Science Fair

Science Fair:
Fact (green) or Myth (red)

Parents are not supposed to help their child(ren).

Logbooks can make or break a project.

Science Fair projects take weeks if not months.

Measurements should be in the metric system.

Experiments should have only one variable changed.

The best project ideas come from parents.

Nuts and Bolts – Important Dates

- Registration is due by Friday, Feb. 14th. (t-shirts, ribbons, and certificates cannot be guaranteed after this date)
- Projects are due by Monday, March 30th and can be dropped off between 7:45 am and 8:30 am in the library.
- The District Fair will take place on Sat., April 4th from 9:30-11:30 am in the CHS science wing.

Nuts and Bolts – The Project

- Logbooks and safety forms are a must for each participant!
- Logbooks can be handwritten or typed in Microsoft Word (PDF files are also acceptable).
- Projects will be scored based on a rubric.
- All measurements should be in the metric system.
- Projects can be experiments, observations, engineering, inventions, models, or collections. (More to come on this.)

Project Types and Scoring Guides

- **Model** – a scaled replication of a device or product.
- **Invention** - a new way of making something or performing an action
- **Engineering** – a solution to a problem or an improvement upon an already existing item
- **Experiment** - a problem that is investigated by performing a series of tests in which **one thing is changed** each time and all other things remain the same from test to test.
- **Observation** - a series of events that you watch and try to explain and find common connections or occurrences
- **Collection** - a group of objects or results that form some type of pattern

Nuts and Bolts – The Logbook

A logbook is a very detailed account of a project – start to finish – every time you work on your project. It includes…

- Actions
- Observations
- Research
- Drawings/Diagrams
- Thoughts
- Feelings

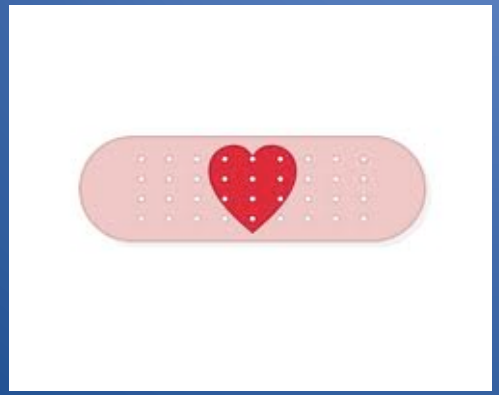
Start your logbook today!

Nuts and Bolts - Display

- Projects can be displayed on a display board or as a slideshow presentation (PDF file).
- Follow the given layout as close as possible as a common courtesy.
- No identifiable photographs.
- Use photographs to represent real things – the real things need not be displayed on the board.
- **Don't go overboard!**

Nuts and Bolts - Project Ideas

Ideas can come from anywhere! The best ideas come from questioning things around our everyday life, or creating a question from our own interests.



Project Categories

- Behavioral and Social Sciences (BSS)
- Biochemistry (BBC)
- Botany (BBO)
- Environmental Science (BEV)
- Medicine and Health (BMH)
- Microbiology (BMB)
- Zoology (BZO)
- Chemistry (PCH)
- Earth and Space (PES)
- Engineering (PEG)
- Mathematics (PMC)
- Computer Science (PCS)
- Physics (PPH)

Safety

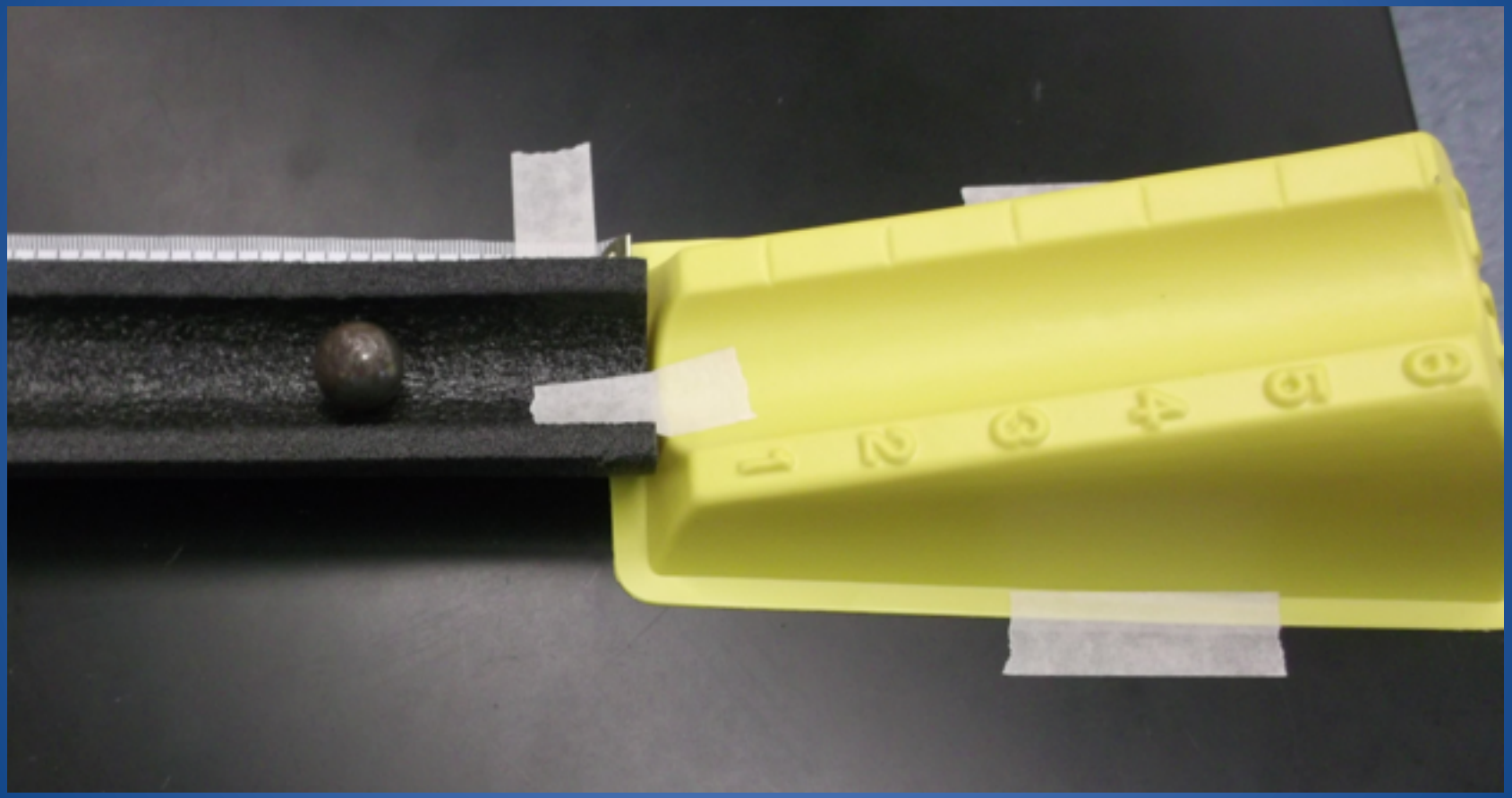
Guidelines:

- **All safety procedures need to be recorded in your logbook.**
- **A signed safety form must be included on the inside cover of your logbook.**
- No animal (this includes invertebrates) should be harmed or caused pain.
- Safety gloves should be used for any testing with food or chemicals.
- EYE PROTECTION: Safety glasses should be used for any experiments with chemicals or if any kind of splash may come in contact with your eyes
- ALLERGIES: Remember human subjects may be allergic to different substances. Always ask about allergies.
- FIRE: Projects are not allowed that involve fire or burning objects.

Safety (cont.)

- HUMANS: No experiments should be done on humans that can cause any potential harm to the human.
- Exceptions include observational type studies such as food tasting, observing, thinking type exercises, etc.
- Bottom line…it is ok as long as there is no possible way that any person can be harmed.
- BACTERIA: Due to the potential for inhaling or coming in contact with harmful bacteria, students should avoid projects where they collect bacteria and then grow bacteria cultures. While this can be done safely, the potential exists for a very harmful pathogen to be inhaled or come in contact with the student.
- OTHER: No experiments should be done using firearms. Experiments cannot include prescription drugs, illegal drugs or alcohol.

Sample Experiment Project



Marble On a Ramp

Possible Variables

- marble size
- marble material
- release point
- obstacle on runway
- shape of runway
- wind
- runway material

Question

(specific and measurable)

Does releasing a marble from a higher position affect the distance the marble will travel?

How does releasing a marble from a higher position affect the distance the marble will travel?

Background

- **Why project is important**
- History of
- Science behind
- Advancements in
- Scientists involved with
- Bibliography (3rd-5th only) – 3 sources

Hypothesis/Prediction

What do you expect to happen and why?

If I put a drop of water on a slope, **then** it will flow downhill **because** gravity pulls objects down.

Marble on Ramp Hypothesis

If we release the marble higher on the ramp, then…

Procedure

Practice, practice, practice.

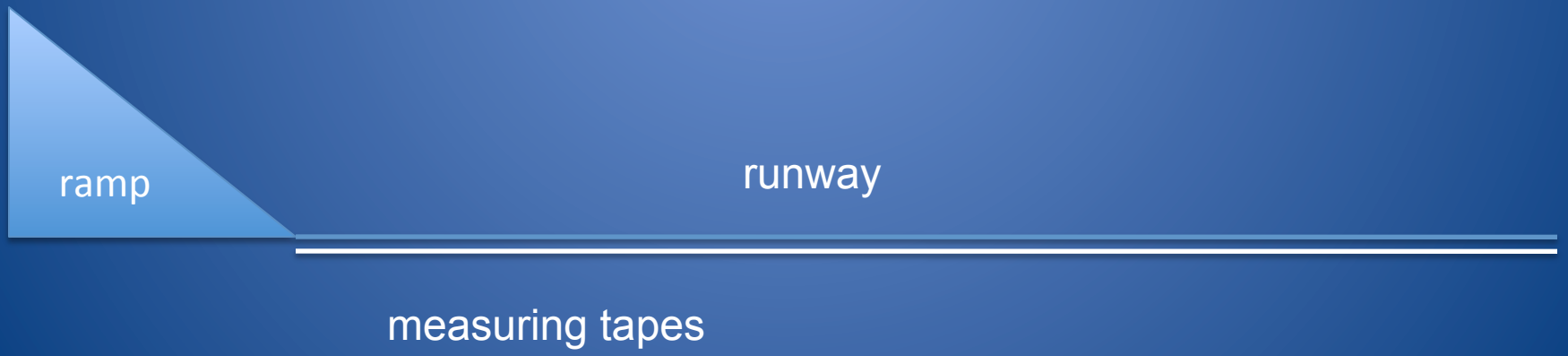
Step-by-Step

Diagrams/Photographs (no faces should be included in the photographs)

Begin each step with a verb and write them as commands.

Marble Runway Procedure

1. Tape the ramp securely on the table.
2. Attach two runways using minimal masking tape to hold them in place.
3. Tape the two measuring tapes on the table next to the runway.



Procedure (cont.)

4. Hold the marble at release point one so that the line on the ramp is even with the middle of the marble.
5. Release the marble.
6. Measure the distance it traveled (cm) down the runway being careful to measure the furthest point of the marble.
7. Record the distance the marble traveled.
8. Repeat steps 4-7 two more times.
9. Repeat steps 4-8 two more times testing the marble at release point 3 and 5.

Materials

Be specific about how many, what size, etc

- 1 steel marble
- 2 foam runways (90 cm)
- 2 measuring tapes (100 cm)
- masking tape

Trials/Samples

- Samples – The number of changes you test in an experiment. (at least 3, incremental)
- Trials – The number of times you do the experiment with each sample. (at least 3)

Variables

Independent Variable: the variable you are changing in the experiment

Release Point: 1, 3, and 5 (these are the samples)

Dependent Variable: what you are measuring **(in metric)**

Distance the marble travels (cm).

Constants:

marble, ramp, runway, location, measuring tape, release method

Control

The “basic” with which all other things are compared.

Note – not all experiments have a control.

Example:

Question: How does the salinity of water affect the growth of bean plants?

Control – distilled water.

Our Control – release point 1

Data Table

Be sure to average your data.

Data Table Title

	Dependent Variable Label			
Independent Variable Label	Trial 1	Trial 2	Trial 3	Average
Sample 1				
Sample 2				
Sample 3				

Marble on Ramp Data Table

The Relationship Between Release Point and Distance

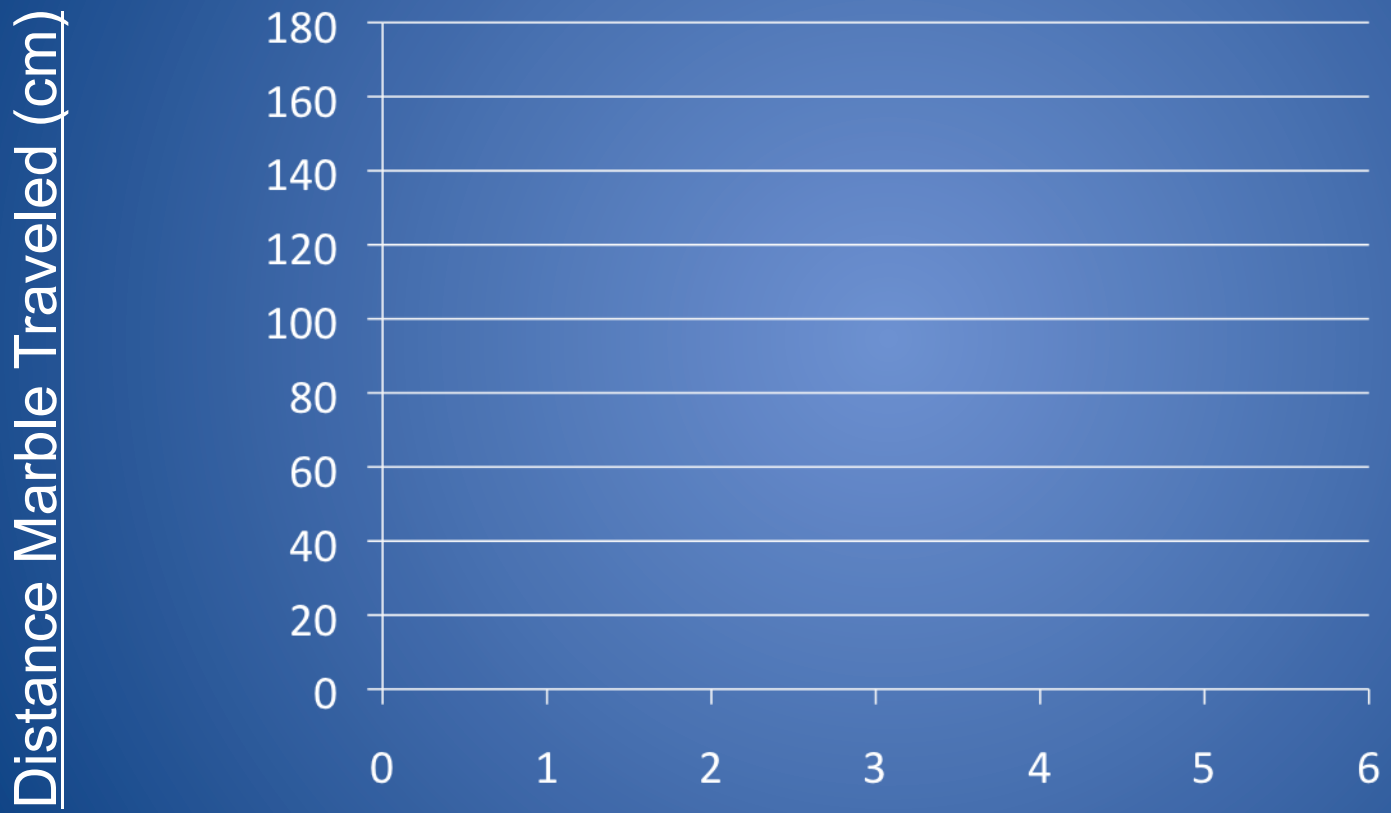
	Distance Traveled			
Release Point	Trial 1	Trial 2	Trial 3	Average
1				
3				
5				

Graph

- **Line graphs** should be used to show change over time or a change made to the same system.
- **Bar graphs** should be used to show isolated incidents.
- Only your average should be graphed.
- Type a sentence explaining the results of your data.

Marble on Ramp Graph

The Relationship Between Marble Release Point and Distance Traveled (cm)



Sentence explaining the results.

Conclusion

Be sure to relate your conclusion to your original question and hypothesis and include specific data.

Claim: The statement you believe to be true.

Evidence: The specific data that support your claim.

Marble on Ramp Conclusion

I thought that the further up the ramp the marble was released, the further the marble would travel. My experiment supports my hypothesis. When we released the marble at release point 1 it traveled _____ centimeters. From release point three the marble traveled ____ centimeters. The marble traveled an average of _____ centimeters when released from point 5.

Conclusion (cont.)

My results agreed with what I found in my research…

Reflection

- Explain how you know your results are valid and reliable.
- Describe how you might improve your project if you could do it again.
- Include ideas for what related questions you might now go on to explore.

Marble on Ramp Reflection

I feel confident that my results are reliable. I completed three trials getting similar results each time. Even so, there is room for improvement. It was difficult to let go of the marble at the exact spot every time. If I were to do this experiment again I would try to find a better way to make sure the marble was released from the very same spot each time.

Reflection (cont.)

This investigation is important for people who use ramps or hills in their every day lives (i.e. sledding, riding bikes, etc.). It is important to know that the higher up a hill you go, the more positional energy there is between you and the bottom of the hill. The more positional energy, the further you will move. While I was completing this investigation I wondered what would happen if I changed the size of the marble. This might be something I would like to study in the future.

Let the projects begin!