Green-highlighted: causal variable (\*I think, but need to confirm); Blue-highlighted: non-causal variable (\*I think, but need to confirm) Un-highlighted: Not a clue (yet)…

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **AX** | **AX-T1** | **DVg-AX-T1 (general DV)**  **DVs-Ax-T1 (specific DV)**  **DVabb-Az-T1 (abbreviated DV)** | **AX-T1-V1**  **AX-T1-V1a** | **AX-T1-V2**  **AX-T1-V2a** | **AX-T1-V3**  **AX-T1-V3a** | **AX-T1-V4**  **AX-T1-V4a** | **AX-T1-IntroExp** |
| A1 = Physical & Chemical Changes | Crystal growth | Amount of crystal growth on a string in water  weight of the crystal growth on the string after two weeks.  Crystal weight  **DV-A1-T1-predict**: more crystal growth on the string after two weeks | water temperature  water temperature | type of crystals  crystal type | initial amount of crystals on the string  initial amount of crystals | type of string  string type | We will mix a crystal (salt or sugar) in water so it dissolves. . We will continue to ADD THE CRYSTALS AND mix until no more crystals can be dissolved in the water.  This is the saturation point."  Then we will put a string in the water. |
| **A1 –T1-VX-L1** | | | Room temp | Salt | A little | Twine |
| **A1 –T1-VX -L2** | | | Hot | Brown sugar | None  (5/15/18:  **“No**” for prediction) | Yarn |
| **A1-T1-VX-LX-modifier** | | | water | crystal | Crystal on the string | (n/a) |  |
| A2 = Heat & Temperature  REPLACEMENT FOR BODY TEMP? | Temperature of a Gas | Temperature of gas in a balloon  Gas temperature within balloon after 30 minutes  Gas temperature  **DV-A2-T1-predict**: a higher gas temperature | Color of the balloon | Amount of Sunlight | Material of balloon | Type of chair (balloon tied to) | We will pump 5 grams of Helium into a balloon. The air in the balloon is 60 degrees Fahrenheit. Then we will place the balloon outside for 30 minutes. The temperature of the outside air is 80 degrees Fahrenheit. |
| **A2 –T1-VX-L1** | | | Lighter (light gray) | Full sun | latex | Wooden |
| **A2 –T1-VX-L2** | | | Darker (black) | shade | Foil | Canvas |
|  |  | **A2-T1-VX-LX-modifier** | balloon | (n/a) | balloon | chair |  |
| A3 = Forces & Motion | Speed of balls at the bottom of ramps | Speed of the ball at the bottom of the ramp  **DV-A3-T1-predict**: the ball to roll faster | slope of the ramp  slope | color of the ball  ball color | starting position of the ball  starting position | surface of the ramp🡪**surface texture**  surface | We will place a ball on the ramp. The ball will roll down the ramp. We will measure the ball’s speed at the bottom of the ramp. |
| **A3 –T1-VX-L1** | | | Not steep | Yellow | Middle | Rough (friction) |
| **A3 –T1-VX-L2** | | | Steep | Pink | Top | Smooth (no friction) |
|  |  | **A3-T1-VX-LX-modifier** | ramp | ball | Starting Position | surface |  |
| A4 = Plant Reproduction | Flower reproduction | Number of seeds produced by flowers in a greenhouse  number of seeds produced by the flowers at the end of the season  number of seeds  **DV-A4-T1-predict**: a higher seed production | number of honey bees in the greenhouse  number of honey bees | amount of sunlight the greenhouse lets in\*  amount of sunlight | Amount of Fertilizer | Type of water  (non-causal) | We will plant 12 sunflowers in the ground in a greenhouse at the beginning of Spring. The flowers will produce seeds then die by the end of the season. |
| **A4-T1-VX-L1** | | | Zero | Full sunlight | None  (5/15/18🡪 “No”?) | Rain water |
| **A4-T1-VX-L2** | | | a whole hive  (5/15/18: “a whole hive of”) | Partial sunlight | Some | Tap water |
| **A4-T1-VX-LX-modifier** | | | bees | (n/a) | fertilizer | (n/a) |  |

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| **AX** | **AX-T2** | **DVg-AX-T2 (general DV)**  **DVs-AX-T2 (specific DV)** | **AX-T2-V1** | **AX-T2-V2** | **AX-T2-V3** | **AX-T2-V4** | **AX-T1-IntroExp** |
| A1 = Physical & Chemical Changes | Soda/Mint reaction | Strength of the reaction between soda and mints  height of the soda geyser  geyser height | type of sweetener in the soda  sweetener | amount of caffeine in the soda  amount of caffeine | texture of mint  mint surface area | amount of carbon dioxide in the soda  amount of carbon dioxide | We will put five mints into a bottle of soda. Bubbles forming a soda “geyser” may come out of the bottle. |
| **A1-T2-VX-L1** | | | Sugar | Some | smoother | Higher |
| **A1-T2-VX-L2** | | | Aspartame | none | Rough(er) | Lower |
| A2 = Heat & Temperature | Ice Melting time | Time it takes for an ice cube to melt in water  time it takes for the ice cube to melt in water  time to melt | initial temperature of the ice cube  initial ice temperature | initial temperature of the water  initial water temperature | pattern on the glass  (non-causal)  **\*\*Nothing in BRM for this** | shape of the glass\*  glass shape  **\*\*Nothing in BRM for this** | We will place an ice cube in a glass filled with 237 mL of water. The ice cube will eventually completely melt. |
| **A2- T2-VX-L1** | | | 0˚C/32F | cold | Striped | Shorter |
| **A2- T2-VX-L2** | | | -20˚ C/-4F | hot | Plain | Taller |
|  |  | **DV-A2-T2-predict**: the ice to melt faster | ice | water | glass | glass |  |
| A3 = Forces & Motion | Time for objects to sink | Time it takes for objects to sink in water  time it takes for the object to sink in water  time to sink | density of the water | shape of the object  object shape | volume of the object | density of the object | We will place an object into a graduated cylinder filled with water. It will sink to the bottom. |
| **A3 - T2-VX-L1** | | | lower (no salt) | Sphere | Smaller | higher (lead) |
| **A3 - T2-VX-L2** | | | higher (salt added) | tear-shaped | Larger | lower (glass) |
|  |  | **DV-A3-T2-predict**: the object to sink faster | Water density | Object | object | Density object |  |
| A4 = Life Sciences | Algae Growth | Amount of algae growth in water  weight of the algae growth after one week  algae weight | temperature of the water | amount of exposure to music | amount of carbon dioxide in the water | Amount of direct Sunlight exposure | We will add fifty grams of algae to a fish tank filled with 16 liters of distilled water. |
| **A4 - T2-VX-L1** | | | Room temperature | Constant music | A lot | Some |
| **A4 - T2-VX-L2** | | | Warmer | No music | none | None |