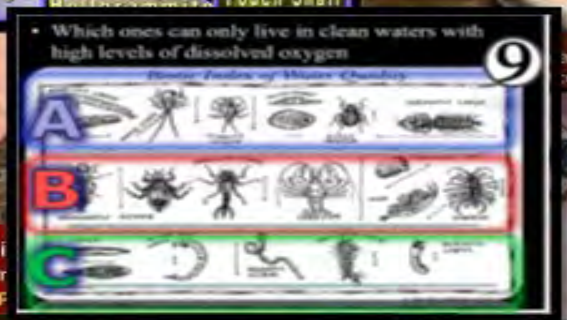
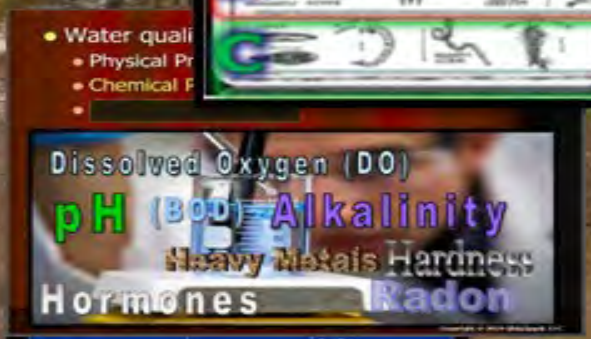
Water Quality Unit Stream Study

Preview is a compressed file





Interactive Slideshows

There's one part of pollution

Can you find the one part per million of pollution on the next slide.

- Benthic Macroinvertebrates.

Benthic: Living on the bottom

Macro: Large

Micro-Small

- Biological: The following live only in unpolluted waters with high levels of dissolved oxygen
  - E- Ephemoptera (Mayfly)
  - P- Plecoptera (Stonefly)
  - T- Tricoptera (Caddisfly)

EPT's

Who wants to tr... saying their name

  - Megaloptera (Hellgrammite)
  - Coleoptera (Waterpenny)
  - Gilled Snail

Learn more about benthic macro-invertebrates at...
http://www.dep.wv.gov/WWE/getinvolved/sos/Pages/Benthics.aspx

- The following can tolerate polluted waters and low dissolved oxygen content. (Class III).
  - Worms
  - Pouch Snails
  - Leeches
  - Midge Larvae
  - Cranefly Larvae
  - Black fly Larvae

- The following can tolerate polluted wa... and low dissolved oxygen content. (C...
  - Worms
  - Pouch Snails
  - Leeches
  - Midge Larvae
  - Cranefly Larvae
  - Black fly Larvae

- Quiz 1-20 Name that Benthic Macro-Invertebrate.
  - Teacher to decide if you can use your sheet.

QUIZ

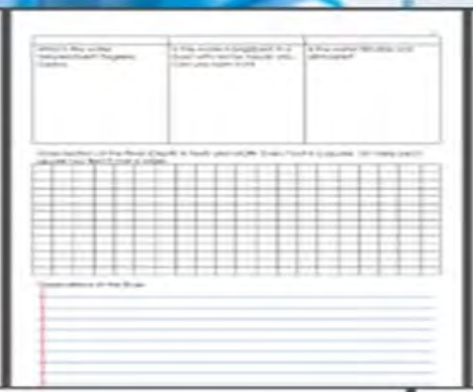
- Biological
  - Fecal coliform, bio...

- Facultative Vernal Pool Species: Species that can use vernal pools for all or portions of their life cycle, but successfully complete their lifecycles in other water bodies.

- Vernal Pool: Seasonal wetland area that is dry and largely uninhabited for much of the year, until rains arrive and fill it with water; it teems with life again.

- Most of the insects that we see actually live most of their life in the water.
  - They emerge from the water to complete their life cycle.

Follow Along Bundle



15 Pages

Activities, Assessments, Keys and more all built-in

Part 2: Water Quality, Physical Properties of Water, Chemical Properties of Water, Bio-Indicators of Water Quality Physical Properties of Water Quality, Stream Discharge and Data Collection, Chemical Testing of Water Quality Sheet, Biological Testing, Benthic Macroinvertebrates, (EPT richness),Identifying Macros and Collection, Writing a Stream Quality Assessment

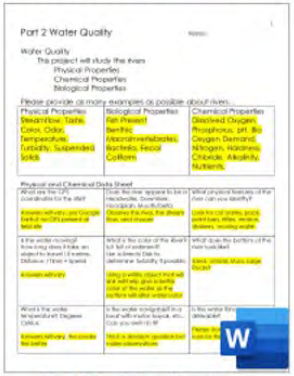
Part 2: Water Quality

Water Quality

Part 2 Lesson 1 Stream Flow

Part 2 Lesson 2 Chemical Testing

Part 2 Lesson 3 Biological Two Days



Part 2 Work Bundle Answers

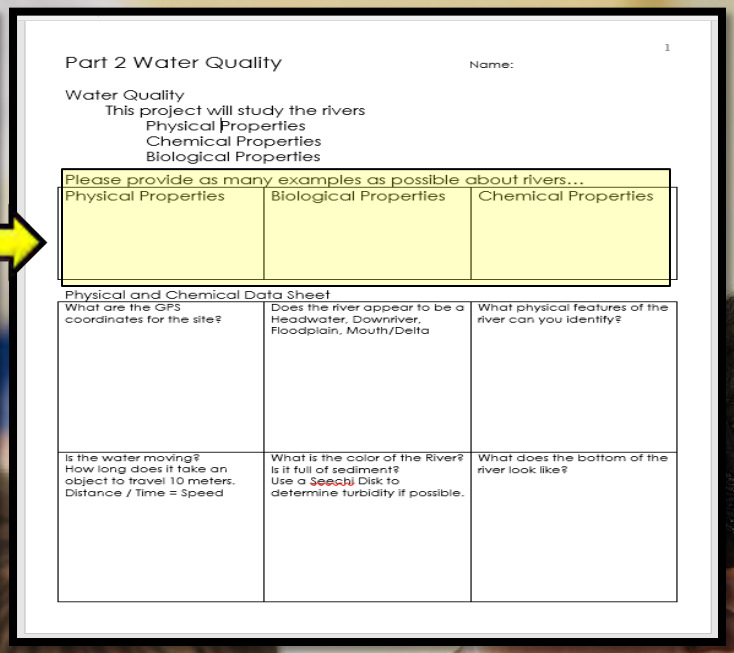
Part 2 Work Bundle Print

SlideSpark Science

MIDDLE-LEVEL EDUCATIONAL RESOURCES

Interactive slideshows provide the roadmap for an amazing learning experience for students in grades 5-9. A Detailed set of work bundles chronologically follow the digital learning, providing a clear and intuitive roadmap to understanding. As the teacher or student advances through a slideshow, exciting hands-on activities, fantastic visuals, fill-in notes, review opportunities, video links, assessments, and much more are strategically placed throughout. Interactive learning unfolds step by step and supported by the work bundle to reach all types of learners. Everything you need to run to an amazing learning experience is provided in this one-of-a-kind science curriculum.

Each unit in the curriculum is designed to help teachers deliver the best possible learning experience for their students. Our interactive science slideshows are filled with questions and answers, important fill-in notes, hands-on activities, projects, games, built-in quizzes, and end of the unit assessment pieces. Students follow along with a work bundle that documents the entire learning experience for a fantastic review and assessment piece.



Part 2 Water Quality Name:

Water Quality
This project will study the rivers
Physical Properties
Chemical Properties
Biological Properties

Please provide as many examples as possible about rivers...

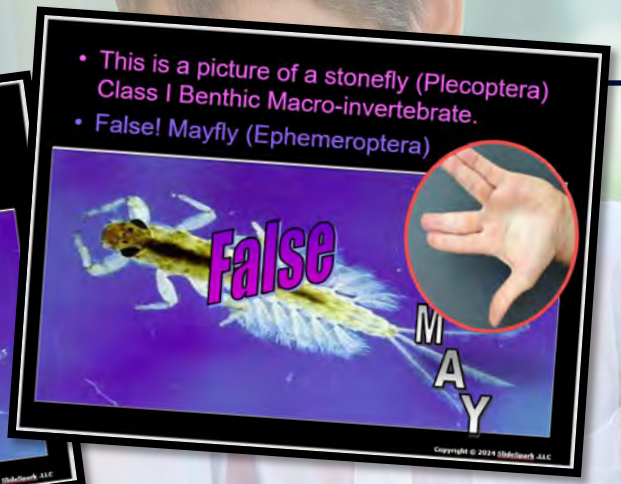
Physical Properties	Biological Properties	Chemical Properties

Physical and Chemical Data Sheet

What are the GPS coordinates for the site?	Does the river appear to be a Headwater, Downriver, Floodplain, Mouth/Delta	What physical features of the river can you identify?
Is the water moving? How long does it take an object to travel 10 meters. Distance / Time = Speed	What is the color of the River? Is it full of sediment? Use a Seechi Disk to determine turbidity if possible.	What does the bottom of the river look like?

Red Slide Notes: Help students record important information in a fun and easy-to-understand way. Designed red-colored slides contain a few pieces of crucial information that students must record into their work bundle to complete the notes. Students will use these important notes throughout the work bundle.

The set-up of the slideshows are designed to make learning fun and interactive for students. With a mix of questions and answers, teachers can use these slides to get their students thinking and actively participating in their education. Plus, the answers are always revealed on the next slide, providing students with immediate feedback and helping teachers assess their understanding.



Next Slide

slideshow supports
Work Bundle

Lesson Planning

Daily lessons space exciting hands-on activities, red slide notes, video and academic links, projects, simulations, readings, built-in quizzes, and review opportunities throughout the slideshows. A typical day may have many different learning styles being targeted. Daily lesson planning becomes advancing through the slideshow roadmap the night before. Each lesson is roughly 50 minutes, but sometimes things can speed up or slow down. The best strategy is just to go at your classes own pace. The work bundle chronologically follows the interactive slideshow and you can always spend extra time assessing the quality of the writing within. If you don't quite finish a lesson, you can always pick it up the next day where you left off. The only real trick in timing is not starting a larger activity if you don't have the available time to complete. The slideshows have been designed to be a low stress, go at your classes own pace experience. Most activities are designed to be cost effective, using general materials that can be gathered from your local stores.

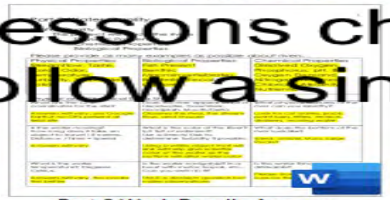
Water Quality

Part 2 Lesson 1 Stream Flow

Part 2 Lesson 2 Chemical Testing

Part 2 Lesson 3 Biological Two Days

Lessons chronologically follow a single work bundle

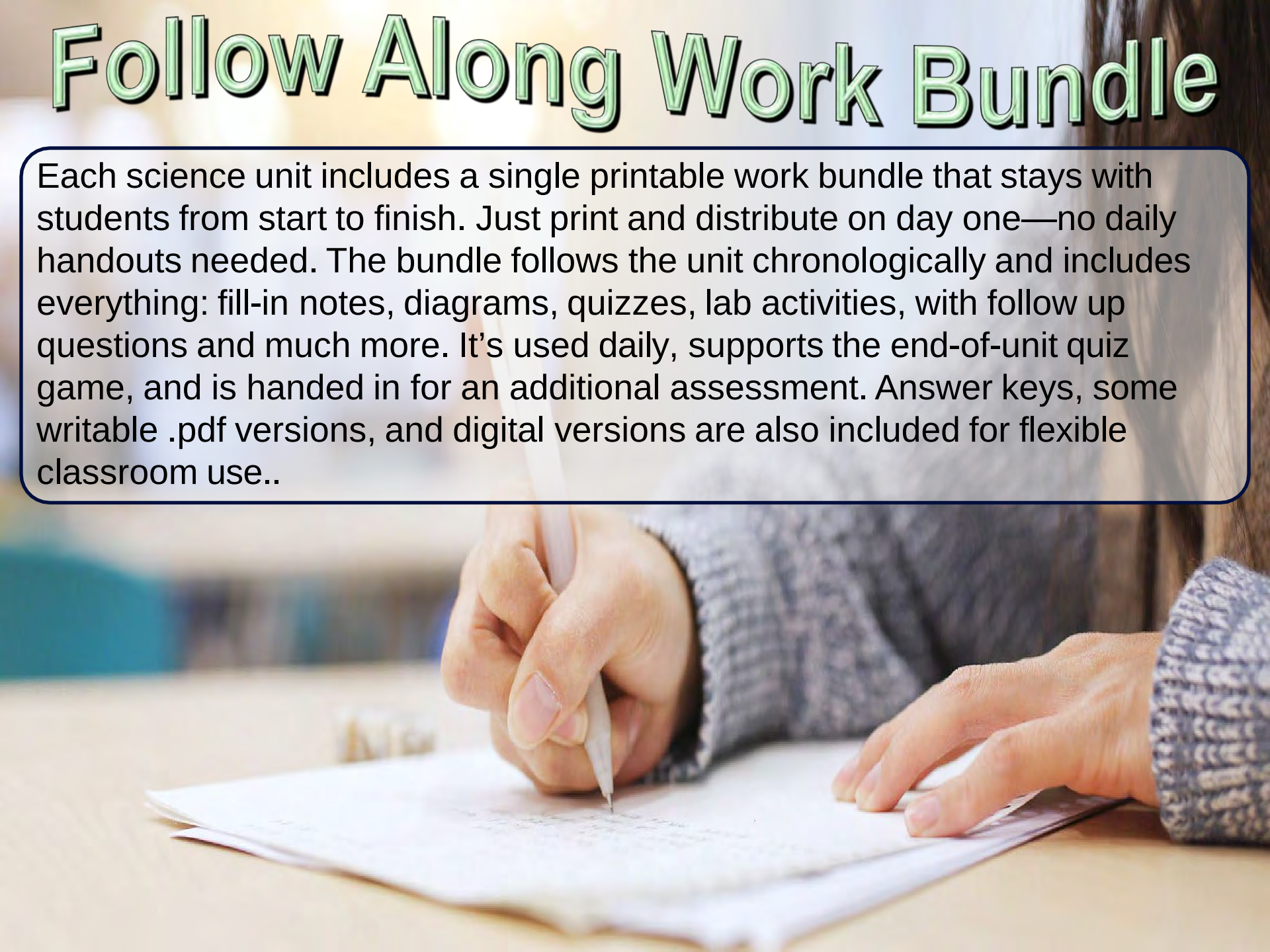


Part 2 Work Bundle Answers

Part 2 Work Bundle Print

Follow Along Work Bundle

Each science unit includes a single printable work bundle that stays with students from start to finish. Just print and distribute on day one—no daily handouts needed. The bundle follows the unit chronologically and includes everything: fill-in notes, diagrams, quizzes, lab activities, with follow up questions and much more. It’s used daily, supports the end-of-unit quiz game, and is handed in for an additional assessment. Answer keys, some writable .pdf versions, and digital versions are also included for flexible classroom use..



Part 2 Water Quality

Name:

Water Quality

This project will study the rivers

- Physical Properties
- Chemical Properties
- Biological Properties

Please provide as many examples as possible about rivers...

Physical Properties	Biological Properties	Chemical Properties

Physical and Chemical Data Sheet

What are the GPS coordinates for the site?	Does the river appear to be a Headwater, Downriver, Floodplain, Mouth/Delta	What physical features of the river can you identify?
Is the water moving? How long does it take an object to travel 10 meters. Distance / Time = Speed	What is the color of the River? Is it full of sediment? Use a Seechi Disk to determine turbidity if possible.	What does the bottom of the river look like?

What is the water temperature? Degrees Celsius.	Is the water navigable? In a boat with motor, kayak, etc. Can you swim in it?	Is the water fishable and drinkable?

Cross-Section of the River (Depth in feet) and width. Every Foot is a square. Or make each square two feet if river is wider.

Observations of the River.

STREAM DISCHARGE DATA SHEET

Please check the box next to the "Site #" *if this is a new site and please be sure to attach a map.* (PLEASE PRINT)

☐ Site # _____ Stream _____ County _____

Site Location _____

Date ___/___/___ Time (military time) _____ Rainfall (Inches in last 7 days) _____ Water Temp. (°C) _____

Trained Data Submitter (responsible volunteer) _____ Stream Team Number _____

Participants _____

Instructions for Calculation of Stream Discharge (Flow)

Step 1a: Determine stream width. Select a section of stream that is relatively straight, free from large objects such as logs or large boulders, with a noticeable current, and with a depth as uniform as possible. Stretch the tape measure provided by the program across the stream. The "0" point should be anchored at the wetted edge of the stream. The end of the tape measure should be anchored at the opposite end so that it is taut and even with the other wetted edge.

☐ Stream Width (Feet)

Step 1b: Determine stream cross-sectional area. The first step in determining cross-sectional area is to measure and calculate the average stream depth. In the table below, for streams less than 20 feet wide, record depth measurements at every foot. For streams greater than 20 feet wide, record depth measurements every two feet. The depth must be measured in **tenths of a foot** (e.g. 1.7 feet equals one foot and seven tenths). **DO NOT MEASURE DEPTH IN INCHES.**

Record Depth at 1-Foot Intervals

Interval Number	Depth in Feet	Interval Number	Depth in Feet	Interval Number	Depth in Feet
1		11		21	
2		12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	
Sum		Sum		Sum	

The average depth is calculated by dividing the sum of the depth measurements by the number of intervals at which measurements were taken.

☐ Sum of Depths (Feet) ÷ ☐ Number of Intervals = ☐ Average Depth (Feet)

The final step in calculating the cross-sectional area is to multiply the average depth (in feet) by the stream width (in feet) at the point where the tape measure is stretched across the stream.

☐ Average Depths (Feet) X ☐ Stream Width (Feet) = ☐ Cross Sectional Area (Feet)²

Step 2: Determine the average velocity for the stream. **For a stream less than ten feet in width,** select three points in the stream approximately equal distances apart for velocity measurements. **For streams greater than ten feet in width,** no fewer than four velocity measurements should be taken at approximately equal distances across the stream. For example, if the stream were eight feet wide, then velocity measurements would be taken at approximately two foot intervals across the stream in order to derive three measurements. If the stream were sixteen feet across, then velocity measurements would be taken at approximately three foot intervals across the stream in order to derive four measurements. This method of measuring the stream velocity will insure that velocity measurements are recorded for the slow and fast portions of the stream.

Once you have determined the number of velocity float trials you need to complete, measure the water's surface velocity in the following manner. Select two points located equal distance upstream and downstream from the tape measure you have stretched across the stream. Determine the distance between these two points and record this value (in feet) in the **Distance Box** on the back of this page. Count the number of seconds it takes a mutually buoyant object (such as a wiffle practice golf ball) to float this distance. Record this time (in seconds) in the table on the back of this page for each float trial you complete.

Velocity Float Trials	
Trial Number	Time (Seconds)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Sum	

Distance Box

Distance Floated (in Feet)

The next step in calculating the surface velocity is to determine the average float time. Average float time is equal to the sum of the float times (in seconds) divided by the number of float trials.

[ ] ÷ [ ] = [ ]

Sum of Float Times (Seconds) | Number of Trials | Average Float Time (Seconds)

The final step is to divide the distance floated (from the **Distance Box** at top) by the average float time.

[ ] ÷ [ ] = [ ]

Distance Floated (Feet) | Average Float Time (Seconds) | Average Surface Velocity (Feet per Second)

Water in the stream does not all travel at the same speed. Water near the bottom travels slower than water at the surface because of friction (or drag) on the stream bottom. When calculating stream discharge, the water's velocity for the entire depth (surface to bottom) needs to be determined. Therefore, you must multiply the average **surface** velocity (from above) by a correction factor to make it represent the water velocity of the **entire stream depth.**

Choose the correction factor that best describes the bottom of your stream and multiply it by the average surface velocity to calculate the corrected average stream velocity.

Stream Bottom Type: Rough, loose rocks or coarse gravel: **correction value = 0.8**
Smooth, mud, sand, or bedrock: **correction value = 0.9**

[ ] x [ ] = [ ]

Correction Value | Average Surface Velocity (Feet per Second) | Corrected Average Stream Velocity (Feet per Second)

Step 3: Calculate the stream discharge. Multiply the cross-sectional area (Feet)² from **Step 1** by the corrected average stream velocity (Feet/Second) from **Step 2.**

[ ] x [ ] = [ ]

Cross-Sectional Area (Feet)² | Corrected Average Stream Velocity (Feet per Second) | Stream Discharge (Feet)³ per Second or Cubic Feet per Second (CFS)

Fish Present (Please Mark) **Yes** () or **No**()

PLEASE KEEP A COPY AND MAIL ORIGINAL DATA TO: VWQM Coordinator
Water Protection Program
Department of Natural Resources
PO Box 176
Jefferson City, MO 65102-0176

Water Quality Volunteer

Volunteer Monitoring - 12/15

Part 2 Chemical Testing

What is ppm? _____ _____ _____

Chemical Test	ppm (parts per million)	Water Quality -Excellent -Good -Medium -Poor/Fair
Alkalinity		
Ammonia		
Chloride		
Chlorine		
Chromium		
Copper		
Dissolved Oxygen (DO)		
Bio-Oxygen Demand (BOD)		
Iron		
Hardness		
Nitrate		
Phosphate		
pH		

CHEMICAL TESTING FOR RIVER

Group:

Please use the spreadsheef below to record the chemical data of the river.

Alkalinity: _____

_____

_____

Total Alkalinity in ppm _____.

Alkalinity levels of 100-200 ppm will stabilize the pH of a body water. 20-200 are found in freshwater.

Ammonia: _

_____

_____

Total ppm for Ammonia: _____ppm

Ammonia is usually present in low quantities (less than 1 ppm) in non-polluted, well oxygenated waters. It may reach 5 or 10 ppm in areas with low dissolved oxygen and large amounts of decaying matter.

Chloride _____

_____

_____

Total Chloride ppm:_____

Drinking water standards recommend a maximum chloride concentration of 250 ppm. Salinity is an important water quality measurement that is related to chloride. It is the total of all salts dissolved in water. The salt content of water affects the distribution of plant and animal life in an aquatic system, based on the amount of salt they can tolerate. Salinity can be calculated from the chloride concentration, and is usually expressed as parts per thousand 9ppt) ranging from 0ppt in freshwater up to 35 ppt in sea water.

Salt water info_____

Convert pm chloride to ppt salinity= ppt Salinity = (.oo1805 x ppm chloride) +0.03 ppt salinity =

Chlorine: _____

_____

_____

Chlorine ppm =_____

Chlorine should not be present in natural bodies of water. Swimming pools have a level of chlorine around 1-3 ppm. Drinking water should have a level of below .5 ppm. High levels of chlorine are fatal to aquatic plants and animals.

Chromium:

_____

_____

_____

Chromium ppm:_____

Chromium levels over .5 ppm are evidence of pollution from untreated or incompletely treated waste.

Copper: _____

_____

_____

Copper ppm:_____

The copper content of drinking water is generally below .03 ppm but occasionally ranges up to .6 ppm in some areas. Concentrations above 1 ppm gives water a bitter taste and causes staining.

Dissolved Oxygen (DO)

_____

_____

Dissolved Oxygen (DO) ppm_____

Aquatic organisms require difference amounts of dissolved oxygen. Dissolved oxygen levels below 3 ppm are stressful to most aquatic organisms. Dissolved oxygen levels below 2 or 1 ppm will not support fish. Levels of 5 to 6 ppm are usually required for the growth of and activity of aquatic organisms.

Biological

Fecal coliform, bio-indicators EPT's and the PTI index.

What is a Benthic Macroinvertebrates? _____

_____

Most of the insects that we see actually live most of their life in the water.
They emerge from the water to complete their life cycle.

Biological: The following live only in unpolluted waters with high levels of dissolved oxygen

- E- Ephemoptera (Mayfly)
- P- Plecoptera (Stonefly)
- T- Tricoptera (Caddisfly)
- Megaloptera (Hellgrammite)
- Coleoptera (Waterpenny)
- Gilled Snail

Please correctly identify the following benthic macro-invertebrates. Label the class (I. II. III)








Name the Class and Benthic Macroinvertebrate

Quiz 1-20 Name that Benthic Macro-Invertebrate.

- Teacher to decide if you can use your sheet.

1)	2)	3)	4)
5)	6)	7)	8)
9)	10)	11)	12)
13)	14)	15)	16)
17)	18)	19)	20)

Group I: Generally sensitive to pollution. Large numbers of these types of organisms normally indicate GOOD WATER QUALITY.


Water Penny Beetle Larva


Riffle Beetle Adult


Mayfly Nymph


Stonefly Nymph


Gilled Snail
(has a thin, horny plate to seal shell opening)


Hellgrammite & fishfly larva


Non-Net-Spinning Caddisfly Larva

Group II: Can exist under a wide range of water quality conditions. Large numbers of these organisms, in the absence of Group I organisms, normally indicate MODERATE WATER QUALITY.


Damselfly Nymph


Cranefly Larva


Crayfish


Aquatic Sowbug


Scud


Alderfly Larva


Net-spinning Caddisfly Larva


Clams & Mussels


Beetle Larvae

Group III: Generally tolerant of pollution. Large numbers of these types of organisms normally, in the absence of Group I and Group II organisms, indicate POOR WATER QUALITY.


Blackfly Larva


Midge Larva


Leech


Aquatic Worms


Other Snails (Not Gilled)

Water Quality Rating

To calculate the index value, add the number of **letters** (not numbers of macros) found in the three groups on the other side and multiply by the indicated weighing factor.

Group I – Sensitive

R (Rare) = 1 to 9 organisms found in the sample — (# of R's) x 5.0 = _____
C (Common) = 10 to 99 organisms found in the sample — (# of C's) x 5.6 = _____
D (Dominant) = 100 or more organisms found in the sample — (# of D's) x 5.3 = _____

Sum of Index Value for Group I = _____

Group II – Somewhat Sensitive

R (Rare) = 1 to 9 organisms found in the sample — (# of R's) x 3.2 = _____
C (Common) = 10 to 99 organisms found in the sample — (# of C's) x 3.4 = _____
D (Dominant) = 100 or more organisms found in the sample — (# of D's) x 3.0 = _____

Sum of Index Value for Group II = _____

Group III – Tolerant

R (Rare) = 1 to 9 organisms found in the sample — (# of R's) x 1.2 = _____
C (Common) = 10 to 99 organisms found in the sample — (# of C's) x 1.1 = _____
D (Dominant) = 100 or more organisms found in the sample — (# of D's) x 1.0 = _____

Sum of Index Value for Group III = _____

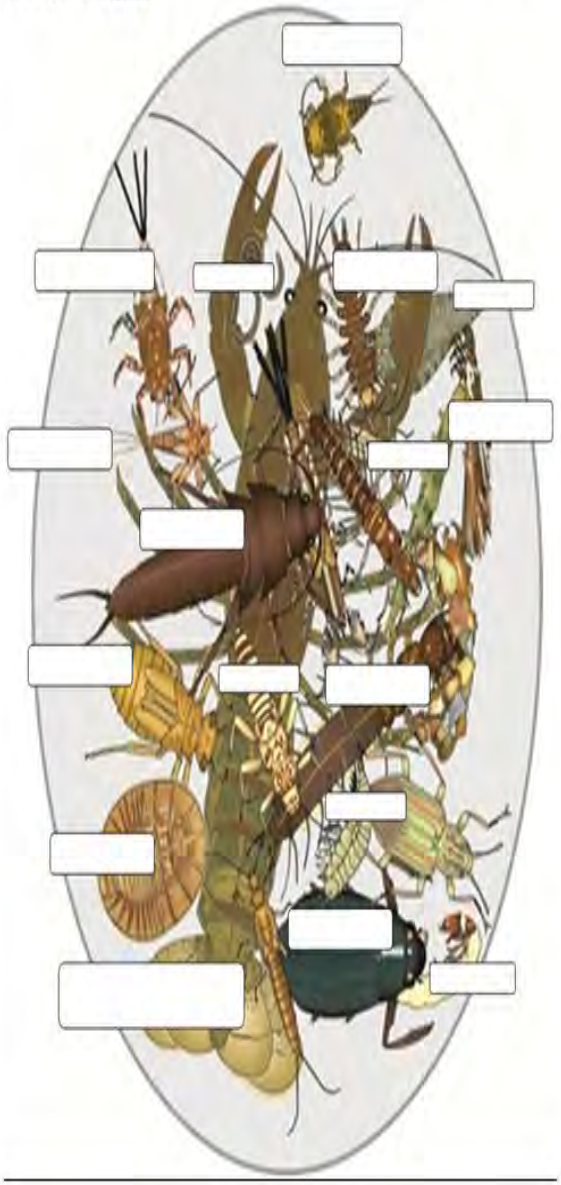
To calculate the water quality score for the stream site, add together the index values for each pollution tolerance group. The sum of these values equals the water quality score.

Water Quality Score = _____

Compare this score to the following number ranges to determine the quality of your stream site:

Good > 40 Fair 20 – 40 Poor < 20

Identify as many Benthic macro-invertebrates as you can from the sample below. Is the water healthy? Yes / No



_____

Vernal Pool: Seasonal wetland area that is dry and largely uninhabited for much of the year, until rains arrive and fill it with water; it teems with life again.

Use the vernal pool to tell about what's inside. Use pictures and text to support your answer. Which are Obligate, and which are Facultative Vernal Pool Species

Sketches / Identification of any life under the microscope / magnification.

Part 2 Review Game

Name:

Each Question 10 points; 5 point bonus

1)	6)
2)	7)
3)	8)
4)	9)
5)	

16

DISCUSSION

• Tell in one clear and concise sentence what your study found (remember, it is okay if you didn't find anything/….don't make it more than it was) • Support your findings with at least two cited sources (author, year) of other scientist who found the same thing as you. • Next, write down any interesting or unusual findings you found or observed during your study. • Next describe how your study could be improved or made more accurate (Can be things you would do differently next time, or hints to make the project easier). •Describe further studies that should be conducted to help get a better understanding of your investigation- Should be relevant to your study or your observations.

ACKNOWLEDGEMENTS

Short and sweet, thank everyone who made your study possible. Make sure to include all members of your group, and thank the school district for funding the study.

WORKS CITED

We will use APA format to cite sources. Please visit http://www.lib.usm.edu/research/guides/apa.html for questions not answered below.

Andrews, W. (1987) Investigating Aquatic Ecosystems. (Second ed., pp. 117-136). Canadian Cataloguing Publication of Data.

Water Quality Monitoring. (2004, October 19). Retrieved November 14, 2016, from http://boquetriver.org/adoptmonitor.html

Water Treatment Solutions. (n.d.). Retrieved December 5, 2016, from http://www.lenntech.com/rivers-pollution-quality.htm

15

-Entire paper is in the past tense

-Do not use 1st person (I, he, she them, names)

-Clear and concise/short and sweet

-Cite all sources (author,year). Example…(Smith, 2004) at end of sentence or Smith (2004) at beginning of sentence or (www.website.com) and finish sentence.

Use science terminology when possible (scientific name of the organism)

DETAILED TITLE OF YOUR INVESTIGATION

By

You and lab partner's full name

Andover Elementary and Middle School

Andover, New Hampshire

INTRODUCTION

• Write at least six introduction sentences that are relevant to your study (background information the reader needs to know about your study). These sentences should also include some cited information. Make sure to cite the author and the year (author, year) or (website www.website.com) then the rest of your sentence. • Then write this study investigates….(then the title of your investigation) • Next write down a sentence that states why this study is important to people and the ecosystem. This sentence requires that you gain background information and cite the source (author, year).

MATERIALS & METHODS

• Entire Paragraph is in the past tense • Provide a paragraph that describes the set-up of your investigation and reasons why it was set up that way. • Describe how the data was collected through your procedures and why you did it that way? • Last sentence describes how your data was analyzed. • Provide a very clear visual of your set up at the end of your methods. This could be a digital photograph (I will provide) or use a paint program.

Place visual here labeled figure 1.1 (could be digital picture, or by paint program)

Figure 1.1 Visual showing set up of experiment

RESULTS

Figure 1.2

•Show your data table here

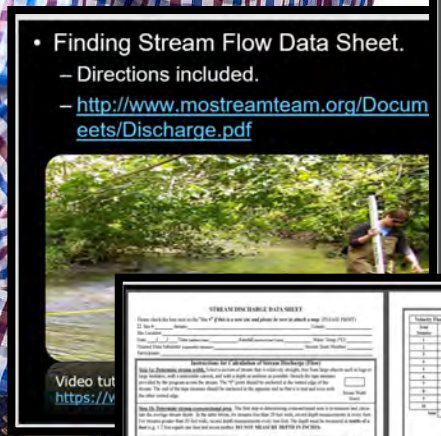
•Use a graphing program on the computer and cut and paste your spread sheet from excel.

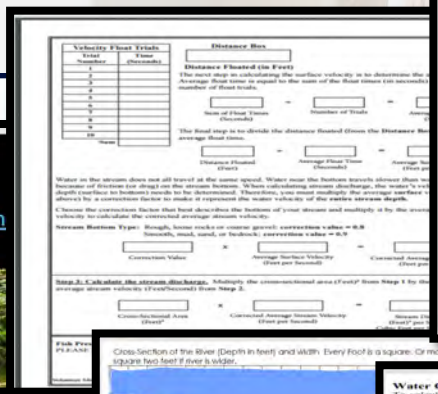
Figure 1.3

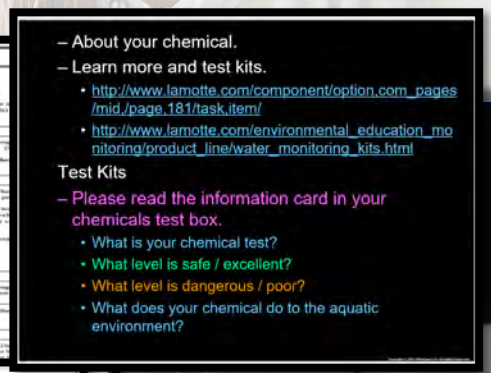
• Cut and paste your graph here (make sure each axis is labeled and you have a title that is relevant) Remember to use scientific names in the title.

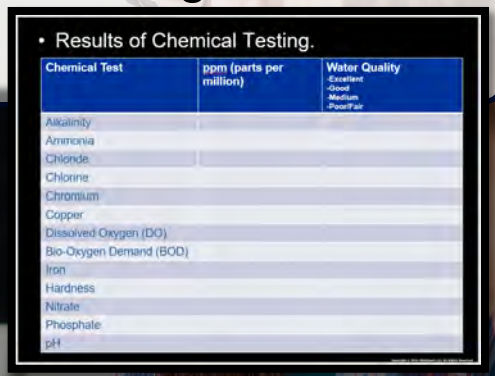
Activities / Labs

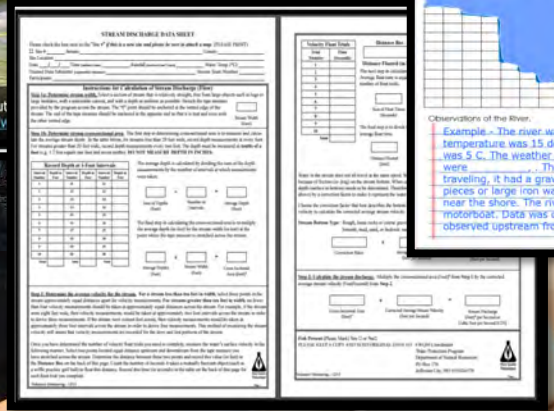
Our science activities are designed to help students explore and understand complex scientific concepts in an engaging and interactive way. Each science unit includes several hands-on activities that encourage students to collect data and think critically about the world around them. Our easy-to-follow slideshow provides detailed visuals, simple materials, and clear directions, making it easy for both students and teachers to navigate the activities.

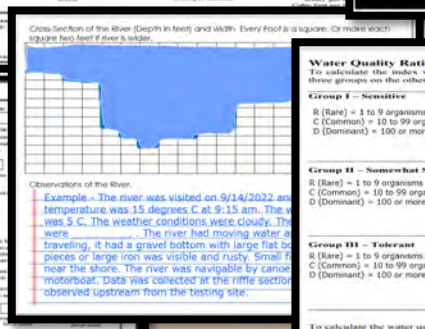


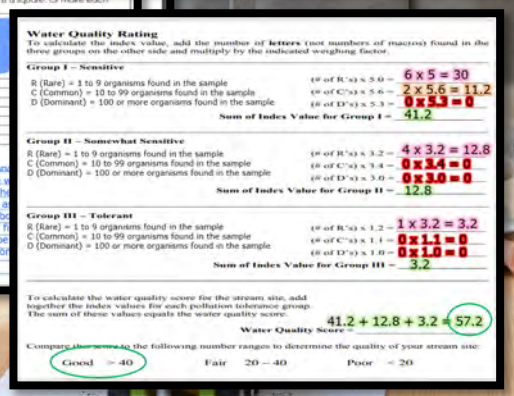


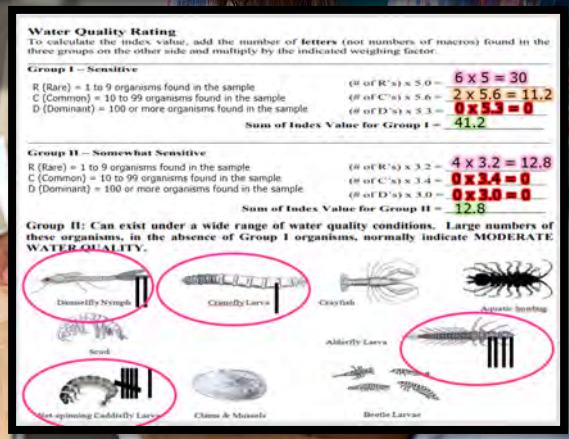






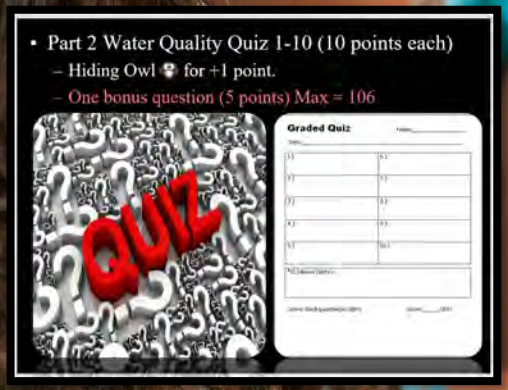


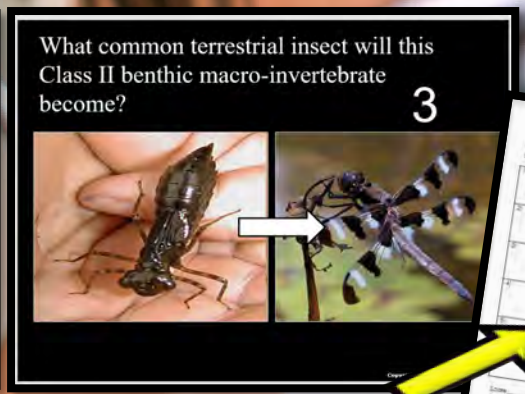


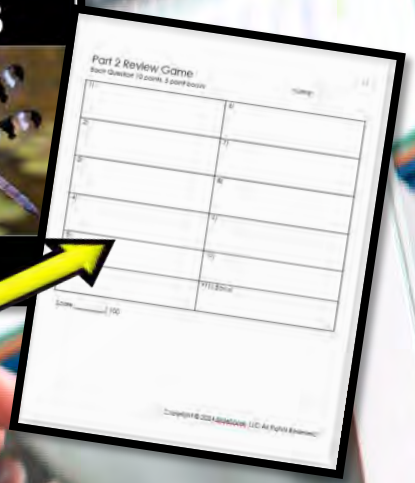


Built-in Assessment

Each unit contains several built-in assessment questions that students answer in their work bundle. With the question revealed before the answer, the teacher can easily call on individual students or table groups to respond. These provide an effective and efficient way for teachers to assess student learning.



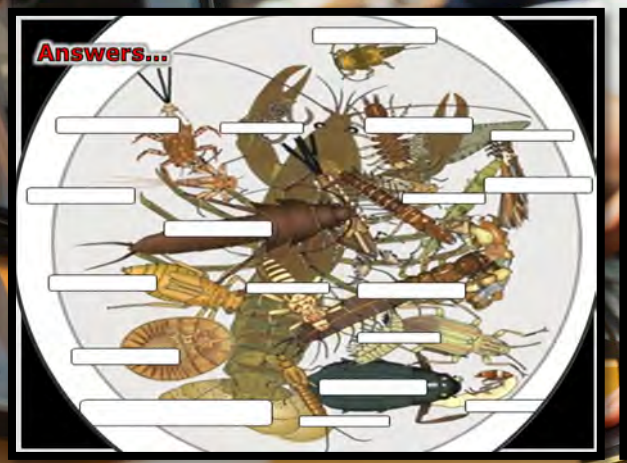


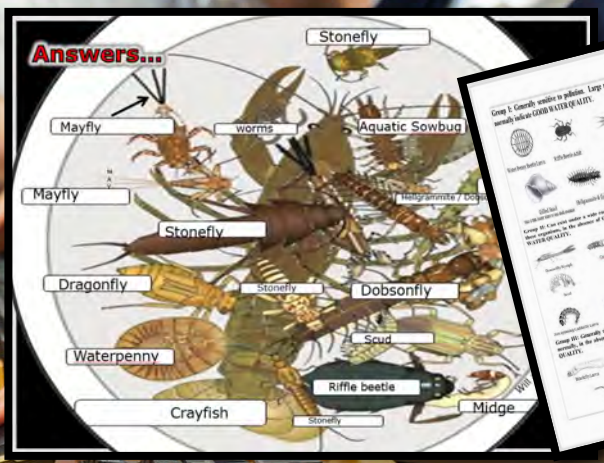


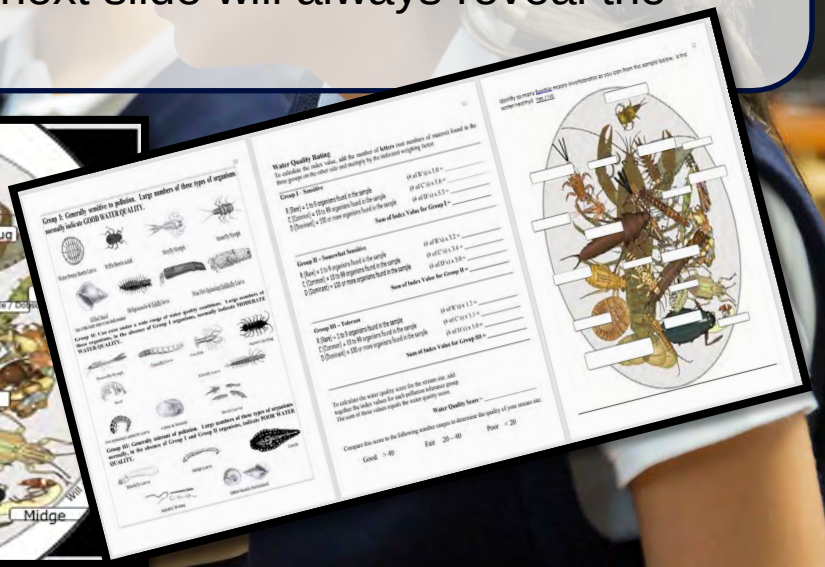
Questions in Work Bundle

Built-in Questions and Assessments

Many slides will have relevant terms covered with a box. When advancing through the slideshow an outline around the box will glow with a bright color. The next slide will make the box disappear. These slides allow the teacher to call upon students or table groups / check for understanding before advancing. The team at SlideSpark has found that using this technique helps to keep the students focused. Constantly recalling and reviewing information learned is necessary when moving through a large unit. The slideshows don't just give everything away for free. Students should be able to demonstrate knowledge before moving on. Some slides have full questions instead of just covered terms. In these slides, the teacher should encourage small group work. The teacher can then call upon one or two groups to share before advancing the slide. The next slide will always reveal the correct answer.

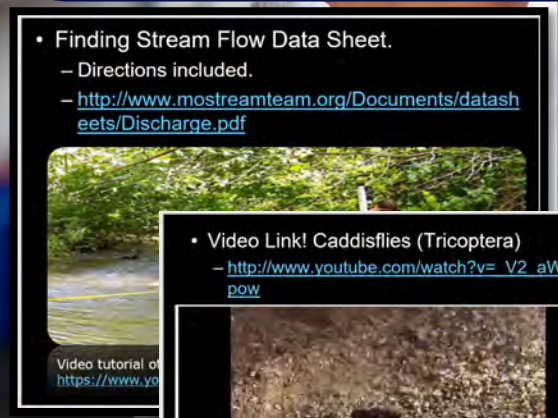


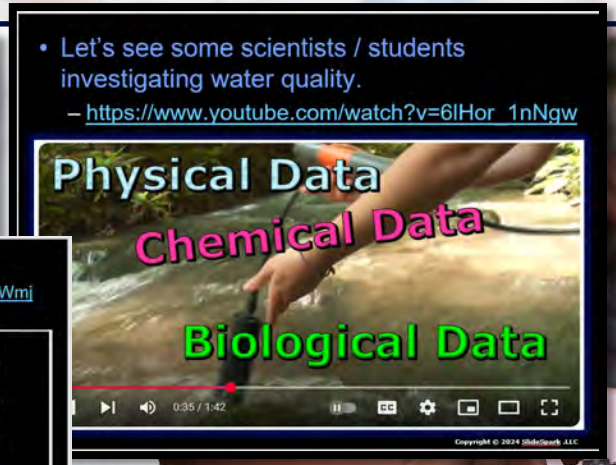


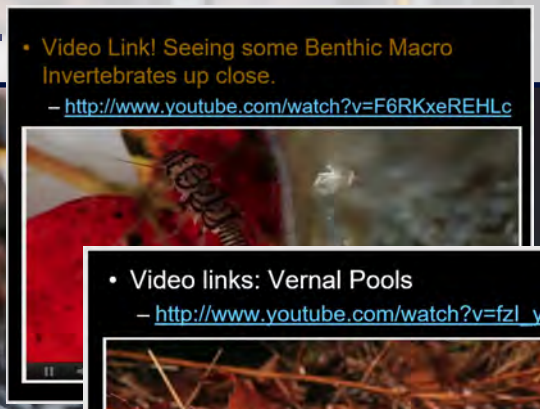


Built-in Video Links

Our science education program is designed with the modern, multimedia learner in mind, and our video links are a perfect complement to our educational materials. These short clips are embedded into the slideshow at just the right places for a fantastic review. Whether you're studying biology, chemistry or physics, our video links are an excellent way to reinforce your learning.

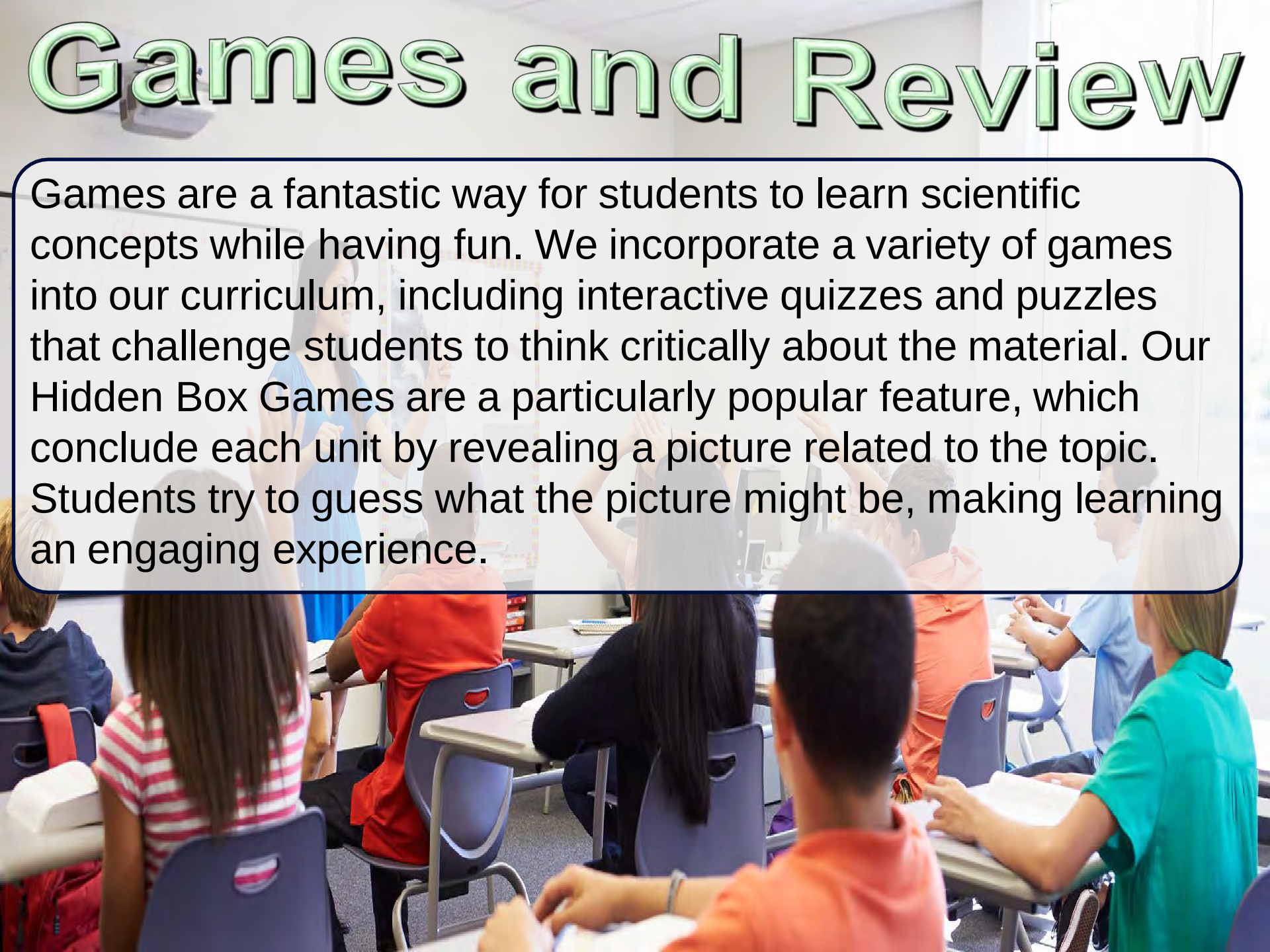


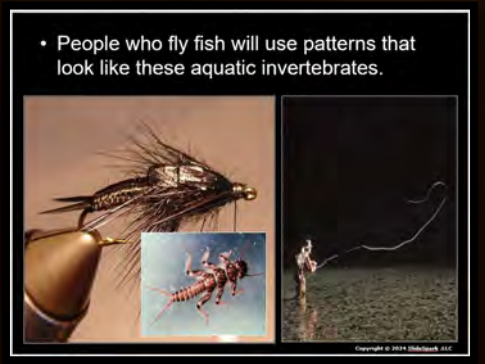


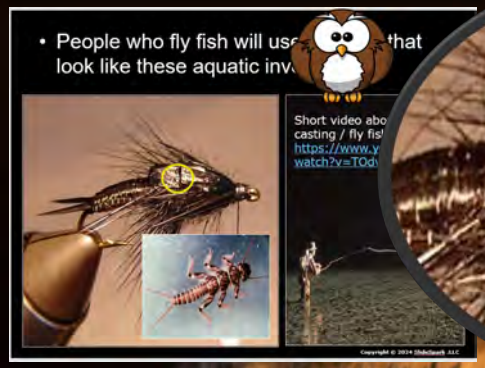


Games and Review

Games are a fantastic way for students to learn scientific concepts while having fun. We incorporate a variety of games into our curriculum, including interactive quizzes and puzzles that challenge students to think critically about the material. Our Hidden Box Games are a particularly popular feature, which conclude each unit by revealing a picture related to the topic. Students try to guess what the picture might be, making learning an engaging experience.



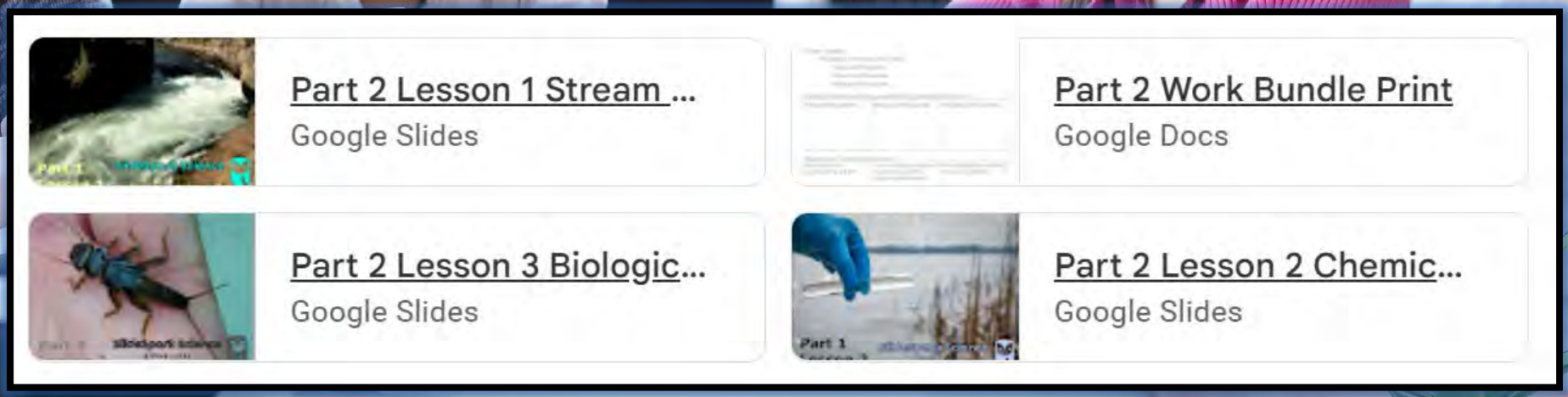




The Owl - Each Part of the slideshow has a small clipart Owl hiding somewhere in a slide. The owl is incredibly small and blended into just the right slide. If a student spots the “Owl” they can raise their hand high into the air. When you call upon the student they can say “Owl" and be the student who spotted the Owl. Each PowerPoint Review game also has an owl hiding in it worth one point. Remind the students that they secretly write the word "owl" rather than yell it out during the review games. The Owl search is not included in every lesson. A slide at the beginning of the lesson will alert the students that today is an “Owl’ day. Everything arrives editable so delete if you wish. You will find that some students will become the expert owl hunters in the group.

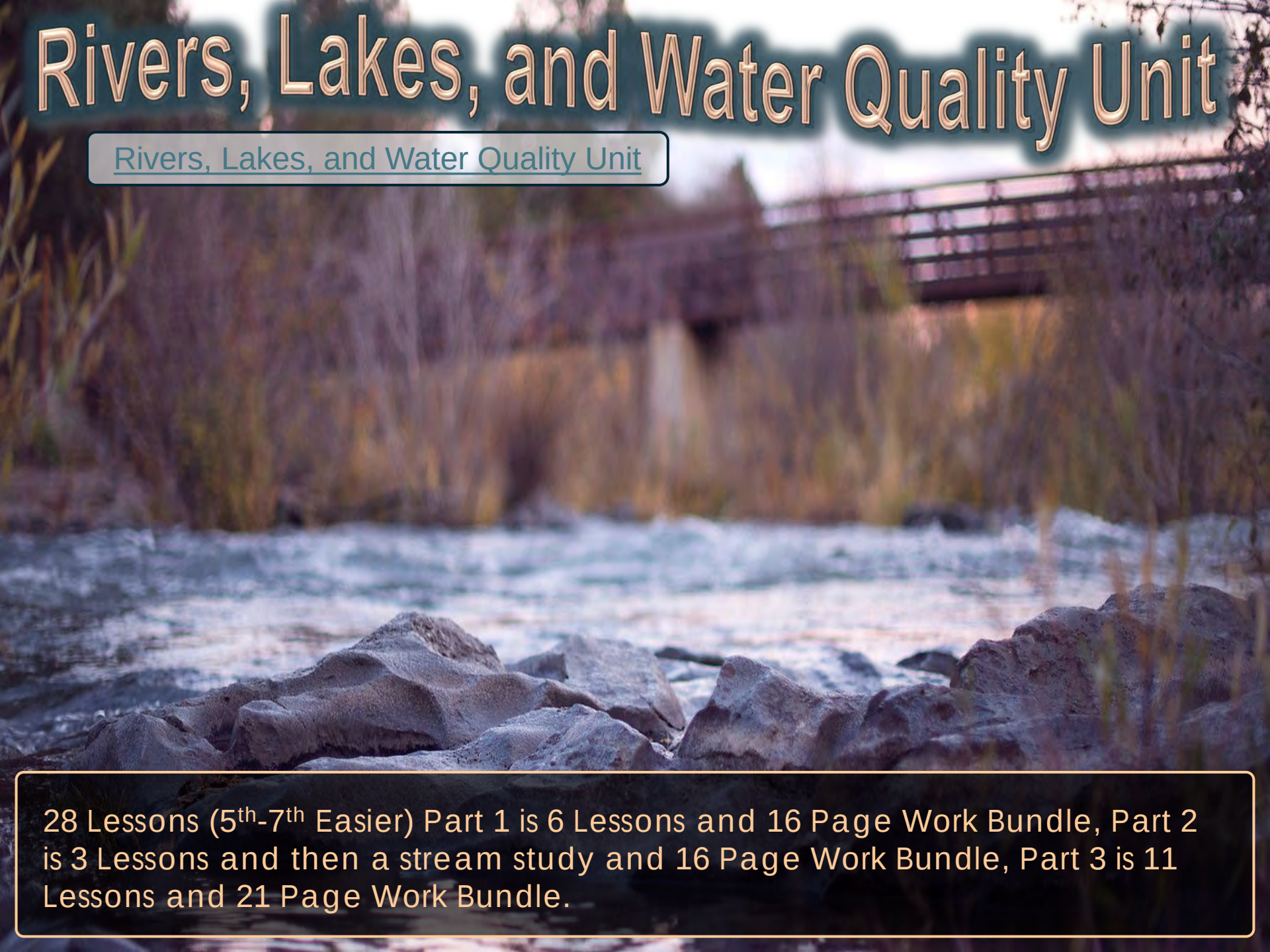
Google Classroom Compatible

Our digital learning programs are designed for students to learn science in a flexible and engaging environment. Our Google Classroom-compatible units provide a seamless learning experience whether your students are in the classroom or learning from home. Our step-by-step slideshows and student work bundles ensure that students can complete their work independently. The PowerPoint Slideshows and step-by-step work bundles can easily be loaded to your Google Drive and posted in your Google Classroom. These are great for daily lessons, students who need additional time, and for a student who was absent and looking to catch up in their work bundle.



Rivers, Lakes, and Water Quality Unit

Rivers, Lakes, and Water Quality Unit



28 Lessons (5th-7th Easier) Part 1 is 6 Lessons and 16 Page Work Bundle, Part 2 is 3 Lessons and then a stream study and 16 Page Work Bundle, Part 3 is 11 Lessons and 21 Page Work Bundle.

Part 1: Rivers and Watersheds: Watersheds, Making a Watershed Activity, Major Rivers of the United States, Parts of a River, Stream Order, Erosion, Transport, Deposition, Parts of a River, Headwaters, Downriver, Floodplain, Mouth / Delta, Design a River from the Mtns to the Ocean Class Activity, Meanders, Cutbank, Point bar, Riffles, Oxbow Lakes, Old-channels, Braided Stream, Alluvial Fan, Terraces, Riparian Areas, Importance of Riparian Areas, Stream Table Activity, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so students can Self-Assess

Part 2: Water Quality: Water Quality, Physical Properties of Water, Chemical Properties of Water, Bio-Indicators of Water Quality Physical Properties of Water Quality, Stream Discharge and Data Collection, Chemical Testing of Water Quality Sheet, Biological Testing, Benthic Macroinvertebrates, (EPT richness),Identifying Macros and Collection, Writing a Stream Quality Assessment

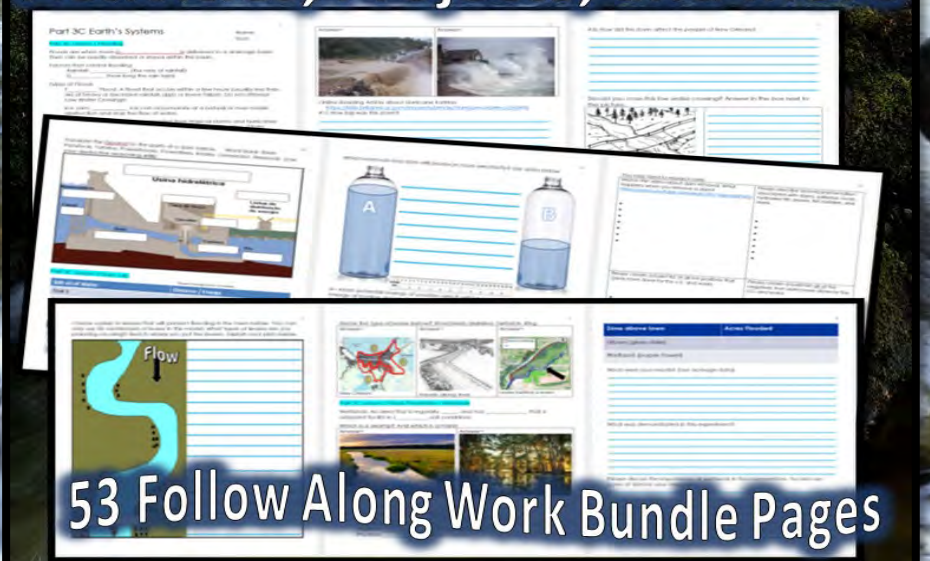
Part 3: Flooding, Levees, Dams, Wetlands, Salmon : Flooding, Factors that Control Flooding, Types of Floods, Coastal Floods, Urban Floods, Flash Floods, Ice Jams, Case Study of Hurricane Katrina, Flood Prevention, Levees, Types of Levees, Levee Design Project, Importance of Wetlands, Wetlands vs. Urbanization Activity, Dams, Hydroelectric Dams, Aswan Dam Case Study, Parts of Dam, Locks and how they work, High and Low Head Dams and Activity, Positive and Negatives of Dams, Dam Debate Role Play Project, Salmon, Salmon Life Cycles, Salmon Case Study, Salmon Simulation Activity, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so students can Self-Assess

Rivers, Lakes, Water Quality Unit

20 + Lessons

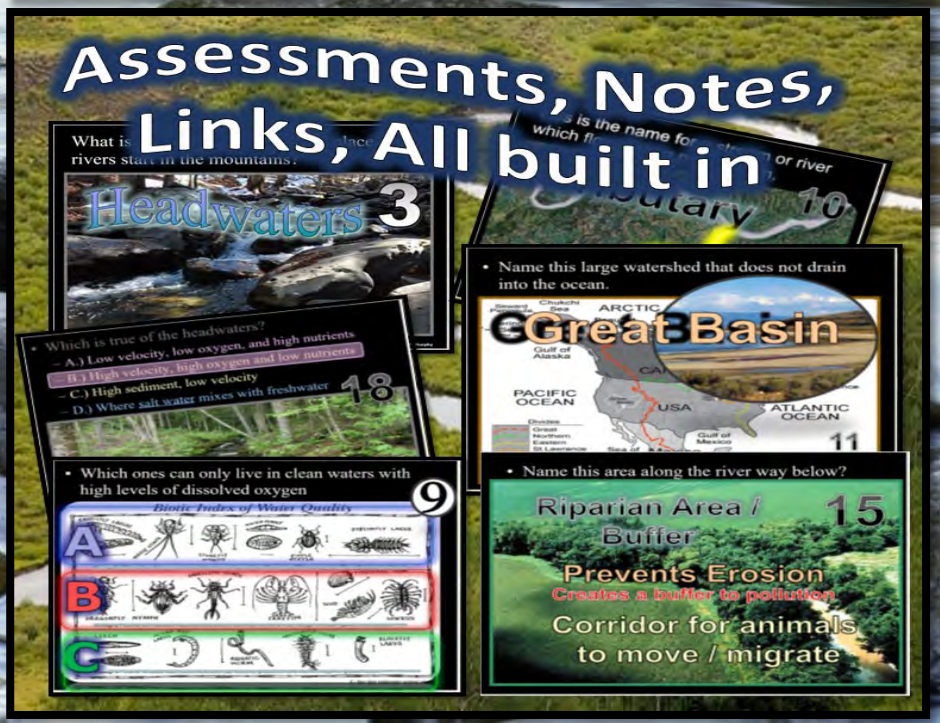
Amazing and Interactive Slideshows

Work Bundles, Hands-on Activities, Projects, and more



53 Follow Along Work Bundle Pages

Assessments, Notes, Links, All built in



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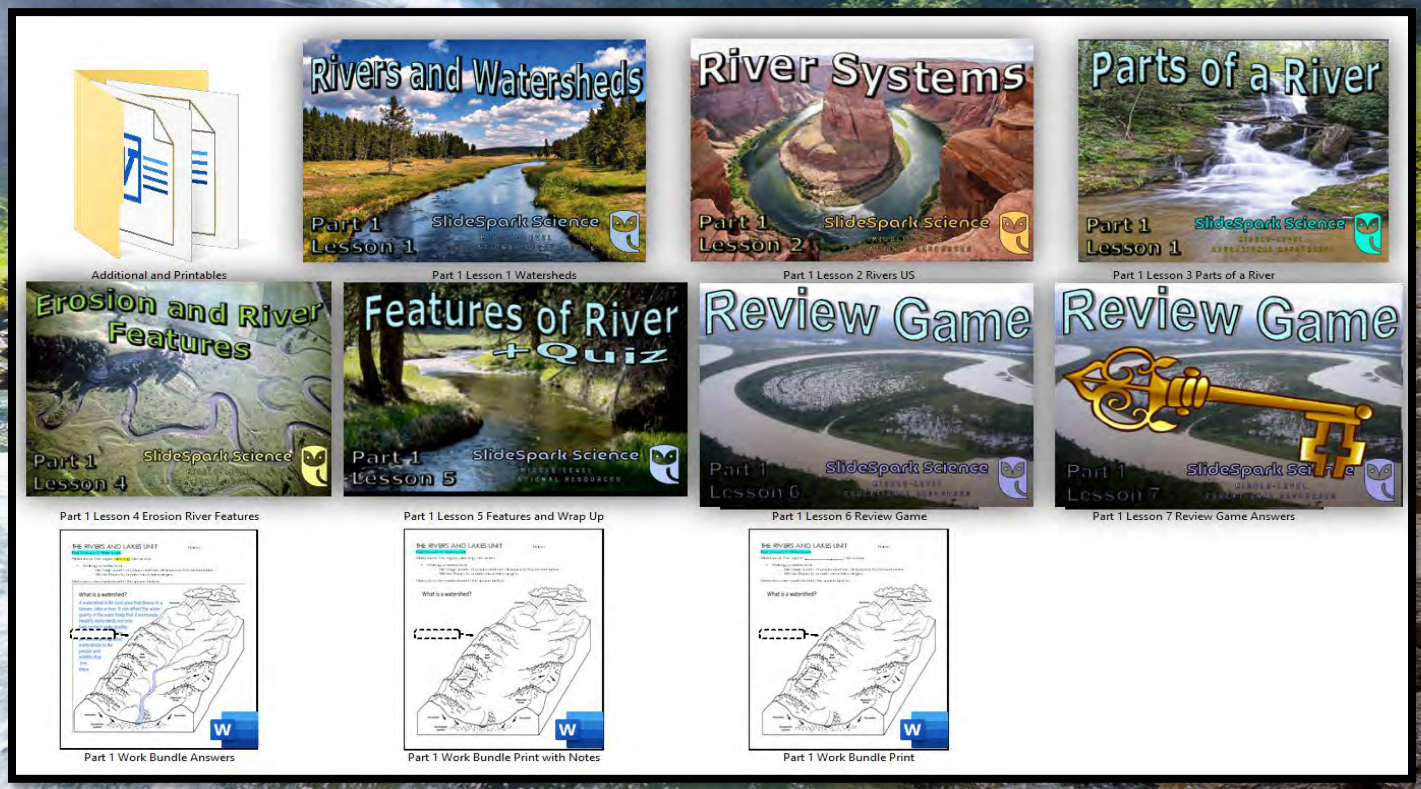
Part 1: Rivers and Watersheds



Part 2: Water Quality, Physical Properties of Water, Chemical Properties of Water, Bio-Indicators of Water Quality Physical Properties of Water Quality, Stream Discharge and Data Collection, Chemical Testing of Water Quality Sheet, Biological Testing, Benthic Macroinvertebrates, (EPT richness),Identifying Macros and Collection, Writing a Stream Quality Assessment

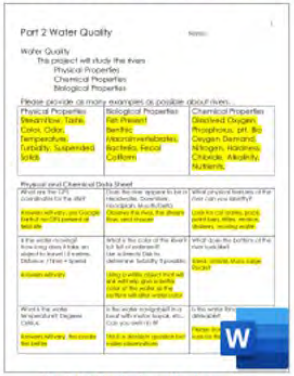
Part 2: Water Quality

Water Quality

Part 2 Lesson 1 Stream Flow

Part 2 Lesson 2 Chemical Testing

Part 2 Lesson 3 Biological Two Days



Part 2 Work Bundle Answers

Part 2 Work Bundle Print

Water Quality Unit Stream Study

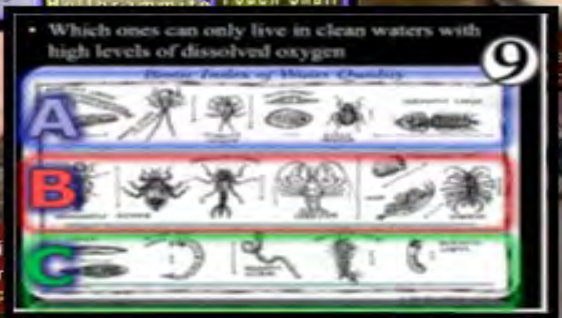
- Finding Stream Flow Data Sheet.
  - Directions included.
  - http://www.mostreamteam.org/Documents/datasheets/Discharge.pdf

Video tutorial other method (5 minutes).
https://www.youtube.com/watch?v=VgsMzlWlboQ

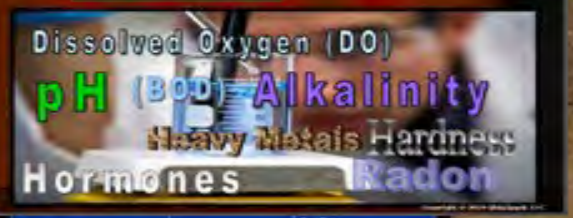
Benthic Macro-invertebrate class I

- Which is a picture of an adult damselfly?
  Zygoptera

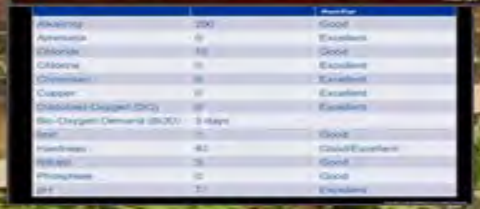
- Which ones can only live in clean waters with high levels of dissolved oxygen



- Water quali
  - Physical Pr
  - Chemical P



What three properties should be investigated when examining water quality? Physical, Chemical, Biological



- This is a picture of a stonefly (Plecoptera) Class I Benthic Macro-invertebrate.
- False! Mayfly (Ephemeroptera)

Interactive Slideshows

There's one part of pollution

Can you find the one part per million of pollution on the next slide.

- Benthic Macroinvertebrates.

Benthic: Living on the bottom

Macro: Large

Micro-Small

- Biological: The following live only in unpolluted waters with high levels of dissolved oxygen
  - E- Ephemoptera (Mayfly)
  - P- Plecoptera (Stonefly)
  - T- Tricoptera (Caddisfly)

EPT's

Who wants to tr... saying their name

  - Megaloptera (Hellgrammite)
  - Coleoptera (Waterpenny)
  - Gilled Snail

Learn more about benthic macro-invertebrates at...
http://www.dep.wv.gov/WWE/getinvolved/sos/Pages/Benthics.aspx

- The following can tolerate polluted waters and low dissolved oxygen content. (Class III)
  - Worms
  - Pouch Snails
  - Leeches
  - Midge Larvae
  - Cranefly Larvae
  - Black fly Larvae

- The following can tolerate polluted wa... and low dissolved oxygen content. (C...
  - Worms
  - Pouch Snails
  - Leeches
  - Midge Larvae
  - Cranefly Larvae
  - Black fly Larvae

- Biological
  - Fecal coliform, bio...

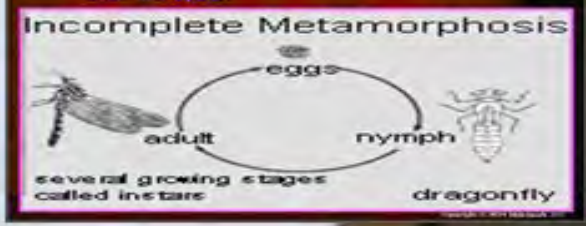
- Quiz 1-20 Name that Benthic Macro-Invertebrate.
  - Teacher to decide if you can use your sheet.

QUIZ

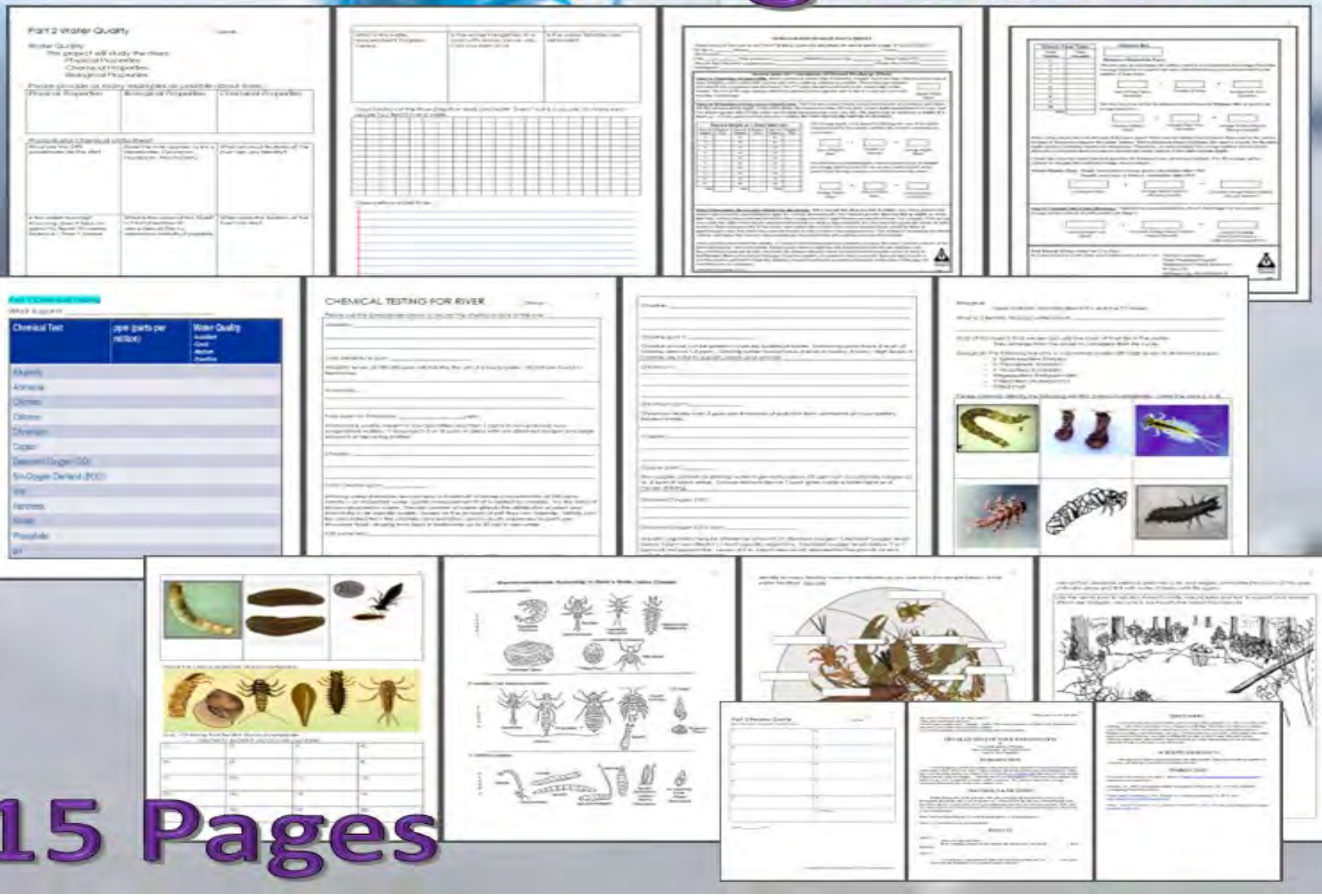
- Facultative Vernal Pool Species: Species that can use vernal pools for all or portions of their life cycle, but successfully complete their lifecycles in other water bodies.

- Vernal Pool: Seasonal wetland area that is dry and largely uninhabited for much of the year, until rains arrive and fill it with water; it teems with life again.

- Most of the insects that we see actually live most of their life in the water.
  - They emerge from the water to complete their life cycle.



Follow Along Bundle



15 Pages

Activities, Assessments, Keys and more all built-in

Part 3: Flooding, Factors that Control Flooding, Types of Floods, Coastal Floods, Urban Floods, Flash Floods, Ice Jams, Case Study of Hurricane Katrina, Flood Prevention, Levees, Types of Levees, Levee Design Project, Importance of Wetlands, Wetlands vs. Urbanization Activity, Dams, Hydroelectric Dams, Aswan Dam Case Study, Parts of Dam, Locks and how they work, High and Low Head Dams and Activity, Positive and Negatives of Dams, Dam Debate Role Play Project, Salmon, Salmon Life Cycles, Salmon Case Study, Salmon Simulation Activity,

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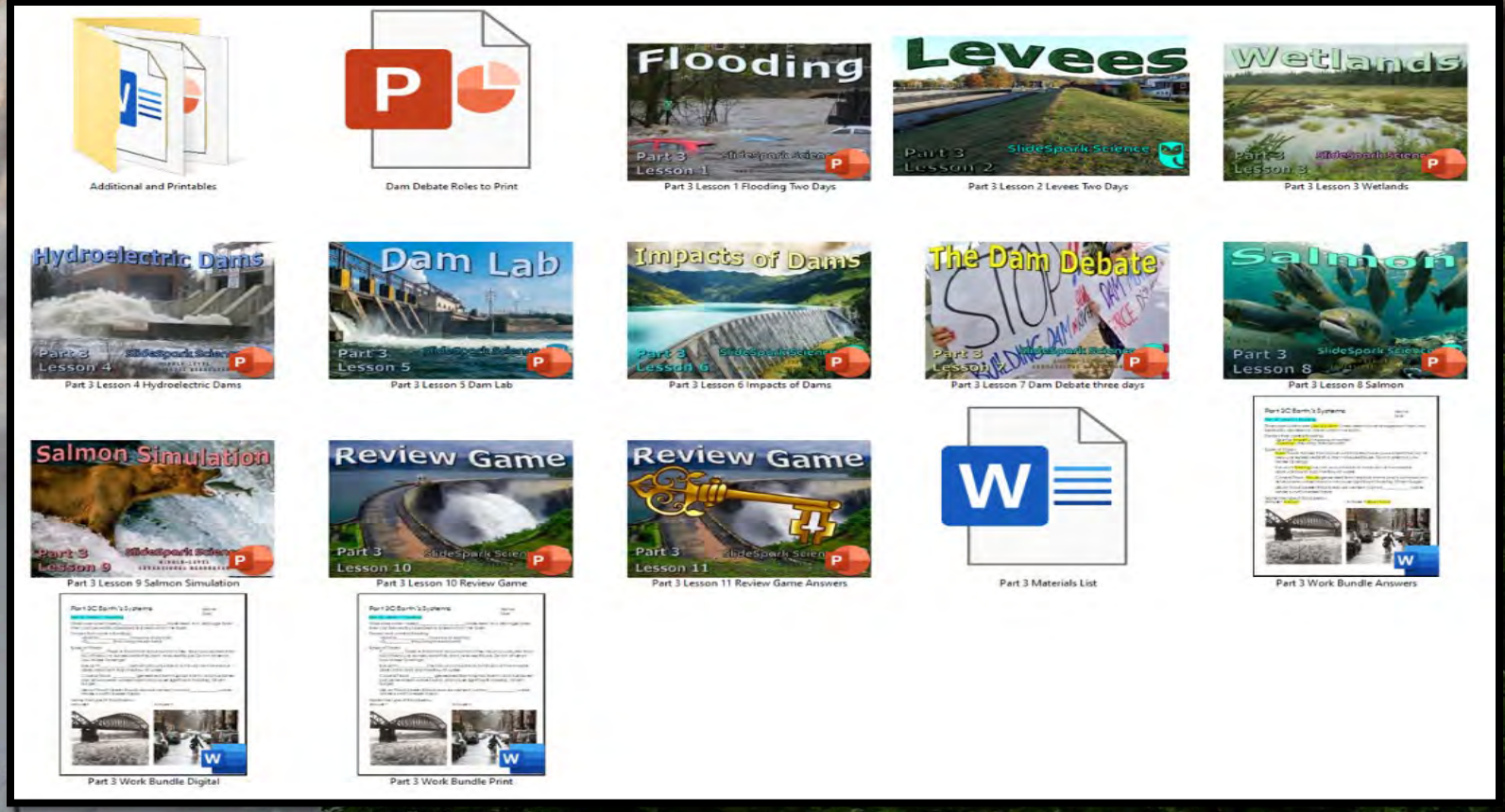
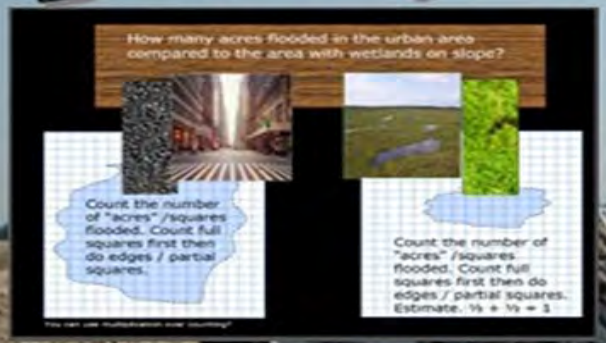
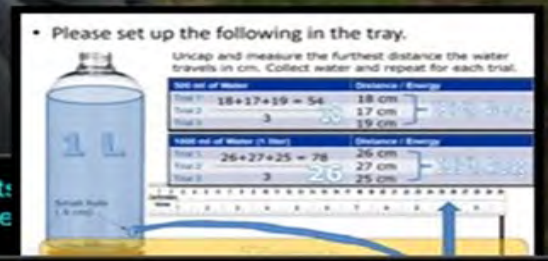
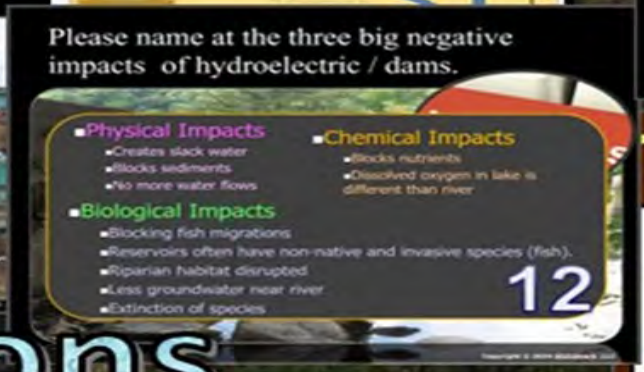


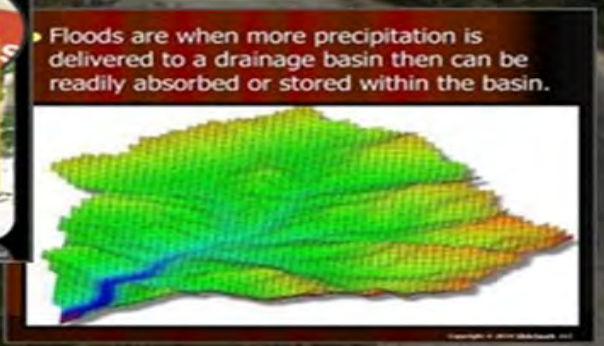
Flooding, Levees, Wetlands, Dams, Salmon, More Unit





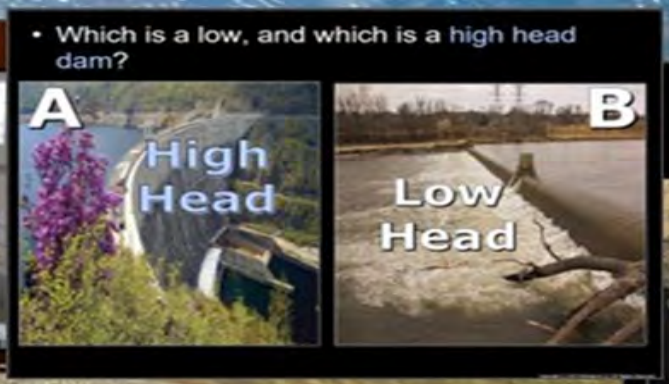
more money than all other natural disaste
combined.



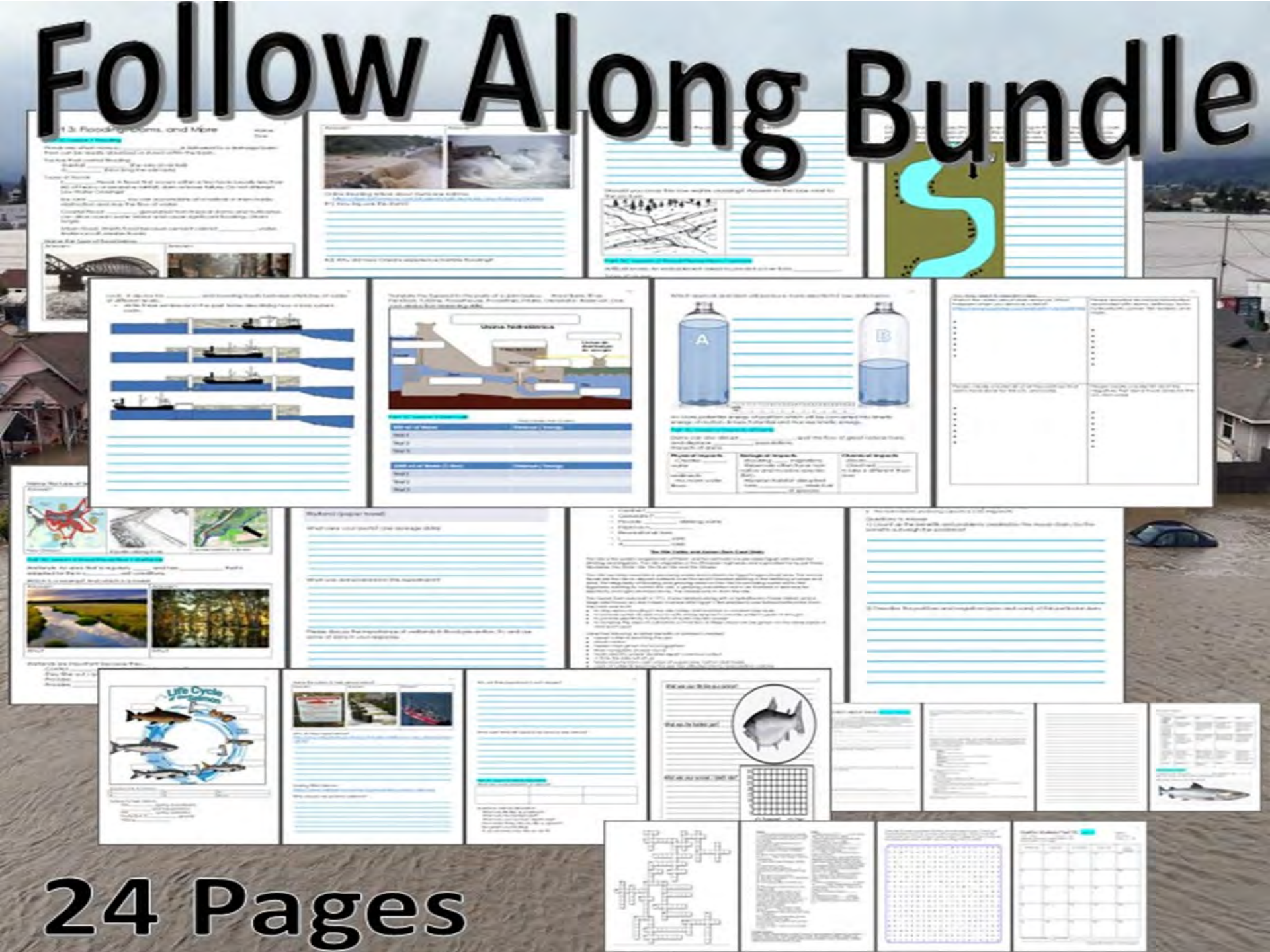


11 Lessons

Interactive Slideshows



Follow Along Bundle



24 Pages

Activities, Assessments, Keys, and more all built-in

- Biological Impacts
  - Blocking fish migrations
  - Reservoirs often have non-
    species (fish).
  - Riparian habitat disrupted
  - Less groundwater near river
  - Extinction of species

- Dams are accumulative.
  - If 5% of the salmon are lost at each dam, what % of juvenile salmon will even make it to the ocean?

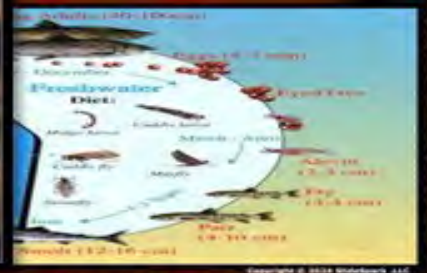
- Activity! The Dam De
  - You will role play, write, and present a persuasive speech about a dam proposal in a small town.

- Removing Dams
  - https://www.youtube.com/watch?v=VipVo8zPH0U

- Chemical Impac
  - Blocks nutrients
  - Dissolved oxygen in lake is different than river

- Wetlands: An area that is regularly wet and has vegetation that is adapted for life in saturated-soil conditions.

Fish born in freshwater
e ocean to grow into
eturn to freshwater to



Curriculum Guide

Number of Lessons in each unit (50 min, daily lessons) and difficult rating scale / intended grade level.

=Easier,


= More difficult,


=Most difficult

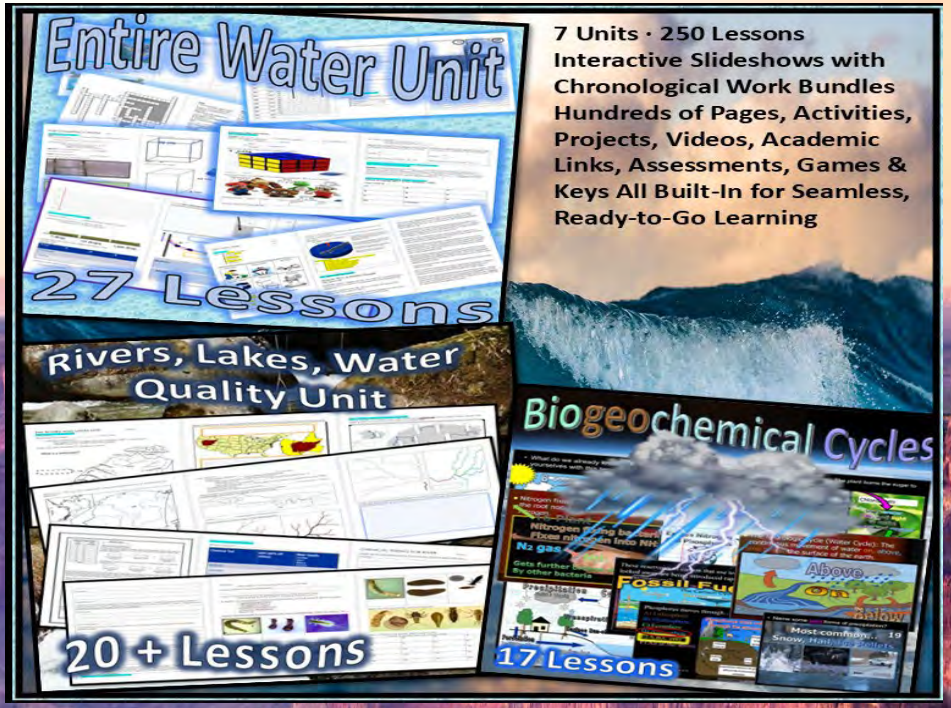
Earth Science Units	Daily Lessons	Intended Grade	
Geology Topics Unit	60 Lessons	6-8 medium difficulty	MORE DIFFICULT
Weather and Climate Unit	40 Lessons	6-8 medium difficulty	MORE DIFFICULT
Astronomy Unit	60 Lessons	6-8 medium difficulty	MORE DIFFICULT
Weathering, Soil Sciences	28 Lessons	5-7 easier	EASIEST
Rivers and Water Quality	25 Lessons	5-7 easier	EASIEST
Water Molecule Unit	20 Lessons	5-7 easier	EASIEST
Biogeochemical Cycles Unit	16 Lessons	5-7 easier	EASIEST

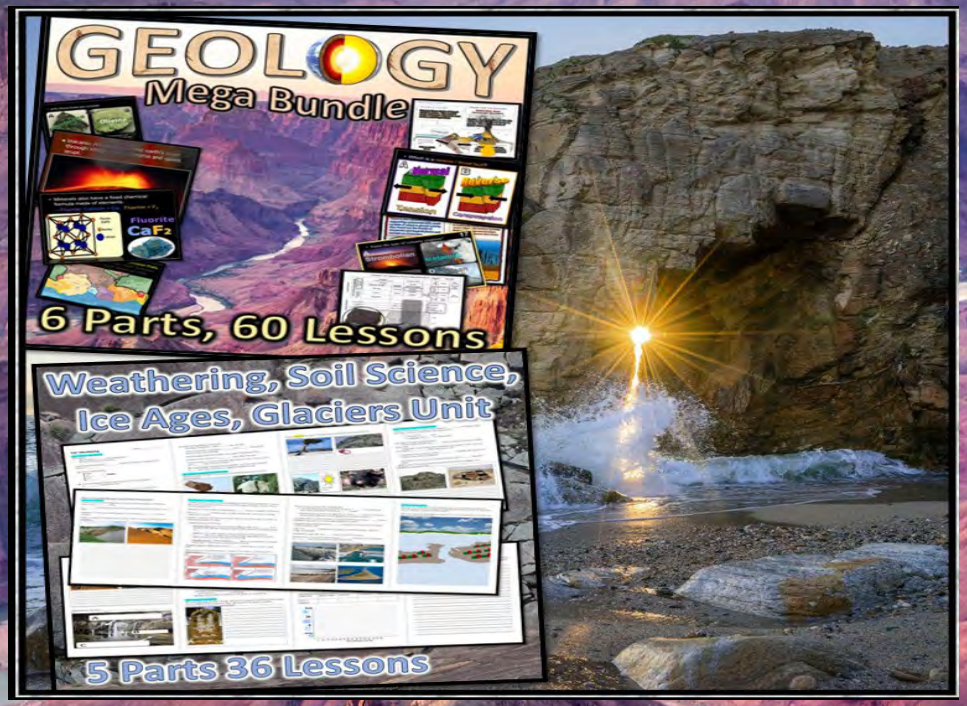
Earth Science Curriculum

Earth Science Curriculum

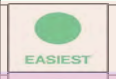
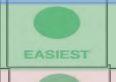
SlideSpark Science

MIDDLE-LEVEL EDUCATIONAL RESOURCES



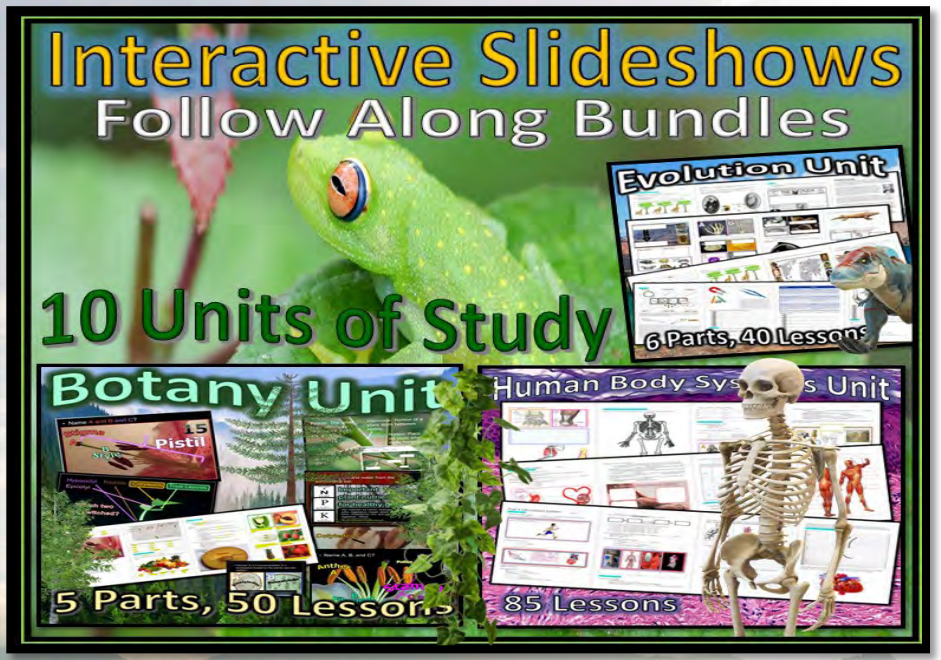


Life Science Units

	Daily Lessons	Intended Grade	
Ecology Feeding Levels Unit	13 Lessons	5-6 easier	
Ecology Interactions Unit	30 Lessons	5-6 easier	
Ecology Abiotic Factors Unit	13 Lessons	5-6 easier	
Botany Unit	50 Lessons	5-7 easier	
Evolution and Natural Selection	40 Lessons	5-7 easier	
Taxonomy and Classification	50 Lessons	6-8 medium difficulty	
Infectious Diseases Unit	30 Lessons	7-9 more difficult	
DNA and Genetics Unit	42 Lessons	8-10 most difficult	
Human Body Systems Unit	85 Lessons	6-8 medium difficulty	
Cell Biology Unit	30 Lessons	8-10 most difficult	

Life Science Curriculum


Life
Science
Curriculum
SlideSpark Science
MIDDLE-LEVEL
EDUCATIONAL RESOURCES


Interactive Slideshows
Follow Along Bundles
10 Units of Study
Evolution Unit
6 Parts, 40 Lessons
Botany Unit
5 Parts, 50 Lessons
Human Body Sys s Unit
85 Lessons


Cellular Biology Unit
Form Follows Function
30 Lessons of 50 minutes
DNA and Genetics Unit
40 Lessons
Infectious Diseases
30 Lessons


Taxonomy and Classification Unit
6 Parts
50 Lessons
Ecology Interactions Unit
30 Lessons
Ecology Feeding Le
Full Unit
Ecology Abiotic Factors Unit
27 Lessons

Physical Science	Daily Lessons	Intended Grade	
Laws of Motion and Machines Unit	33 Lessons	8-10 most difficult	
Matter Energy and the Environment	58 Lessons	7-10 medium difficulty	
Atoms and Periodic Table Unit	44 Lessons	8-10 most difficult	
Science Skills Unit	30 Lessons	5-7 medium difficulty	

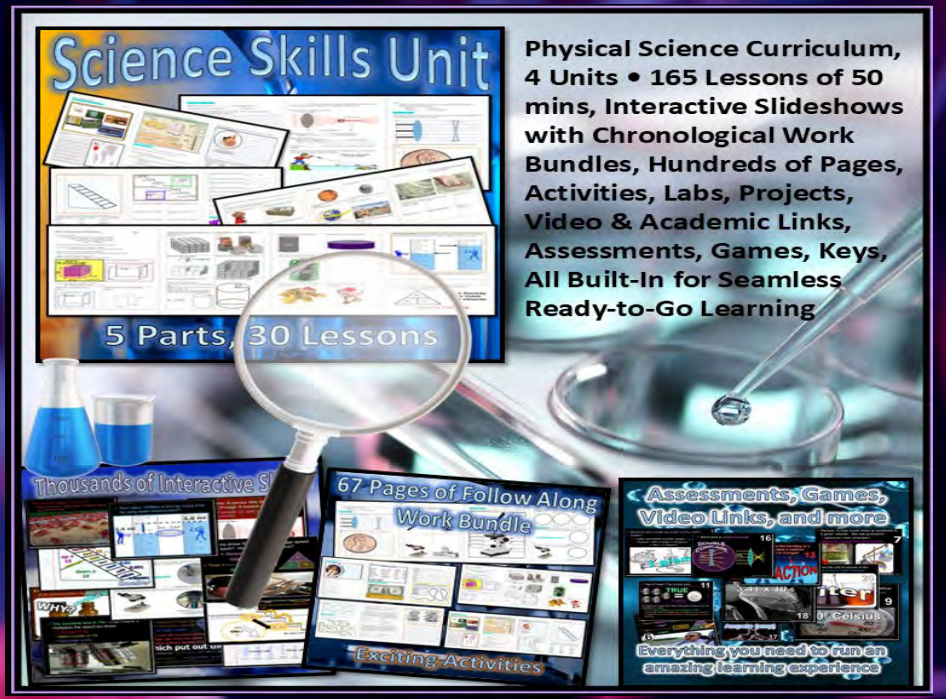
Physical Science Curriculum

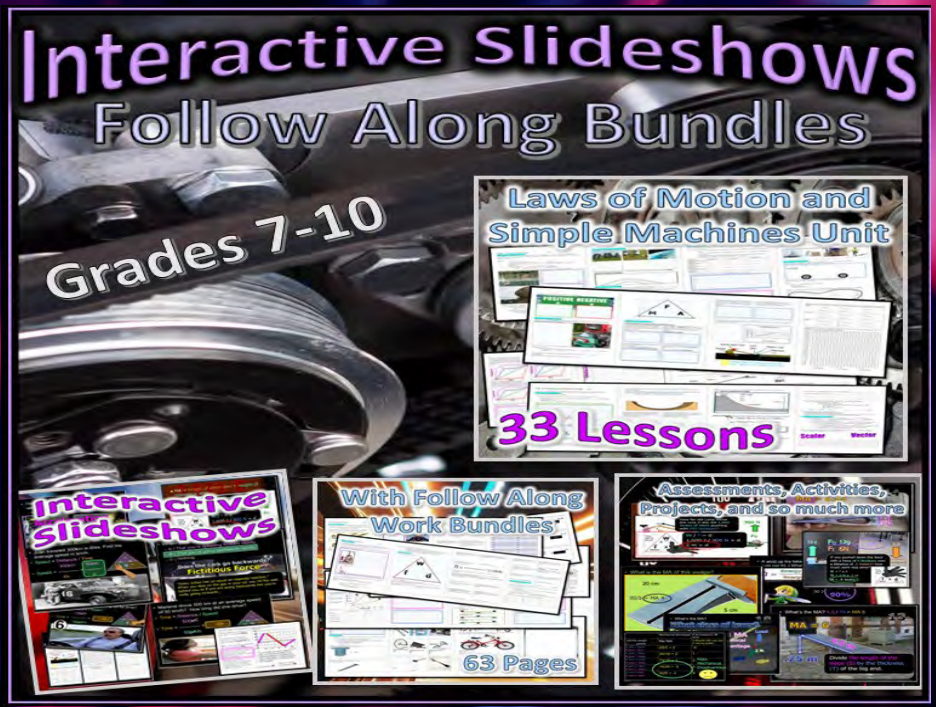
Entire SlideSpark Science Curriculum

Physical Science Curriculum

SlideSpark Science

MIDDLE-LEVEL EDUCATIONAL RESOURCES





Dear Valued Educator,

Our fully editable .pptx and .doc resources are perfect for educators looking to bring enthusiasm and creativity to their lessons. We encourage you to make changes to fit your needs and style. As science educators, we're committed to providing students with the tools they need to succeed in the classroom and beyond. Each unit in the curriculum includes a range of resources that have been developed through extensive research and use in a busy classroom. Our teaching approach is designed to make science education engaging and exciting for learners of all ages. We offer a one-of-a-kind science curriculum that will challenge, inspire, and educate students to become tomorrow's scientists and leaders. Join us today and learn more about how our program can help you achieve your classroom goals.

With appreciation,

Support@SlideSpark.net

Thank you for your time and interest in our Science curriculum. We strive to provide students with engaging and informative lessons that will spark their curiosity and encourage scientific exploration. Should you have any questions or concerns, please do not hesitate to contact us. Thank you again for considering our curriculum, and we wish you all the best in your educational journey.

Sincerely,

Support@slidespark.net

SlideSpark Science

MIDDLE-LEVEL

EDUCATIONAL RESOURCES

[SlideSpark Science on TpT]