

**TADPOLES**  
Science

Grades: 2-3

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**Acceleration Approach**

Standard has been accelerated by moving grade level 2/3 up to the standard used for grade level 5.

K	1	2	3	4	5	6	7	8	9	CIM	CRLS/ CAM yes
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**Organizing Overarching Concept (e.g. systems, patterns of change, models, scales)**

Patterns of Change

**Organizing Higher Order Skills (e.g. Bloom’s, Paul’s Model of Reasoning)** Paul's Model of Reasoning including question at issue, inferences and data

**Differentiation Features - Students:**

- Add more variables to study
- Conduct original research
- Use explicit reasoning
- Provide alternatives for tasks, products and/or assessment

**Resources**

- *Dust bowl a problem-based unit*. Center for Gifted Education, College of William and Mary . Adapt Experiment Worksheets pg 61, 63, 65, 67 Use teacher samples for instruction pg 69. (See Center for Gifted Education, College of William and Mary in the Appendix Section VIII)
- Frog and Toad An AskERIC Lesson Plan <http://www.askeric.org/Virtual/Lessons/Interdisciplinary/INT0024.html>
- Monarch Watch <http://www.monarchwatch.org/>

The editor used the internet for many resources listed in this document. The listed books and internet sites should be reviewed and evaluated by the teacher before using.

**Common Curriculum Goal**

**Science-Life Science**

Understand structure, functions, and interactions of living organisms and the environment.

**Science-Hereditry**

Understand the transmission of traits in living things.

**Science-Scientific Inquiry**

Use interrelated processes to pose questions and investigate the physical and living world.

**Forming the Question/Hypothesis**

Formulate and express scientific questions or hypotheses to be investigated.

**Designing the investigation**

Design safe and ethical scientific investigations to address questions or hypotheses.

**Collecting and presenting data**

Conduct procedures to collect, organize, and display scientific data.

**Analyzing and interpreting results**

Analyze scientific information to develop and present conclusions.

**CONTENT STANDARDS**

**Science - Scientific Inquiry**

Make observations. Formulate and express scientific questions or hypotheses to be investigated based on the observations.

Design scientific investigations to address and explain questions or hypotheses.

Collect, organize and display scientific data.

Analyze scientific information to develop and present conclusions.

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### Archetypal Model

Scientific inquiry including making observations, designing an investigation, collecting data and summarizing results.

### TASK DEMAND

**Theme:** Life Cycle of the Frog

#### Sample Task Activity

- **(Whole Class)** Observing the transformation of tadpole to frog in desktop habitats, the whole class will make daily observations in their journal. A guided question and hypothesis will be explored whole class (e.g., Will tadpoles that are fed rabbit food or tadpole bites grow faster?) **Special note:** Not all frogs should be released into your environment. Check with the Fish and Wildlife before releasing animals.
- **(Independent)** A cluster of TAG students will develop individually, or with a partner, an original question to investigate and form an original hypothesis. Formation of the conclusion will be guided. The teachers has available the Graphic Organizers *Student Brainstorming Worksheet*, *Student Experiment Worksheet*, *Experiment Decision Worksheet* and *Scientific Inquiry Student Planner* to have students develop their ideas. For the final scientific inquiry students use the Graphic Organizer set *Scientific Inquiry Student Planner* which includes *Framing the Question*, *Designing the investigation*, *Collection and Presentation Data*, and *Analyzing and Interpreting Results*. *Light Experiment Data Sheet* is for data collecting.
- **Note to teacher:** Meet with TAG cluster when others are journaling. Have discussions with other table groups about their journal entries.
- Modifications involve acceleration from Benchmark 1 to Benchmark 2 in the area of inquiry, moving from a simple guided exploratory tadpole to frog development to a scientific investigation where TAG students develop an independent question and hypothesis.

### Questions

- What do we want to find out?
- What do we think will happen?
- What will we need to observe or measure in order to find out the answer to our scientific question?
- How will you explain the results?

### Implementation Time

- To be determined by the teacher. Suggested: Four to six 40-minute science periods. Introductory and conclusion sessions, plus 4 weeks of 5-minute daily observations.

### Benchmarks

#### Science-Life Science-Hereditry:

5<sup>th</sup> Grade – Describe the life cycle of an organism.

#### Science-Scientific Inquiry

3<sup>rd</sup> Grade – Make observations. Based on these observations, ask questions or form hypotheses, which can be explored through simple investigations.

5<sup>th</sup> Grade – Make observations. Ask questions or form hypotheses based on those observations that can be explored through scientific investigations.

5<sup>th</sup> Grade—Design a simple scientific investigation to answer questions or test hypothesis.

5<sup>th</sup> Grade—Collect, organize, and summarize data from investigations.

5<sup>th</sup> Grade—Summarize analyze, and interpret data from investigations.

**Graphic Organizer**  
**STUDENT BRAINSTORMING WORKSHEET**

Grades: 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

<b>1. Scientific Problem: What do we need to find out?</b>	<b>2. Resources: What materials do we have available?</b>
<b>3. Resources: How can we use these materials to help us find out?</b>	<b>4. Hypothesis: What do we think will happen?</b>
<b>5. Designing the Investigation: What will we need to observe or measure in order to find out the answer to our scientific question.</b>	<b>6. Conclusion: How will we explain what we learned?</b>

## GRAPHIC ORGANIZER

## STUDENT EXPERIMENT WORKSHEET

CURRICULUM #56

Grades: 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

Title of Experiment \_\_\_\_\_

<b>1. Hypothesis</b> (Educated guess about what will happen):	<b>2. Independent Variable</b> (The variable that <u>you change</u> ):
<b>3. Dependent Variable</b> (The variable that responds to changes in the independent variable):	<b>4. Observations/Measurements to Make:</b>
<b>5. Constants</b> (All the things or factors that remain the same):	<b>6. Control</b> (The standard for comparing experimental effects):

GRAPHIC ORGANIZER  
**EXPERIMENT DECISION WORKSHEET**

Grades: 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

1. How often am I going to take my measurements?

\_\_\_\_\_

2. What are the ways I changed the dependent variables (the different kinds of soil or different ways of watering or different kinds of light?)

A. \_\_\_\_\_ B. \_\_\_\_\_

C. \_\_\_\_\_ D. \_\_\_\_\_

3. How am I taking my measurement (height, weight, numbers of things)?

\_\_\_\_\_

4. What other things should I be looking for?

\_\_\_\_\_

GRAPHIC ORGANIZER  
**SCIENTIFIC INQUIRY STUDENT PLANNER**

Grade 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

**A. Make a list of your own ideas for an investigation.**

**B. Select one of your ideas and write your ideas as a:**

- 1. Question to answer OR
- 2. Hypothesis to test

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**C. Describe background knowledge (preliminary observations) that:**

- 1. Relate to the Investigation AND
- 2. Clarify the purpose of your experiment.

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GRAPHIC ORGANIZER  
**SCIENTIFIC INQUIRY STUDENT PLANNER**

Grade 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

**Designing the Investigation**

- A. Make a list of the kind of data you will need to:**  
1. Answer your question OR  
2. Test your hypothesis  
Make sure your design is scientifically logical, safe, and ethical.

- B. Decide what must be done to have a fair test of your question or hypothesis, then describe a practical design that will give the right kind of data (to answer your question or test your hypothesis).**

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- C. Write out the procedure that you decided on. Describe a general plan and include details on some of your procedures. Your procedure must be clear enough that another person could repeat your experiment.**

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GRAPHIC ORGANIZER  
**SCIENTIFIC INQUIRY STUDENT PLANNER**

Grade 2-3

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Name \_\_\_\_\_ Date \_\_\_\_\_

**Analyzing and Interpreting Results**

**A. Report the results of your investigation, identify patterns, and propose explanations. Use science concepts, models and terminology in your explanation.**

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**B. Address your question or hypothesis:**  
1. Answer your question or explain why you cannot OR  
2. Explain how the test of your hypothesis came out.

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**C. Review your investigation for possible errors in the measurements or observations. Explain the limitations of your conclusions. Review the design/and/or procedure and suggest design improvements, if possible.**

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**LIGHT EXPERIMENT DATA SHEET**

Science

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Name \_\_\_\_\_ Date \_\_\_\_\_

Day	Kind of Light	Measurement	Other Observations

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**TAG NEEDS ADDRESSED**

INTELLECTUALLY GIFTED	ADVANCED SCIENCE KNOWLEDGE/SKILLS	CAREER RELATED LEARNING STANDARDS FOR CAM - Certificate of Advanced Mastery	TEACHER CHECKS THE BENCHMARK LEVEL STUDENT IS PURSUING
<input checked="" type="checkbox"/> Advanced Critical Reasoning <input type="checkbox"/> Scholarly Interaction <input checked="" type="checkbox"/> Continuous Progress for Level and Rate* <input checked="" type="checkbox"/> Challenging Resources <input type="checkbox"/> Effecting Change <input type="checkbox"/> Decision Making; Ethical Use of Influence <input type="checkbox"/> Leadership Training/Career <input type="checkbox"/> Realistic Goal Setting <input type="checkbox"/> Regular Interaction with Intellectual Peers <input type="checkbox"/> Social-Emotional Issues; Support; Coping Strategies <input type="checkbox"/> Advanced Academic Planning <input type="checkbox"/> Opportunity for Competition/ Failures/Successes <input checked="" type="checkbox"/> Creative Problem Solving with Real Problems/ Audiences <input checked="" type="checkbox"/> Pursuit of Advanced Level Research <input checked="" type="checkbox"/> Advanced Vocabulary Development	<input type="checkbox"/> Advanced Critical Thinking in Science <input checked="" type="checkbox"/> Continuous Progress/Level and Rate* in Science <input type="checkbox"/> Challenging Science Resources <input checked="" type="checkbox"/> Creative Problem Solving Strategies in Science <input checked="" type="checkbox"/> Science Advanced Vocabulary Development <input type="checkbox"/> Leadership Training/Career <input type="checkbox"/> Decision Making; Ethical Use of Influence <input type="checkbox"/> Regular Interaction with Talented Science Peer <input type="checkbox"/> Realistic Goal Setting <input type="checkbox"/> Opportunity for Competition/ Failures/Successes <input type="checkbox"/> Advanced Academic Planning in Science	<input checked="" type="checkbox"/> Personal Management <input checked="" type="checkbox"/> Problem Solving <input checked="" type="checkbox"/> Communication <input checked="" type="checkbox"/> Teamwork <input type="checkbox"/> Employment Foundations <input type="checkbox"/> Career Development  <p>* Rate requires monitoring to ensure that the student was allowed to move ahead upon acquiring concepts.</p>	<p><b>Science:</b></p> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> CIM <input type="checkbox"/> CAM
		<p>Student _____ Grade _____</p> <p>Teacher _____ School _____</p> <p>Date Initiated _____ Date Completed _____</p> <p>Check TAG Identification category:  <input type="checkbox"/> Intellectual    <input type="checkbox"/> Academic Math    <input type="checkbox"/> Academic LA</p>	