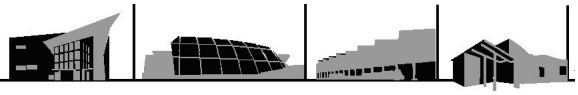

Teacher's notes	**Science investigations**

Introduction

These notes contain guidelines for science investigations that are consistent with the Bybee's 5E's approach to teaching and constructivist approaches to learning. The investigation concerns the flight of a whirlybird as a model for the approach taken.

Key messages

- Science should be engaging not just fun.
- Science is concerned with building knowledge not searching for truth.
- Real scientists do not follow prescribed methods in research.
- Not all scientific investigations require a hypothesis.
- Working scientifically is a way of thinking based on evidence.
- Knowledge and understanding can be integrated into science investigations in schools by asking *why*.
- Science "investigations" conducted in schools range from closed (most common) to open (less common).
- Open investigations can be achieved at all levels through scaffolding.

Activity: A research question about performance design

Engage

Research question:

How can I make my whirlybird stay in the air longer?

What I already know:

What do I know about flight?

-
-
-

What do I know about the flight of whirlybirds?

-
-

Explore

Explore the flight of whirlybirds until your observations are making some sense with what you know.

Observations:

-
-
-

Explain

Variables:

What are the factors (variables) that have an effect on the flight of a whirlybird?

-
-
-

What factor, that you are able to change, has the greatest effect on the flight of the whirlybird?

-

Hypothesis: Statement of a possible relationship between variables

Construct a hypothesis as follows:

The (time of flight) for a (whirlybird) depends on the (variable to change)

Prediction: Statement of expected outcome from changing one variable

If the wing size is larger the whirlybird should stay in the air longer.

Fair test:

- Change variable
- Measure variable
- Variables not to change
- Times to repeat

Collect the data:

- Record what happens
- Collate the data

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Analyse the data

- What does the data mean?
- Does the evidence (data) support the prediction?

Conclusions:

- Do the test results support the hypothesis?
- If not, why not?
    - Fair test?
    - Modify Hypothesis?
    - Modify knowledge?

Elaborate

- What other tests could be performed?
- Design your whirlybird to achieve the longest flight time.

Evaluate

- How well did your whirlybird perform?
- How did your whirlybird performance compare to others?
- What other factors could be changed to improve your whirlybird's flight time?