

E.S.P.

EXPLORING SCIENTIFIC PROCEDURES



FREEBIES!!!!

E=McQ

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BOX OF SPAGHETTI, TWO FEET OF STRING, SMALL PAPER CUP, PAPERCLIP, 50-60 PENNIES (OTHER ITEMS WILL WORK SUCH AS PAPERCLIPS, MARBLES, ETC.)

PLACE THE PIECE OF SPAGHETTI BETWEEN TWO TABLES AND HANG A PIECE OF STRING AT ITS CENTER. AT THE END OF THE STRING ATTACH A PAPERCLIP. HOOK A PAPER CUP ONTO THE PAPERCLIP AND COUNT THE NUMBER OF PENNIES THAT CAN BE SUPPORTED BY THE SPAGHETTI "BRIDGE UNTIL IT BREAKS." CHANGE THE NUMBER OF SPAGHETTI PIECES AND RECORD THE NUMBER OF PENNIES IT CAN SUPPORT.

ONE PAPER CUP, MEASURING SPOONS, SAND, CONTAINER OF WATER (MUST BE DEEP ENOUGH TO SUBMERGE THE CUP!)

MEASURE THE AMOUNT OF SPOONFULS OF SAND A PAPER CUP CAN HOLD BEFORE IT SINKS TO THE BOTTOM OF THE CONTAINER OF WATER. CHANGE THE SIZE OF SPOONS (1/4 TSP, 1/2 TSP, 1 TSP)

SEVERAL SUGAR CUBES, SPOON, TWO CUPS, WARM AND COLD TAP WATER

DROP A SUGAR CUBE INTO A CUP WITH COLD WATER AND ANOTHER IN ONE WITH WARM WATER. STIR UNTIL THE CUBE DISSOLVES. WHICH ONE DISSOLVES FASTER?

ALUMINUM FOIL, CONTAINER OF WATER, 50-60 PENNIES

CONSTRUCT A SQUARE-BOTTOMED BOAT (A FOUR INCH SQUARE WORKS FINE) WITH THE FOIL AND PLACE PENNIES INTO THE STRUCTURE UNTIL IT SINKS. REDUCE THE SIZE OF THE BOAT BY A HALF AND TRY AGAIN.

FILM CANISTER (THE WHITE/CLEAR CANISTERS WORK BEST!), WATER, EFFERVESCENT TABLETS (CHEAPER BRANDS WORK GREAT!!), CLOCK

PLACE A SMALL AMOUNT OF LIQUID WITHIN THE FILM CANISTER. BREAK THE EFFERVESCENT TABLETS INTO FOURTHS AND PLACE ONE PIECE INTO THE CANISTER. QUICKLY CLOSE THE TOP. RECORD THE AMOUNT OF TIME IT TAKES TO BLOW ITS TOP. CHANGE THE AMOUNT OF LIQUID WITHIN THE FILM CANISTER FOR EXPERIMENTATION.

ONE DOLLAR BILL, YARDSTICK

MEASURE REACTION TIME BY DROPPING DOLLAR BILLS FROM KNOWN HEIGHTS THROUGH THE STUDENTS' FINGERS AND RECORDING WHETHER OR NOT THEY CAN CAPTURE THE FALLING MONEY. MAKE CERTAIN TO PLACE THE STUDENT FINGERS AT THE SAME PLACE ALONG THE BILL FOR EACH TRIAL!!! CHANGE THE HEIGHT OF THE DROP FOR EXPERIMENTATION.

1/4 CUP NO-TEARS BABY SHAMPOO (LIQUID HAND WASHING SOAP WORKS WELL TOO!), 3/4 CUP WATER, 3 TABLESPOONS LIGHT CORN SYRUP, STRAW, ADDITIONAL WATER, BLACK TRASH BAG, TAPE, RULER, SPONGE/TOWEL

MIX THE SHAMPOO, WATER AND LIGHT CORN SYRUP TO MAKE THE BUBBLE SOLUTION. TAPE THE BLACK TRASH BAG ONTO A FLAT SURFACE PLACE TWO OR THREE DROPS OF BUBBLE SOLUTION ONTO THE TRASH BAG. HAVE THE STUDENTS BLOW INTO THE DROPS WITH THEIR STRAW. THEY ARE TO BLOW UNTIL THE BUBBLE POPS. HAVE THE STUDENTS MEASURE THE DIAMETER OF THE BUBBLE AND WIPE OFF THE SURFACE. DOUBLE THE AMOUNT OF WATER IN THE BUBBLE SOLUTION FOR EXPERIMENTATION.

HOT WATER, THERMOMETER, PAPER AND PENCIL, ONE STYROFOAM CUP

READ ALOUD THE STORY OF GOLDBLOCKS AND THE THREE BEARS. INDICATE THAT YOU HAVE ALWAYS BEEN CONCERNED ABOUT WHY BABY'S PORRIDGE WAS ALWAYS "JUST RIGHT". COULD WE PUT THIS IDEA TO A TEST? IS IT TRUE THAT PAPA'S WOULD BE TOO HOT, MAMA'S TOO COLD, AND BABY'S BE JUST RIGHT? HEAT A POT FULL OF PORRIDGE (WATER) AND PLACE THE THERMOMETER IN THE CUP. FILL ONE CUP WITH "PORRIDGE" AND RECORD THE HIGHEST TEMPERATURE REACHED. TEMPERATURES SHOULD BE RECORDED EVERY MINUTE FOR PAPA'S PORTION (FULL CUP), MAMA'S PORTION (HALF CUP) AND BABY BEAR'S PORTION (ONE QUARTER CUP). IT MAY BE BEST TO TAKE AN AVERAGE OF THE TEN SETS OF DATA FOR EACH PORTION. (SORRY FOR THE MATH!!!) HAVE STUDENTS COMPARE THEIR EXPERIMENTAL RESULTS WITH THE STORY.

PAPER CLIP, RULER, THREE IDENTICAL MAGNETS

PLACE THE PAPER CLIP ON THE SURFACE OF A TABLE AND POSITION THE RULER AT IT'S END. PLACE ONE OF THE MAGNETS AT THE OTHER END OF THE MAGNET AND SLOWLY MOVE IT TOWARDS THE PAPERCLIP. STOP THE MAGNET WHEN THE PAPERCLIP MOVES TO THE MAGNET. RECORD THE DISTANCE THE PAPERCLIP TRAVELED. ADD MORE MAGNETS TO THE ORIGINAL MAGNET FOR EXPERIMENTATION.

30 DOMINOES, RULER, CLOCK

LINE UP DOMINOES APPROXIMATELY 1 CM APART, STRETCHED OUT OVER A 30-CM LENGTH. MEASURE AND RECORD THE TIME IT TAKES FOR ALL THE DOMINOES TO FALL. RECORD THE AMOUNT OF TIME IT TOOK FOR ALL THE DOMINOES TO FALL. REPEAT THE PROCESS OF SETTING UP THE DOMINOES AND RECORDING THEIR RATE OF FALLING; HOWEVER, ALTER THE DISTANCE BETWEEN EACH DOMINO TO 2 CM AND 3 CM.

ONE FOUR (4) INCH BLOCK OF WOOD (2X4 WORKS FINE!), DRILL WITH AT LEAST A 1/2 INCH BIT, PLASTIC SPOON, HOT GLUE, COTTON BALL
DRILL A SMALL HOLE IN THE CENTER OF A 4" X 4" BLOCK OF WOOD. HOT GLUE THE HANDLE OF A PLASTIC SPOON INTO THE HOLE SO THAT IT CAN BE BENT BACKWARDS IN DIFFERENT MEASURABLE ANGLES. MEASURE THE DISTANCE A COTTON BALL TRAVELS AS THE ANGLE OF THE BENT SPOON IS ALTERED. AS YOU BEND THE SPOON BACK TOWARDS THE BLOCK OF WOOD, YOU WOULD BE DECREASING ITS ANGLE.

TWO FILM CANISTERS, GLUE, BOOK (TO BE USED AS A RAMP), WATER, CLOCK, TAPE

GLUE THE BOTTOM OF TWO FILM CANISTERS TOGETHER. ADD IDENTICAL AMOUNTS OF WATER INTO THE CANISTERS, SEAL THEM WITH THEIR LIDS, AND PLACE THEM AT THE TOP OF THE RAMP. PLACE A STRIP OF TAPE APPROXIMATELY THREE FEET FROM THE RAMP. THIS WILL BE THE FINISH LINE. RELEASE THE CANISTERS AND RECORD THEIR TIME TO REACH THE END OF A FINISH LINE. THE WATER THAT IS PLACED INTO THE CANISTERS CAN BE EASILY INCREASED/DECREASED FOR EXPERIMENTATION.

BASKETBALL, TENNISBALL, YARDSTICK

PLACE THE TENNIS BALL ONTO THE BASKETBALL AND DROP THE TWO FROM DIFFERENT HEIGHTS. MEASURE THE VARYING HEIGHT OF THE TENNISBALL. CHANGE THE HEIGHT OF THE BASKETBALL/TENNISBALL COMBO FOR EXPERIMENTATION. NOTE-DROP THE BALLS FROM SMALL HEIGHTS (UNDER TWO FEET) AND GIVE YOURSELF PLENTY OF ROOM!!! YOU MAY FIND THIS ACTIVITY IS BEST DONE OUTSIDE!!!

ICE CUBES, FOIL, LAMP, GLASS CONTAINER, MEASURING CUPS/SPOONS

COVER THE GLASS CONTAINER WITH ALUMINUM FOIL. PLACE ONE OF THE ICE CUBES IN THE CONTAINER AND MEASURE THE AMOUNT OF MELTED ICE THAT OCCURS AFTER A TIMED AMOUNT OF EXPOSURE TO THE LIGHT SOURCE. ALTER THE AMOUNT OF TIME FOR EXPERIMENTATION.

**RULER, RUBBER BAND, CARDBOARD SQUARE (5-6 INCH) -
OPTIONAL, SCISSORS -OPTIONAL**

HAVE THE STUDENTS PLACE THE RUBBERBAND ON THE END OF THE RULER AND PULL IT BACK A KNOWN DISTANCE (I.E. 2IN, 3IN, ETC.) AFTER LETTING THE RUBBERBAND GO, MEASURE THE DISTANCE THE RUBBERBAND FLEW. OPTIONAL - ALLOW THE STUDENT TO CREATE THEIR OWN RUBBER BAND LAUNCHER WITH THE CARDBOARD. THE CARDBOARD CAN BE CUT AND SHAPED INTO ANY FORM THE STUDENT CHOOSES, AS LONG AS THE DISTANCE THE RUBBERBAND IS PULLED BACK CAN BE MEASURED.

**VINEGAR, BAKING SODA, TALL/CLEAR/SKINNY CONTAINER (OLIVE
JARS WORK WELL), RULER , TAPE**

TAPE THE RULER ONTO THE CONTAINER SO THAT THE STUDENT CAN MEASURE THE DISTANCE THE FOAM WILL RISE UP FROM THE BOTTOM. PLACE A SMALL AMOUNT OF BAKING SODA INTO THE CONTAINER (THE AMOUNT WILL VARY DEPENDING ON THE SIZE OF THE CONTAINER... TEST THIS OUT BEFORE YOUR STUDENTS!! TRY 1/4 TSP AT FIRST!!!) POUR 1 TBS OF VINEGAR INTO THE CONTAINER AND MEASURE THE HEIGHT OF THE FOAM. INCREASE THE AMOUNT OF BAKING SODA FOR EXPERIMENTATION.

**1/8-CUP LIQUID HAND WASHING SOAP , 1/4-CUP WATER, 1
TABLESPOONS LIGHT CORN SYRUP, WHITE PIECE OF PAPER, CLOCK**
MIX TOGETHER THE SHAMPOO, WATER AND CORN SYRUP TO MAKE THE BUBBLE SOLUTION. DIP THE OPEN MOUTH OF THE FILM CAN INTO THE SOAP SOLUTION. PULL IT OUT. HOLD THE FILM CAN VERTICALLY OVER THE WHITE PAPER IN A BRIGHTLY LIT PLACE. NOTICE THE COLORS THAT FORM (TO PASS THE TIME!!) RECORD THE AMOUNT OF TIME IT TAKES FOR THE BUBBLE TO POP. DOUBLE THE AMOUNT OF WATER IN THE BUBBLE SOLUTION FOR EXPERIMENTATION.

CHEWING GUM, YARDSTICK

HAVE THE STUDENTS CHEW THE GUM FOR ONE MINUTE. REMOVE THE GUM AND SLOWLY STRETCH THE GUM AS FAR AS POSSIBLE BEGINNING AT THE END OF THE YARDSTICK. RECORD THE DISTANCE THE GUM REACHES BEFORE IT BREAKS. INCREASE THE AMOUNT OF TIME OF CHEWING FOR EXPERIMENTATION.

**SHOEBOX, UTILITY KNIFE, STRAWS (AT LEAST 20), BALLOON,
YARDSTICK**

CUT A TWO-INCH SQUARE IN THE CENTER OF THE END OF A SHOE BOX. LAY THE BALLOON INSIDE THE BOX WITH ITS MOUTH STICKING OUT OF THE HOLE IN THE END. INFLATE THE BALLOON. PLACE SEVERAL DRINKING STRAWS 2 INCHES FROM EACH OTHER UNDER THE BOX AND RELEASE THE BALLOON. MEASURE THE DISTANCE THE BALLOON TRAVELS. FOR EXPERIMENTATION, CHANGE THE AMOUNT OF STRAWS.

COMPACT DISK (IF YOU RECEIVE MAIL, YOU PROBABLY GET THESE ALL THE TIME-IF NOT, CHECK OUT YOUR AREA RETAIL STORES, MOST HAVE SOME AS PROMOTIONAL MATERIALS), FILM CANISTER, GLUE, BALLOON, NAIL (A DRILL WITH DIFFERENT SIZED BITS WORK BEST!), SMOOTH SURFACE (TABLE, LINOLEUM TILE, ETC.), CLOCK

GLUE THE FILM CANISTER WITHIN THE CENTER OF A CD (LIKE A TEACUP ON A SAUCER) AND DRILL OR POKE A SMALL HOLE IN ITS CENTER. INFLATE A BALLOON AND STRETCH IT OVER THE TOP OF THE FILM CANISTER. RELEASE THE BALLOON AND WATCH THE STRUCTURE "HOVER" ACROSS A SMOOTH SURFACE. CHANGE THE DIAMETER OF THE HOLE WITH THE NAIL OR THE DRILL AND RECORD THE AMOUNT OF TIME THE HOVERCRAFT REMAINS ALOFT.

PLASTIC BOTTLE WITH LID (A SOFT DRINK BOTTLE WILL WORK), SAND, STRING, NAIL, PAPERCLIP, CLOCK, TABLE, TAPE

FILL THE PLASTIC BOTTLE HALF-FULL WITH SAND AND POKE A HOLE IN THE TOP OF THE LID WITH THE NAIL. THREAD THE STRING THROUGH THE HOLE AND TIE IT ONTO THE PAPERCLIP SO THAT, WHEN CLOSED, THE PAPERCLIP WILL BE SEALED WITHIN THE BOTTLE. SUSPEND THE PENDULUM'S STRING FROM A TABLE WITH A PIECE OF TAPE. MOVE THE PENDULUM APPROXIMATELY ONE FOOT, LET IT GO AND MEASURE THE AMOUNT OF TIME IT TAKES FOR THE PENDULUM TO COME TO A HALT. CHANGE THE AMOUNT OF SAND WITHIN THE CAN AND MONITOR ANY CHANGE IN TIME.

TWO RULERS WITH CENTER GROOVE (FOR RAMP) , PAPER CAR CUTOUT (SEE ATTACHED), THREE BOOKS/BLOCKS/ETC...(FOR CHANGING THE HEIGHT OF THE RAMP), FLAT AND SMOOTH SURFACE, MARBLE

LAY ONE OF THE BOOKS/BLOCKS/ETC. ON A FLAT SMOOTH SURFACE AND SUPPORT THE END OF ONE RULER ON ITS EDGE (TO CREATE A RAMP). CUT OUT ONE OF THE PAPER CARS, FOLD IT ON THE DOTTED LINE AND POSITION IT AT THE END OF THE RAMP. ROLL THE MARBLE DOWN THE RAMP SO THAT IT WILL CRASH INTO THE PAPER CAR. MEASURE THE DISTANCE THE CAR MOVES AND ALTER THE HEIGHT OF THE RAMP WITH ADDITIONAL BOOK/BLOCKS/ETC. FOR EXPERIMENTATION.

MATCHBOX CARS (OR SIMILAR TOYS), PENNIES, TAPE, SECTION OF WOOD (TO BE USED AS A RAMP), CLOCK

ROLL A MATCHBOX CAR DOWN A RAMP THAT IS MADE OF WOOD. THE RAMP SHOULD NOT BE TOO STEEP, OR THE DATA COLLECTION WILL BE DIFFICULT. RECORD THE AMOUNT OF TIME IT TAKES FOR THE CAR TO REACH THE BOTTOM. REPEAT THIS PROCEDURE, ADDING PENNIES TO THE CAR, FOR EXPERIMENTATION.

GALLON MILK JUG, BUCKET OF WATER (BIG ENOUGH TO PLACE THE MILK JUG AND BOTH HANDS), APPROXIMATELY THREE FEET OF TUBING (1/2 INCH WORKS FINE!), MEASURING CUPS

TAKE ONE MILK JUG AND FILL IT WITH WATER. PLACE THE OPEN END OF THE MILK JUG INTO A BUCKET FILLED WITH WATER. THE IDEA IS TO FILL THE LARGER BUCKET WITH WATER, INVERT THE MILK JUG INTO THE WATER, AND BLOW AIR INTO THE SMALLER BUCKET THROUGH A TUBE. IT IS VERY IMPORTANT TO USE ONLY ONE BREATH!!!

MEASURE THE AMOUNT OF LIQUID THAT REMAINS IN THE MILK JUG BY CAPPING OFF THE JUG WHILE IT IS STILL UNDER WATER. EXERT YOUR BODY TO MODERATE EXERCISE FOR 5, 10 AND 15 MINUTE INTERVALS AND REPEAT THE TRIALS STATED ABOVE FOR EXPERIMENTATION. AS DIFFERENT PEOPLE TRY THE APPARATUS YOU WILL GET DIFFERENT AMOUNTS OF AIR AND DIFFERENT MEASUREMENTS OF THE RISING OF THE BUCKET. THIS PROJECT HAS BEEN USED TO TEST WHICH SEX HAS THE GREATEST LUNG CAPACITY, AND WHETHER ATHLETES OR NON-ATHLETES HAD THE GREATER CAPACITY.

NOTEBOOK/TYPING PAPER, MASKING TAPE, SEVERAL BOOKS

ROLL AND TAPE FOUR SHEETS OF PAPER INTO TUBES THAT ARE EIGHT AND A HALF INCHES LONG AND APPROXIMATELY TWO INCHES IN DIAMETER. STAND THE TUBES ON END AND STACK AS MANY BOOKS AS POSSIBLE ON THESE PILLARS. RECORD THE NUMBER OF BOOKS THAT COULD BE STACKED ON THE PILLARS. CREATE PILLARS OF DIFFERENT DIAMETERS FOR EXPERIMENTATION.

VINEGAR, BAKING SODA, WATER, SMALL-MOUTHED BOTTLE, CLOCK, BALLOON

POUR ABOUT 3 TBS. OF VINEGAR INTO THE BOTTLE. FILL THE BALLOON HALF FULL OF BAKING SODA. STRETCH THE OPEN END OF THE BALLOON OVER THE NECK OF THE BOTTLE. MAKE SURE IT'S ON TIGHT! LET THE HEAVY END OF THE BALLOON DANGLE, SO NO BAKING SODA GOES IN THE BOTTLE. HOLD ONTO THE BALLOON AT THE BOTTLENECK, AND PICK UP THE HEAVY PART OF THE BALLOON SO THAT ALL THE BAKING SODA FALLS INTO THE VINEGAR AT THE BOTTOM OF THE BOTTLE. TIME HOW LONG IT TAKES FOR THE BALLOON TO STAND STRAIGHT UP. DILUTE THE VINEGAR BY $1/2$ AND $1/4$ FOR EXPERIMENTATION.

BALLOON, FISHING LINE, PAPER LUNCH SACK, TAPE, DRINKING STRAW, YARDSTICK, MEASURING TAPE, SMALL PAPER CUP, 10 PENNIES

INSERT A DRINKING STRAW ONTO A LONG PIECE OF FISHING LINE. TIE THE ENDS OF A FISHING LINE ONTO TWO STURDY STRUCTURES AND PULL TAUGHT. TAPE THE LONG END OF A LUNCH SACK ONTO THE DRINKING STRAW. TAPE THE PAPER CUP ON THE BOTTOM, AND END, OF THE LUNCH SACK. INFLATE A BALLOON; PLACE IT IN THE SACK AND RELEASE. MEASURE THE DISTANCE THE BALLOON TRAVELS. REMOVE THE PAPER, INSERT 1-10 PENNIES AND REATTACH IT TO THE LUNCH SACK FOR EXPERIMENTATION.