Work Sample Suggestions for Science

for

Flippered Friends

Inquiry for Benchmark Two

In the State of Oregon, there are four components to inquiry science: form, design, collect, and analyze.

In the scientific process used in the past, students would pose a question and then their suggestion for an answer, a hypothesis. Using the inquiry method today, **form** is like hypothesis but there's more. In addition to what a scientist wants to know and what might happen, scientific background must be stated. This requires a lot of language. At this point, form is not a required part of a formal inquiry work sample at benchmark 2.

Design is like procedure from the scientific process. It's important to students to state their plan step by step, label everything, and be as clear as possible.

Collect is collecting data but, again, there's a bit more. The data is listed on a table but must be converted into a chart, graph, percentage, something that can be analyzed.

Analyze is like conclusion. I tell students to imagine that the paper is being handed in and I ask "Well, how did it go?" or "What did you learn?" I encourage students to go back to each of the first three steps and review their work:

FORM

Were you able to answer your question?
Did you get the results you expected?
Did you learn anything new with this activity?

DESIGN

Was your procedure clearly stated? clearly labeled?
Could another scientist follow your design?
Did your design have only one variable?
Would you change anything if you repeated the activity?

COLLECT

Look back: Were the results different from what your hypothesis?
What were your results?
What might you do the next time?

The following page has a set of questions that can guide students through this process.

FORM

What do you know?

What do you want to know?

What do you think will happen? (hypothesis)

DESIGN

Step by step what are you going to do?

Words are helped by drawings when possible

Could I do this without asking you clarifying questions?

COLLECT

Create and record data on a table

Change the data into a graph or chart

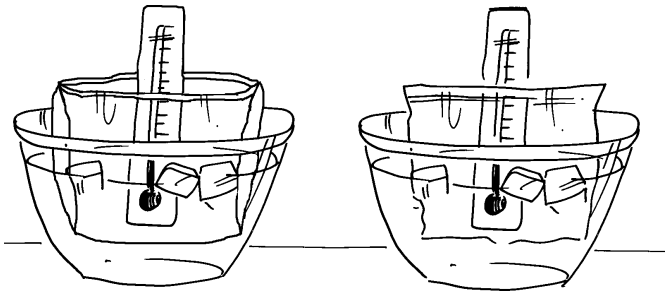
ANALYZE

What were your results?

Look back–did your results match your hypothesis?

Was it a fair test, would you do it differently next time?

Blubber Insulator



FORM

I know that when I put a thermometer into ice water, the temperature on the thermometer goes down. If I put the thermometer into something that is an insulator, the temperature should not go down as fast. The better the insulator, the slower the temperature change.

What if I _____?

I think _____

_____

_____

DESIGN

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

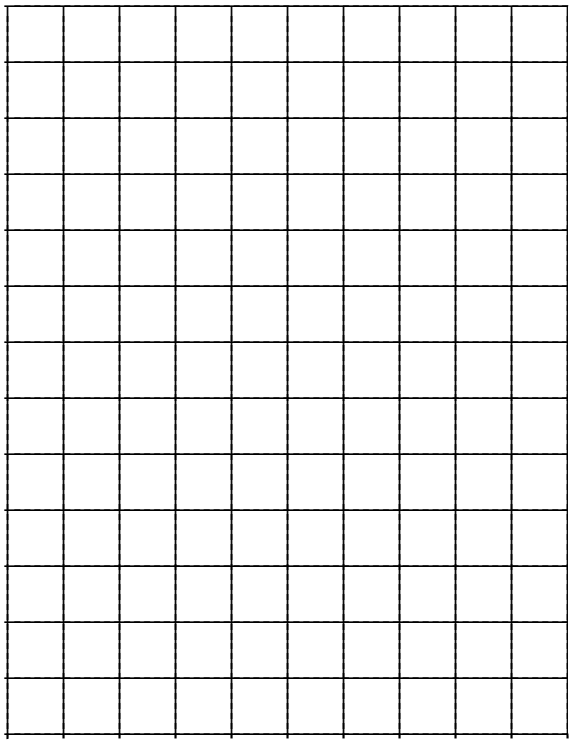
_____

_____

_____

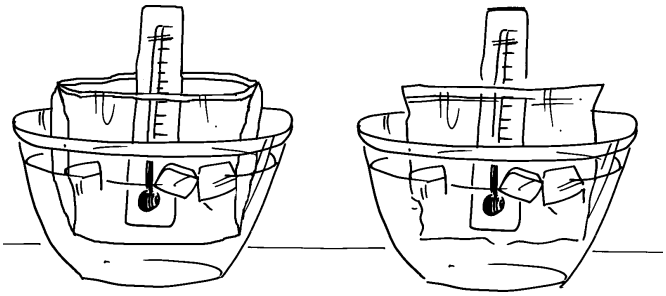
COLLECT

Here is what I found:



ANALYZE

Blubber Insulator



FORM

I know that when I put a thermometer into ice water, the temperature on the thermometer goes down. If I put the thermometer into something that is an insulator, the temperature should not go down as fast. The better the insulator, the slower the temperature change.

What if I put the thermometer into ice water, a plain baggie, or a baggie with shortening?

I think the baggie with shortening is the best insulator. When I hold an ice cube with my hand in a baggie with shortening I don't feel the cold. When I hold an ice cube with my hand in just a baggie, I feel the cold. I feel the cold the most when I just hold an ice cube with nothing on my hand.

DESIGN

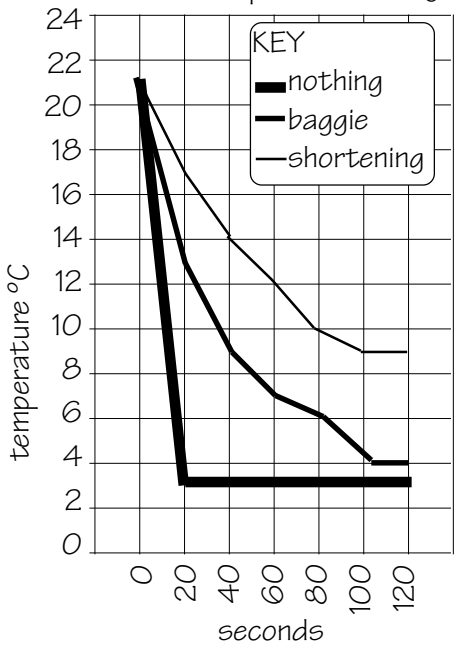
1. I am going to use a thermometer, baggies, shortening, and ice water.
2. Put a thermometer in a cup of ice water and record the temperature every twenty seconds for two minutes.
3. Put a thermometer in a baggie and then into a cup of ice water and record the temperature.
4. Put a thermometer into a baggie with one tablespoon of shortening. Squish the shortening so that it surrounds the thermometer. Put this baggie into a cup of ice water and record the temperature for two minutes.

COLLECT

Here is what I found:

time	nothing	baggie	shortening
0	21	21	21
20	3	13	17
40	3	9	14
60	3	7	12
80	3	6	10
100	3	4	9
120	3	4	9

How did the temperature change?



ANALYZE

My hypothesis was supported by my results. The temperature went down much slower with shortening than just a baggie. It was 4 or 5 degrees colder with the baggie only than with the shortening every time I recorded the temperature. Next time, I would put three baggies inside each other and then inside a fourth baggie and see if several layers of plastic and the air trapped between the baggies is a good insulator.