



### Connecting FOSS to Northern Arizona

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### Overview:

**Pg. 1 Introduction:** Explains the project “Connecting FOSS to Northern Arizona”

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**Contact Sheet:** Important names, numbers, e-mails and web-sites for reference information, guest speakers, and program possibilities

**Possible Field Trips:** Local field trip sites and programs that would be appropriate and place-based

**Book List:** A list of both reference and literature books that might be helpful for use with this kit

**Web Resources:** A list of websites that are informative for both teachers and students

Prior to the kit: Review/learn metric (6<sup>th</sup> grade Math DAP assessment)

### Investigation 1: *Terrestrial Environments*

(Cycles—seeds)

**Pg. 1 Note:** Phone FSRC and order live materials for investigations 2, 3, and 4 (now!) Penny Planeta 773-4160

**Pg. 5 Activity 1:** “Flying Fruits” Gathering seeds from the school grounds can be a great introduction into seed dispersal!

Russell, H. R. (1990). Ten-Minute Field Trips. Washington D.C: National Science Teachers Association. Pp. 30-35. [NAEERC: EE 038 C1]

**Note:** exchange Kit seeds for Native seeds —call *Native Plant and Seed* 773-9406

**Activity 2:** “Draw and Label a Seed and The Seed Cycle” Examine seeds with magnifying glasses. Draw seeds on a gigantic scale.

Russell, H. R. (1990). Ten-Minute Field Trips. Washington D.C: National Science Teachers Association. Pp. 30-35. [NAEERC: EE 038 C1]



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### Investigation 1 Cont'd:

- Pg. 5 Activity 3:** "How Many Seeds Will Grow?" See what seeds will germinate. Inquire into the whys and hows of germination. Draw seeds on a gigantic scale.  
Russell, H. R. (1990). *Ten-Minute Field Trips*. Washington D.C: National Science Teachers Association. Pp. 30-35. [NAEERC: EE 038 C1]  
**Note:** plan ahead for field trips and guest speakers: See contact sheet in overview section.
- Pg. 8 Note:** exchange Kit seeds for Native seeds – call *Native Plant and Seed* 773-9406
- Pg. 11 Note:** *Amazon Rainforest Journal*  
(6<sup>th</sup> grade DAP assessment – Narrative Writing)
- Pg. 12 Note:** Growing season in Flagstaff is approximately 70 days. There is a chance of a freeze as late as June. How can we better prepare for such a short growing season? Answer: Grow indoors!
- Pg. 14 Supplement 1:** "How might we plant the seeds outdoors in Flagstaff?"  
Consider: location, orientation, and shade. Discuss the different regions of Flagstaff and how the growing conditions might be different, for example: mineral-rich wells along the Rio de Flag, warmer temperature along the south side of Mt. Elden, strong winds at Doney Park.
- Pg. 18 Note:** Begin classroom growth chart of plant growth  
(6<sup>th</sup> grade math DAP assessment – Bar Graph)
- Pg. 19 Note:** Make a list of the six different terrestrial environments: Compare and Contrast to our Ponderosa Pine Environment  
**Note:** *Terrestrial Environments around The World*  
(6<sup>th</sup> grade DAP assessment – Expository Writing)
- Pg. 20 Note:** Math Extension: Problem of the Week: Design a garden for Flagstaff  
(6<sup>th</sup> grade Math DAP assessment – Metric length)
- Pg. 21 Note:** Inv1 Page 21: Design a garden for Flagstaff. What plants would you plant, when, where and how?



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### Investigation 2: Bugs and Beetles

- Pg. 1 Note:** set up a jar full of mealworms  
(call FSRC – Penny Planeta 773-4160 or local pet store “Wet Pets” 779-2360)  
**Note:** find a native bug display to show students
- Pg. 4 Supplement 2:** "Native Bombardier Beetle" –  
Learn about one stinky method of protection from the Bombardier Beetle (*Brachinus*).
- Pg. 10 Note:** Isopods, mealworms, and beetles can be collected from the school grounds
- Pg. 13 Note:** Message: “**Compassion and Respect for All Life**”
- Pg. 13 Note:** Reminder: call FSRC (Penny Planeta 773-4160) to order live materials but it could be more fun for students to find their own on the school grounds.  
**Note:** Making Runways  
(6<sup>th</sup> grade DAP assessment – Following directions)
- Pg. 15 Note:** Venn Diagram – Compare/contrast bugs and beetles; have students share stories of their own experiences with bugs  
**Note:** Inv2 Page 15: Have students share stories of their own experiences with bugs or beetles
- Pg. 20 Note:** (Language Arts) Write a poem or short story about beetles or isopods; perhaps a narrative (6<sup>th</sup> grade DAP assessment) from the bugs perspective
- Pg. 25 Note:** Venn Diagram – Compare/contrast isopods and insects
- Pg. 29 Note:** Have the students make predictions –  
What will happen to the isopods? Beetles? Plants?

### Investigation 3: Water Tolerance

- Pg. 1 Pre/post-activity:** "Our Levels of Tolerance"  
Define and discuss our own levels of tolerance. How might we be able to survive under severe conditions; for example, in the desert during the summer? Give examples of living organisms adapted to their environment?



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### Investigation 3 cont'd:

- Pg. 11 Note:** Discuss the importance of water in our environment. Where does it come from? And in the desert?  
**Note:** (Central Arizona Project) supplies much of the needed water to Tucson and Phoenix from the Colorado River.  
**Note:** Ask: What types of soil might you find in Flagstaff? Is it good for growing vegetable? What might grow well in Flagstaff? Native Plants?
- Pg. 12 Note:** Create other environments – Acid Rain (vinegar/water solution), Acidic (pine needles soaked in water), high pH (limestone)
- Pg. 13 Note:** Begin a classroom growth chart for all plants in each environment
- Pg. 15 Note:** *Auntie's Plants*  
 (6<sup>th</sup> grade DAP assessment – Narrative)
- Pg. 21 Note:** Ask: Where might water come from in Flagstaff? (Lake Mary, wells, springs, run-off)  
**Note:** How might we best accommodate for Flagstaff's limited water supply?  
**Note:** Ask: Are some plants more water tolerant than others? Examples? (Cactus, Ponderosa Pine, Pinyon and Juniper)
- Pg. 23 Note:** Language Extensions: Have students create a "wet poem" or "dry poem" using their list of words.  
**Note:** Math Extension: Problem of the Week  
 (6<sup>th</sup> grade Math DAP assessment – percentages & decimals)

### Investigation 4: Aquatic (Riparian) Environments (Cycles – Nitrite, Nitrate, Ammonia, CO<sub>2</sub>)

- Pg. 1 Pre-activity:** "The WATER Planet?"  
 calculate water volumes using percentages (6<sup>th</sup> grade Math DAP assessment).  
 Western Regional Environmental Council. 1987.  
Project Aquatic: Aquatic Education Activity Guide. Pg. 7-9.  
**Note:** plan ahead for field trips and guest speakers



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Investigation 4 cont'd:

- Pg. 8 Note:** Substitute Goldfish for Native fish – Sonoran Suckers, Desert Suckers, and the Speckled Dace can be had from Game and Fish 774-5045 (Chuck Benedict)
- Pg. 10 Note:** other organisms can be had from any of the local lakes (Marshall Lake)
- Pg. 11 Note:** local aquatic environments: Lake Mary, Flagstaff MS Pond, Oak Creek, Colorado River, Lake Powell  
**Note:** Draw and Label the physical characteristics of fish  
**Note:** Ask: “What might be some of the environmental factors in aquatic environments in Flagstaff?”
- Pg. 12 Note:** Compare/contrast – lakes, ponds, rivers, seashores, coral reefs, etc., choose two aquatic environments to draw and color accurately, then list similarities and differences
- Pg. 15 Note:** Can you think of any other acids? (Sulfuric acid, acid rain, lemon/lime)  
**Note:** Use a pine needle solution (acidic) and the vinegar to demonstrate BTB  
**Note:** Other indicators: Lichen (an indicator of air pollution), tree-rings (an indicator of wet/dry seasons), ozone (an indicator of increased carbon dioxides)
- Pg. 16 Activity 4:** (Science/Health) “What’s Wrong With This Water?” Identify major sources of aquatic pollution.  
 Western Regional Environmental Council. 1987. Project Aquatic: Aquatic Education Activity Guide. Pg. 137-142.
- Pg. 17 Activity 5:** (Science/Health) “Tadpoles to Frogs”  
 Make inferences about the potential effect of acid precipitation on aquatic life  
 The Watercourse and the Council for Environmental Education. (1998). Project Wet. Bozeman, MT: Montana State University. Pg. 279. NAEERC – WR 028 R.