Name_____

DATA Nugget

Marvelous mud

Featured scientist: Lauren Kinsman-Costello from Kent State University

Research Background:

The goopy, mucky, often stinky mud at the bottom of a wetland or lake is a very important part of the ecosystem. Wetland mud is much more than just wet dirt. For example, many species of microbes live in the wetland mud where they decompose (breakdown) dead plant and animal material to obtain energy. This dead plant and animal material is called **organic matter**. However, the wetland mud microbes do not have all the oxygen they need to decompose the plant and animal tissues quickly and efficiently. Because of this, the dead material in wetland mud decomposes much more slowly than similar dead material in dry soil.

As a graduate student, Lauren became fascinated with wetland mud and its interesting properties. She wanted to know how important all the mud and its organic matter is for wetlands. By talking with other members of her lab and reading scientific papers, Lauren learned that wetland mud can often be high in the element **phosphorus** and that phosphorus acts as a fertilizer for plants, including wetland plants and algae. However, nutrients, such as phosphorus can build up in wetland mud. Lauren thought it might be possible that the organic matter in the mud was the source of all the phosphorus in some wetlands. She predicted that wetlands with more organic matter would have more phosphorus. If her data support her hypothesis, it could mean that organic matter is very important for wetlands, because nutrients are needed for algae and plants to grow.

Although most mud is high in organic matter and nutrients, not all mud is the same. There is natural variation in the amount of organic matter and nutrients from place to

You can tell that the mud in this picture is high in organic matter because it is dark brown and mucky (in real life you'd be able to smell it, too!)

Scientist Lauren holding a mud core. You can see that the tube has mud at the bottom, as well as some water at the top.

place. Even within the same location mud can be very different in spots. Lauren used this variability to test her ideas. She measured organic matter and phosphorus in mud from 16 freshwater locations (four lakes, five ponds, and seven wetlands). She took cores that allowed her to sample mud deep into the ground. She then brought her cores back to the lab and measured organic matter and phosphorus levels in her samples.

Scientific Question: What is the relationship between organic matter and phosphorus in mud from lakes, ponds, and wetlands?

What is the hypothesis? Find the hypothesis in the Research Background and underline it. A hypothesis is a proposed explanation for an observation, which can then be tested with experimentation or other types of studies.

Scientific Data:

Use the data below to answer the scientific question:

Location	Ecosystem Type	Organic Matter (%)	Total Phosphorus (ug P/g d.w.)
Wintergreen	Lake	24%	528
Douglas Lake	Lake	55%	523
Jackson Hole	Lake	5%	105
Whitford Lake	Lake	1%	28
Pond 9	Pond	21%	556
Pond 18	Pond	24%	512
Pond 10	Pond	17%	537
Pond 23	Pond	19%	366
Pond 6	Pond	6%	177
Loosestrife Fen	Wetland	40%	773
FCTC	Wetland	80%	1441
Osprey Bay	Wetland	8%	167
Turkey Marsh	Wetland	15%	459
Sheriffs Marsh	Wetland	30%	1909
Brook Lodge	Wetland	18%	443
Eagle Marsh	Wetland	4%	130

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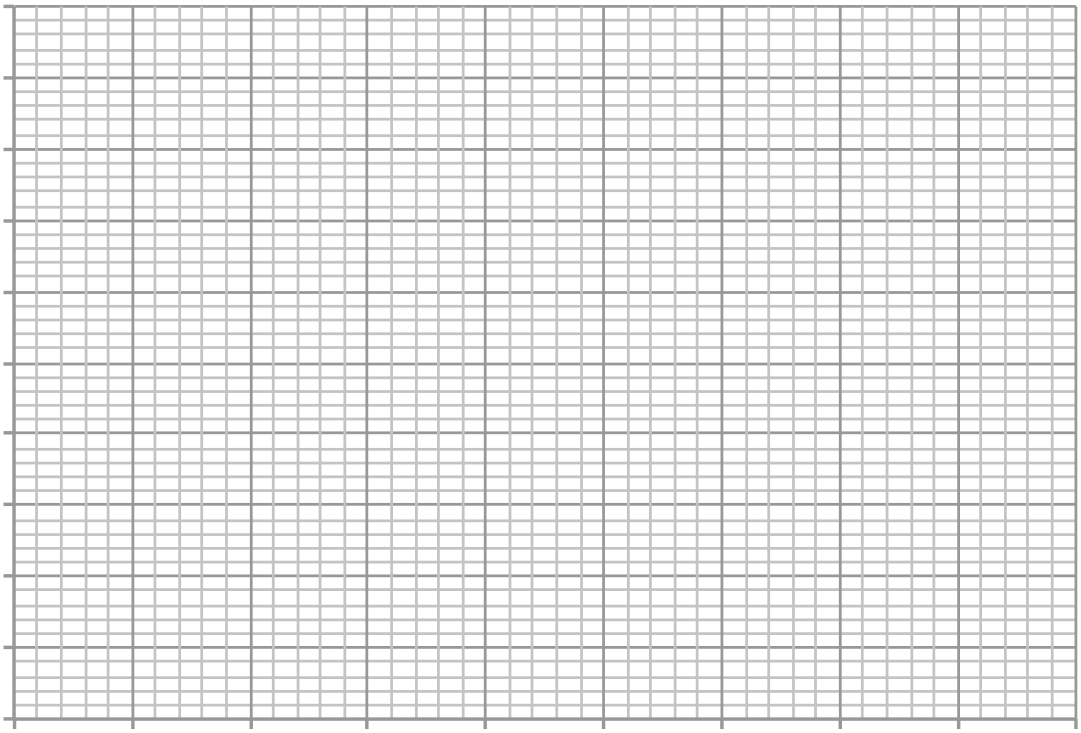
What data will you graph to answer the question?

Independent variable: _____

Dependent variable: _____

Draw your graph below: Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.



Interpret the data:

Make a claim that answers the scientific question.

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What evidence was used to write your claim? Reference specific parts of the table or graph.

Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about decomposition of organic matter in mud and how this differs from dry soils.

Did the data support Lauren's hypothesis? Use evidence to explain why or why not. If you feel the data were inconclusive, explain why.

Name_____

Your next steps as a scientist: Science is an ongoing process. What new question(s) should be investigated to build on Lauren's research? What future data should be collected to answer your question(s)?