hole in the center
• 16.9 oz water bottle filled with plaster of Paris that the roll of tape can fit around and the ball can balance on

Directions:

• Tie the 6 strings to the edge of the roll of tape and spread them evenly round the outside.
• Place the roll of tape on the ground and rest the ball over the circle in the center.
• Have each crew member take a string. They must hold it from the end and cannot shorten the length.
• They must then lift the roll of tape, keeping the ball balanced on top. Carry it to the bottle and rest the ball on the top of the bottle with the roll of tape resting on the ground.
FRICTION ADDICTION EXPERIMENT

MATERIALS:  
ACV (Air Cushion Vehicle)  
Balloon  
Balloon Pump

QUESTION: What happens when you release the air from the balloon while it is attached to the ACV?

PREDICTION: ____________________________________________

EXPERIMENT: *Please read steps 1-6 before beginning.  
1. Blow up the balloon and twist the end to keep the air from escaping.  
2. Keep the ACV on the table. Holding the twist, stretch the balloon over the top of the ACV.  
3. With the ACV on the table, untwist the balloon and allow the air to escape. While the air is escaping, give the ACV a few gentle pushes.  
4. Now, with the balloon empty, give the ACV a few more gentle pushes.  
5. Compare how the ACV glides with and without air escaping from the balloon.  
6. Carefully remove the balloon.

OBSERVATION: What did you observe in Step 3? ___________________________
CONCLUSION: *Using the term “friction”, explain what you observed?*

______________________________________________________________

______________________________________________

Construct your own ACV (Air Cushion Vehicle) at home:

**Materials needed:**
Super Glue (I recommend *Gorilla Glue* – follow directions on package)
Old, unwanted compact disk (CD)
Pop-up top (from sports water bottle, dish soap bottle, etc.)
Balloon
Balloon pump (optional)

**Directions:**
1. Place the CD on the table, shiny side up.
2. Have your parent or teacher apply the super glue to the Pop-up top (apply glue around the bottom of the Pop-up top).
3. Place the Pop-up top over the center of the CD.
4. Allow the super glue to dry for at least 60 minutes.
5. Follow the directions listed in the experiment.
SPACE STATION

Shuttle Oxygen Scrubber Failure Activity-

One of the oxygen scrubbers onboard the Space Station has failed and must be replaced. Directions for the construction of a new scrubber can be found in Mission Control.

The Space Station contains the necessary components for constructing a working oxygen scrubber. However, the directions for assembly are kept at Mission Control. A member of Mission Control will communicate with you in order to complete this task.

Remove all pieces from oxygen scrubber box and wait for instructions from Mission Control.
MISSION CONTROL

Shuttle Oxygen Scrubber Failure Activity-

One of the oxygen scrubbers onboard the Space Station has failed and must be replaced. Directions for the construction of a new scrubber can be found in Mission Control.

Mission Control:

Using detailed and descriptive language, explain to a member of the Space Station crew how to build the oxygen scrubber using the oxygen scrubber assembly diagram.
ROBOTIC ARM

Task #1 - Use robotic arm to stack the 4 large cubes on top of each other.

Task #2 – Use the robotic arm to place the small cubes into the cup.
SKITTLES STATISTICS

Take one bag of Skittles and one worksheet per person and get ready to record your findings.

1. First open the bag, count every Skittle. Record your total below.

   Total Number of Skittles: __________________________
   (denominator)

2. Sort the candy according to color and write each color in the data table below.
3. Count the total number of each color and record your results.
4. You will then write a fraction for each color and list in the appropriate column.
   Example: Four red out of 15 total would be written as 4/15.
5. Complete the data table by calculating a decimal and percent for each color.
6. On the back of this page create a circle graph to illustrate the percentage of each color.

HINT: To calculate decimals: Divide the numerator by the denominator.

\[
\frac{4}{15} \quad (4 \div 15 = 0.26)
\]

To calculate percent: \(0.26 \times 100 = _______\%

Skittles Statistics Data Table

<table>
<thead>
<tr>
<th>Color</th>
<th>How Many? ((\text{numerator}))</th>
<th>Fraction</th>
<th>Decimal</th>
<th>Percent</th>
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SNAP CIRCUIT LAUNCH

TASK #2:

Using the components listed below, build a working circuit that will launch the blade to simulate a flying saucer.

Components Needed:

4 #2 snap circuits
1 #3 snap circuit
1 Motor
1 Fan Blade
1 (S1) Slide Switch
1 (B1) Battery holder
**SUPER SPINNER EXPERIMENT**

**MATERIALS NEEDED:**
- Paper strip (to be cut and folded)
- Scissors
- Paper clip

**Background information:**
Helicopter blades are *rotary wings*. An engine turns the rotor blades, and the blades generate “lift” as they spin through the air. The blades are shaped like the wings of an airplane but can be rotated.*

*World Book Encyclopedia*

**QUESTION:** Will the Super Spinner always spin in the same direction when dropped?

**PREDICTION:** _____________________________

**EXPERIMENT-PART A:** Follow the directions (located on the Spinner) to make your Super Spinner. Hold it up high, then drop it to the ground and observe to see if it spins clockwise (to the right) or counterclockwise (to the left). Do this two more times.

**OBSERVATION:** Which way did it spin?

Drop 1: __________________________

Drop 2: __________________________

Drop 3: __________________________
EXPERIMENT-PART B: What do you need to do to change the rotation direction? ____________________________________________

CONCLUSION: Explain why the Super Spinner changed rotation direction in Part B.

______________________________________________________________________________________________
TOXIC WASTE TASK FORCE

Mission: A Nuclear device is leaking. The goal is to neutralize the waste without causing any death or destruction. The team must neutralize the radioactive isotopes by carefully transferring them from the smaller container into the (larger) toxic waste receptacle using only the equipment provided.

Your team leader must effectively lead their team of scientists and make decisions while at the same time listening to ideas others have that may work.

The team must figure out how to lift the smaller container of plutonium isotopes (balls) together without spilling it and then move it to the circle with the large receptacle. The scientists must then pour the contents from the small container into the large container without losing any of the plutonium isotopes.

Warning:

• If the waste is spilled, it will blow up and destroy most of the state and cause certain death to those in its path.
• Small amounts of spillage of the waste will create partial death and destruction.
• Maintain a safe distance from the radiation zone emanating from the toxic waste in the leaking container. Anyone who ventures into the radiation zone will suffer injury or possibly even death.

To finish the mission, the team must move the smaller container back to the starting point.
TOXIC WASTE TASK FORCE

Facilitator Notes

Category: Leadership, Teamwork, Concentration, Self-control

Equipment:

- 8 -- ropes / cords
- 1 -- bungee cord loop
- 8 -- plastic toy pit balls
- 1 -- large container (ex: 5 gal bucket)
- 1 -- small size can (ex: 1 gal bucket)
- 2 -- ropes to create circles for radiation zones

The Team leader will guide/instruct and will not be an actual part of moving the isotopes.

A POSSIBLE SOLUTION:
The team leader must have their team of scientists slip their ropes under the bungee cord so that they have two ends in their hands. Every scientist except the leader will be tied in. Carefully and collectively move the bucket without spilling any of the plutonium isotopes. Return the small bucket back to its original place.

Variations could include a time limit.