Last Updated: July 2017

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Supply and Demand Gap Projects: Rebecca.Mitchell@state.co.us

Water Storage Projects: Anna.Mauss@state.co.us

Conservation, Land Use Planning: Kevin.Reidy@state.co.us

Education & Innovation Activities: Mara.MacKillop@state.co.us

Agricultural Projects: Gregory.Johnson@state.co.us

Environmental & Recreation Projects: Linda.Bassi@state.co.us

Applicants interested in submitting an 'Intent to Apply' in the future are encouraged to check here ☐ and fill in all sections with the best information available at the time. Exhibits excluded.

This "Intent to Apply" will help CWCB prioritize Projects that are not ready for fully completed Water Plan Grant Application due to the initial timeframe and deadlines required.

Water Project Summary

Name of Applicant	Colorado Foundation for Agriculture
Name of Water Project	*Understanding Water Activity Book*

CWP Grant Request Amount	$ 64,000.00
Other Funding Sources Lower Arkansas Water Conservancy	$1000.00
Other Funding Sources _____	$
Applicant Funding Contribution	$
Total Project Cost	$ 65,000.00

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Applicant & Grantee Information	
Name of Grantee(s)	Colorado Foundation for Agriculture
Mailing Address	PO Box 10, Livermore, CO 80536
FEIN	94-1177351
Organization Contact	Bette Blinde
Position/Title	Director
Email	bblinde@growingyourfuture.com
Phone	970 881-2902
Grant Management Contact	Bette Blinde
Position/Title	Director
Email	bblinde@growingyourfuture.com
Phone	970 881-2902
Name of Applicant (if different than grantee)	
Mailing Address	
Position/Title	
Email	
Phone	

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Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
The Colorado Foundation for Agriculture (CFA) is a 501(c)(3) not-for-profit educational corporation. It was formed in 1991 and took over responsibility for Colorado's Ag in the Classroom program. CFA produces and distributes educational materials on Colorado agriculture and natural resource topics to Colorado schools. It is the sole source provider of the *Colorado Reader* series and *Understanding Water Activity Book*. Materials are provided free to any Colorado educator who requests them. CFA has produced and distributed over seven million *Colorado Readers* ~ a student newspaper on agriculture and natural resources topics and has distributed over 100,000 *Understanding Water Activity Books.*

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Type of Eligible Entity (check one)	
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
X	**Non-governmental organizations (NGO):** Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

Type of Water Project (check all that apply)	
	Study
	Construction
	Identified Process or Program
X	Other: Education/outreach

Category of Water Project (check all that apply)		
	Supply and Demand Gap Projects - Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap. (Applicable Exhibit A Task(s) _____)	
	Water Storage Projects - Projects that facilitate the development of additional storage, artificial recharge into aquifers, and dredging existing reservoirs to restore the reservoirs' full decreed storage capacity. (Applicable Exhibit A Task(s) _____)	
	Conservation and Land Use Planning Projects - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. (Applicable Exhibit A Task(s) _____)	
x	Engagement & Innovation Projects - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application available on the website. (Applicable Exhibit A Task(s) _____)	
	Agricultural Projects - Projects that provide technical assistance and improve agricultural efficiency. (Applicable Exhibit A Task(s) _____)	
	Environmental & Recreation Projects – Projects that promote watershed health, environmental health, and recreation. (Applicable Exhibit A Task(s) _____)	
	Other	Explain:

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Location of Water Project	
Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	State of Colorado
Latitude	
Longitude	

Water Project Overview
Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain. The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.
This is an education project. It will update and print 40,000 copies of the *Understanding Water Activity Book*. These publications will be distributed to Colorado educators that request them. We anticipate 40,000 books will take three years to distribute. They will also be made available to the nine basin roundtables and the PEPO workgroup for use in their area. In addition the Understanding Water Activity Book will be converted to an online interactive publication. It will also be converted to an interactive E-Pub.

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Measurable Results		
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
	Quantity of Water Shared through Alternative Transfer Mechanisms	
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
x	Other	Explain: Distribute 8,000 to 10,000 Understanding Water Activity Books to classrooms each year for the next 3 years.

Water Project Justification
Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers). The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)
There's no shortage of work ahead for today's lawmakers, officials and various professionals when it comes to water in Colorado. But while the 2050 timeline is so often used in chalking up the tall task at hand for Colorado's decision makers, our state also has thousands of grade-school students who will outlive that year – with life expectancies outlasting that mark by decades – and who will face even more extreme challenges. Simply put, time can't be wasted in educating today's youth about water. That is precisely why the Colorado Foundation for Agriculture is submitting this proposal – seeking assistance to update, reprint and distribute its *Understanding Water Activity Book*, and it's the belief of the Foundation that the this project helps implement not only the education measurable objective in Colorado's Water Plan, but will help achieve the other seven objectives. In addition, this resource will help each basin achieve their Education Action Plans. Many basins reference outreach activities, including developing educational content. We can provide this content. The original Understanding Water Activity Book was developed through a grant from WQCD. Input and review was provided by Children's Museum, Colorado Water Conservancy, Denver Regional Council, Sierra Club, Colorado Department of Public Health & Environment, Central Colorado Water Conservancy District, Colorado River Water District, Colorado Department of Agriculture, Colorado Department of Education, Denver Post Newspaper in Education, Fort Collins Water Utilities, Northern Colorado Water Conservancy, CSU Cooperative Extension and Poudre School District. The Foundation's 76-page *Understanding Water Activity Book* not only informs students about the importance of water and discusses the challenges, but also works well with Full Option Science

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Water Project Justification

Systems (FOSS) kits that many teachers use today. In particular, many schools use *Understanding Water Activity Book* as their textbook on water for third- and fourth-grade students – to such an extent that the Foundation distributes between 10,000 and 12,000 each year, and has now exhausted its supplies. Among other aspects, the book – first published in 1998, and now in its third edition – covers the basics of water, then goes into the science behind water, its many uses, and the importance of protecting our limited supplies – all while making the experience fun, and also meeting Colorado's K-4 state standards. Lisa Carrol – a fourth-grade teacher who uses the curriculum at Denver's North Mor Elementary – stressed that "the *Understanding Water Activity Book* was easy for all of my students to read, no matter what their level. It was entertaining, informative and the kids didn't look at it as work."

Furthermore, there is specific documentation regarding the effects on third- and fourth- grade students – the age that the "Understanding Water" publication directly targets – in regards to education about water and the environment. Dr. Franz Bogner, a professor at the University of Bayreuth, in 2013 examined the implications of ages for environmental education and educators, through a program called "Water in Life – Life in Water." Dr. Bogner examined the impacts of the program on children ages 9 and 10 (third- and fourth-grade students) compared to children just slightly older, at 11-13 years old. Conclusions from the study were that the slightly younger pupils showed a stronger connectedness to nature and stronger pro-environmental attitudes than the older pupils, and it was also effective for the younger students six weeks after participation. With its long and deep understanding of this critical age group and water education, the Colorado Foundation for Agriculture believes it has the tool to be effective in this arena with its *Understanding Water Activity Book*, and many teachers agree.

"It enhanced our studies. The students were engaged … enjoyed the activities," said Kathleen Brannan from Audubon Elementary in Colorado Springs, who used the book with her third-grade students, integrating the curriculum in her physical science unit, by studying matter and the water cycle, while also using it in her social studies classes by examining how water has impacted the West.

Paula Denning – a fourth-grade teacher at Queen Palmer Elementary in Colorado Springs, who uses the *Understanding Water Activity Book* to supplement her Discover Colorado lessons – said the curriculum "lent itself as an extension to our lessons and also helped to build background knowledge for future lessons. The activity book was interactive and the students enjoyed reading as well as completing the activities. The students completed their other class work, so they could get back to the activity book."

Many of the state roundtables have expressed an interest in developing an activity book with the education funds they have available. If they used CFA's *Understanding Water Activity Book* it would save them time and money over each roundtable developing their own book. It also provides them a more in-depth and teacher tested information. It would also provide a way for uniform educational materials to be distributed statewide. The Understanding Water Activity Book also lists the Colorado State Standards that are achieved through use of the publication.

Although we don't have the 20% cash match for this project, we have already invested over $20,000 in the research, writing and artwork in this publication. There has been an additional amount of in-kind donations from the groups that helped review it and from the educators that helped to pilot test it.

Related Studies

Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.

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Related Studies
Most water projects need to have an education component to them. This provides a resource other applicants could use to help them achieve their education goals.

Previous CWCB Grants, Loans or Other Funding
List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.
none

Taxpayer Bill of Rights
The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.
Not applicable to 501(c)(3)

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Submittal Checklist	
x	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
x	Statement of Work(1)
x	Budget & Schedule(1) *(Spreadsheet)*
	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
	Map(1)
	Photos/Drawings/Reports
	Letters of Support (Support letter from Basin Roundtable encouraged)
x	Certificate of Insurance (General, Auto, & Workers' Comp.)
x	Certificate of Good Standing with Colorado Secretary of State(2)
x	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
x	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

ENGAGEMENT & INNOVATION GRANT FUND SUPPLEMENTAL APPLICATION

Introduction & Purpose

Colorado's Water Plan calls for an outreach, education, public engagement, and innovation grant fund in Chapter 9.5.

The overall goal of the Engagement & Innovation Grant Fund is to enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem.

The grant fund aims to engage the public to promote well-informed community discourse regarding balanced water solutions statewide. The grant fund aims to support water innovation in Colorado. The grant fund prioritizes measuring and evaluating the success of programs, projects, and initiatives. The grant fund prioritizes efforts designed using research, data, and best practices. The grant fund prioritizes a commitment to collaboration and community engagement. The grant fund will support local and statewide efforts.

The grant fund is divided into two tracks: engagement and innovation. The Engagement Track supports education, outreach, communication, and public participation efforts related to water. The Innovation Track supports efforts that advance the water innovation ecosystem in Colorado.

Application Questions

*The grant fund request is referred to as "project" in this application.

Overview (answer for both tracks)
In a few sentences, what is the overall goal of this project? How does it achieve the stated purpose of this grant fund (above)?
The goal of this project is to provide the *Understanding Water Activity B*ook for statewide distribution. This helps achieve the education goal of Colorado's Water Plan by educating the next generation on the importance of this vital resource and develop in these students an understanding on why and how we should protect and conserve this resource.
Who is/are the target audience(s)? How will you reach them? How will you involve the community?
Target audience is third through sixth grade students. We will reach them by promoting the Understanding Water Activity Book to their teachers via email (we have 11,000 educators on our database), by attending educator conferences such as science conference, CCIRA (reading conference), promoting them at our three Food, Fiber & More Summer Institutes and at the social studies/science coordinators meetings and via social media.
Describe how the project is collaborative or engages a diverse group of stakeholders. Who are the partners in the project? Do you have other funding partners or sources?
Nearly everything developed by the Colorado Foundation for Agriculture (CFA) involves collaboration of diverse stakeholders. The development of the *Understanding Water Activity Book* had input and review provided by Children's Museum, Colorado Water Conservancy, Denver Regional Council, Sierra Club, Colorado Department of Public Health & Environment, Central Colorado Water Conservancy District, Colorado River Water District, Colorado Department of Agriculture, Colorado Department of Education, Denver Post Newspaper in Education, Fort Collins Water Utilities, Northern Colorado Water Conservancy, CSU Cooperative Extension and Poudre School District. We anticipate working

Overview (answer for both tracks)
with the nine basins and the PEPO workgroup on this project.
Describe how you plan to measure and evaluate the success and impact of the project?
Success is measure several ways: first, will be in the number of *Understanding Water Activity Books* that are requested by educators for use with their students; second, will be through the return of an evaluation form that will be sent with the activity books. The online publication will be tracked by number of students using it or by the number of students downloading the e-pub.
What research, evidence, and data support your project?
There is specific documentation regarding the effects on third- and fourth- grade students – the age that the "Understanding Water" publication directly targets – in regards to education about water and the environment. Dr. Franz Bogner, a professor at the University of Bayreuth, in 2013 examined the implications of ages for environmental education and educators, through a program called "Water in Life – Life in Water." Dr. Bogner examined the impacts of the program on children ages 9 and 10 (third- and fourth-grade students) compared to children just slightly older, at 11-13 years old. Conclusions from the study were that the slightly younger pupils showed a stronger connectedness to nature and stronger pro-environmental attitudes than the older pupils, and it was also effective for the younger students six weeks after participation
Describe potential short- and long-term challenges with this project.
One challenge we face is that 1/3 of the teachers in schools change position every year, so we are always marketing the *Understanding Water Activity Book* to make sure new teachers know about this valuable resource. The second challenge is finding the funds to print and distribute these materials. The Colorado Foundation for Agriculture (CFA) is a not-for-profit organization that receives no public funding. For everything we produce, we need to find the funds to cover the cost. We have great support from the water community as they are already adopting classrooms, providing scholarships for teachers to attend our summer institutes or helping cover some of the costs for the water issues of the *Colorado Reader*. We would be unable raise additional funding to have 50% match for this grant. Thus we are asking for a waiver of that amount. We will have many hours of in-kind services provided by the educators who will be pilot testing the online interactive version. CFA has already invested over $20,000 for research, writing, design and illustrations in the development of this publication.

Please fill out the applicable questions for either the Engagement Track or Innovation Track, unless your project contains elements in both tracks. If a question does not relate to your project, just leave it blank. Please answer each question that relates to your project. Please reference the relevant documents and use chapters and page numbers (Colorado's Water Plan, Basin Implementation Plan, PEPO Education Action Plan, etc.).

Engagement Track
Describe how the project achieves the education, outreach, and public engagement measurable objective set forth in Colorado's Water Plan to "significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys."

This statewide project will provide a fun tool for educators to use with their students to educate about the importance of Colorado's water resource. The *Understanding Water Activity Book* and e-pub provides elementary students with a comprehensive foundation for beginning their journey to understanding the complexity of our water resource and it allows for multiple schools to utilize the same water education resource that will provide consistency and commonality of water education outreach messaging. It will also provide an easy way for the 9 basins and PEPO workgroup to add a 3rd – 6th grade educational component to their education/outreach efforts.
Describe how the project achieves the other measurable objectives and critical goals and actions laid out in Colorado's Water Plan around the supply and demand gap; conservation; land use; agriculture; storage; watershed health, environment, and recreation; funding; and additional.
This project helps achieve the Colorado's Water Plan K-12 initiative for education, specifically 3rd through 6th grades. We will easily be able to measure the use of the publication in the orders we receive from teachers.
Describe how the project achieves the education, outreach, and public engagement goals set forth in the applicable Basin Implementation Plan(s).
This is a statewide project. It would provide a comprehensive educational resource for K-6 educational efforts, specifically 3rd to 6th grades. This project will be very useful to basins that have a K-12 education outreach effort in their plan. For those basins that haven't include K-12 education in their plan, this provides an easy way to begin adding it.
Describe how the project achieves the basin roundtable's PEPO Education Action Plans.
Yampa, White, Green River Basin have no K-12 education goals in their plan, but this project could help with their outreach goals. Colorado Basin Roundtable – this project will help the basin enhance their K-12 water education opportunities inside the classroom. South Platte Basin & Metro Basin this project will help with their objective to integrate into statewide outreach initiatives. North Platte Basin this project will provide K-6 educational materials to use in their educational efforts. Arkansas River Basin and Rio Grande Basin this project will provide educational materials they could use in their community outreach. Arkansas has already requested copies for use going into classrooms prior to their water festivals. Southwest Basin has no K-12 education goals in their plan, but this project could help with their outreach goals. Gunnison Basin would like to provide field trips for youth this project would provide them a fun tool to reinforce the learning objective that are part of the tours.

Innovation Track
Describe how the project enhances water innovation efforts and supports a water innovation ecosystem in Colorado.
N/A
Describe how the project engages/leverages Colorado's innovation community to help solve our state's water challenges.

Innovation Track
The online interactive *Understanding Water Activity Book* allows for a tool to educate about Colorado's water resources that can be easily accessed via computer, I-pad, Galaxy Tab, smart phone and other devices. It can be easily updated with current information and resources.
Describe how the project helps advance or develop a solution to a water need identified through TAP-IN and other water innovation challenges. What is the problem/need/challenge?
The problem is "How do we engage today's youth in wanting to learn about water?" The online interactive *Understanding Water Activity Book* puts this information at their fingertips, which is where many of these youth enjoy spending their time.
Describe how this project impacts current or emerging trends; technologies; clusters, sectors, or groups in water innovation.
In Colorado schools there is a push to make sure students are technology literate. As such, many schools are providing I-pads, Galaxy tabs and other devices to their students. This gives us the opportunity to develop resources for these devices that achieve Colorado Education Standards and educate about water, conservation and protecting this vital resource.

Last Updated: July 5, 2017

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**July 25, 2017**
Name of Applicant:	**Colorado Foundation for Agriculture**
Name of Water Project:	***Understanding Water Activity Book***
Funding Source:	**Water Plan Grant**
Water Project Overview: Please provide a summary of the proposed water project (200 words or less). The same summary can be used from Page 5 of the CWP Grant Application.	
This is an education project. It will update and print 40,000 copies of the *Understanding Water Activity Book*. These publications will be distributed to Colorado educators that request them. We anticipate 40,000 books will take three years to distribute. They will also be made available to the nine basin roundtables and the PEPO workgroup for use in their area. In addition the Understanding Water Activity Book will be converted to an online interactive publication. It will also be converted to an interactive E-Pub.	
Objectives: List the objectives of the project.	
Objective 1: Update, reprint & distribute 40,000 *Understanding Water Activity Books* **Objective 2: Convert the *Understanding Water Activity Book* to an online interactive publication and an interactive e-pub**	

Tasks
Provide a detailed description of each project task using the following format:
Task 1 – Update the *Understanding Water Activity Book*
Description of Task:
The *Understanding Water Activity Book* will be reviewed and updated.
Method/Procedure:
Evaluations from teachers using the *Understanding Water Activity Book* will be reviewed. The nine basin roundtables and the PEPO workgroup will be asked to review the publication for recommended changes. Changes will be made to the publication. The new publication will be correlated to Colorado State Education Standards and Agriculture Literacy Outcomes.
Grantee Deliverable: Describe the deliverable the grantee expects from this task

Last Updated: July 5, 2017

Tasks
Press ready PDF file of the updated *Understanding Water Activity Book*
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
PDF file of the updated *Understanding Water Activity Book*

Tasks
Provide a detailed description of each task using the following format:
Task 2 – Print *Understanding Water Activity Book*
Description of Task:
Print 40,000 copies of the *Understanding Water Activity Book*
Method/Procedure:
Schedule the printing, provide printer with press optimized PDF file of the *Understanding Water Activity Book*
Grantee Deliverable: Describe the deliverable the grantee expects from this task
40,000 *Understanding Water Activity Books*
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
100 copies of the *Understanding Water Activity Book*

Tasks
Provide a detailed description of each task using the following format:
Task 3 – Promote and distribute *Understanding Water Activity Books* to schools
Description of Task:
Promote and distribute the *Understanding Water Activity Books*.
Method/Procedure:
Email educators, school administrators and school districts and let them know the *Understanding Water Activity Books* are available. Promote the publication at the Colorado Science Conference, CCIRA Conference (Reading), and at the Food, Fiber & More Summer Institutes (3). Publications will be provided nine basin roundtables and the PEPO workgroups that request them.
Grantee Deliverable: Describe the deliverable the grantee expects from this task

Last Updated: July 5, 2017

Tasks
List of teachers and others receiving the *Understanding Water Activity Books*
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
List of teachers and others receiving the *Understanding Water Activity Books* and the costs to send the books.
Provide a detailed description of each task using the following format:
Task 4 – Program the online interactive *Understanding Water Activity Book*
Description of Task:
Program an interactive online *Understanding Water Activity Book*.
Method/Procedure:
Program the *Understanding Water Activity Book* into an online interactive version. Add videos, quizzes, drag and drop, crosswords and other interactive features. Have nine basin roundtables and the PEPO workgroup review the interactive publication. Make changes based on their recommendations. Have teachers pilot test interactive version. Make changes based on their feedback. Then make link available and promote it to teachers in the same way and time the print version is promoted. Publish this interactive version as an e-pub.
Grantee Deliverable: Describe the deliverable the grantee expects from this task
Link to online interactive *Understanding Water Activity Book* and e-pub.
CWCB Deliverable: Describe the deliverable the grantee will provide CWCB documenting the completion of this task
Link to online interactive *Understanding Water Activity Book* and e-pub.

Budget and Schedule
This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Last Updated: July 5, 2017

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will withhold disbursement the last 10% of the budget until the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Last Updated: July 5, 2017

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Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Exhibit A
Budget and Schedule

Date:

Name of Applicant:

Name of Water Project:

Task No.	Task Description	Start Date[1]	End Date	Grant Funding Request	Match Funding	Total
1	Update Understanding Water Activity Book	month 1	month 3	3,000	1,000	$4,000
2	Print Understanding Water Activity Book	month 3	month 3	$26,000		$26,000
3	Promote & distribute Understanding Water Bo	month 4	month 36	$20,000		$20,000
4	Program online interactive Understanding Wa	month 2	month 6	$15,000		$15,000
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
			Total	$64,000	$1,000	$65,000

(1) Start Date for funding under $100K, minimum 45 Days from Board Approval; Start Date for funding over $100K, minimum 90 Days from B

·Round values up to the nearest hundred dollars.

·Reimbursement eligibility commences upon the grantee's receipt of a Notice to Proceed (NTP)

·NTP will not be accepted as a start date. Project activities may commence as soon as grantee enters contract and receives formal NTP if

·The applicant shall provide a progress repost every 6 months, beginning from the date of contract execution.

·CWCB will withhold disbursement of the last 10% of the total grant amount until a Final Report is completed to the satisfaction of CWCB

August 3, 2017

Mara MacKillop
Colorado Water Conservation Board
1313 Sherman St., Room 721
Denver, CO 80203

Re: Colorado Foundation for Agriculture
Colorado Water Plan Grant – Education & Innovation

Dear Ms. MacKillop,

The Metro Roundtable would like to express our support for the Colorado Foundation for Agriculture's grant application for reprinting the *Understanding Water Activity Books* and for the printing and distribution of the *Colorado Reade*r on water. The Colorado Foundation for Agriculture has a strong record of providing natural resource educational materials to schools across Colorado. They have taken the lead in developing online interactive resources about Colorado agriculture and natural resource topics. We believe both publications are very useful for our education/outreach efforts and look forward to sharing them with our citizens. We are also willing to work with the Colorado Foundation for Agriculture to review the new *Colorado Reader* on water and to provide them input on topics for future water readers and other water related educational endeavors.

The Colorado Foundation for Agriculture has produced factual, relevant, readable materials for many years. Having high quality literature available from a trusted community partner benefits the Roundtables and helps to reach a diverse community audience to provide important contextual background for meaningful public participation in the South Platte Basin Implementation Plan.

We encourage you to fund this project.

Please let me know if you need any additional information. Thank you for your consideration.

Sincerely,
Barbara Biggs
Barbara Biggs, Chairwoman
Metro Round Table

July 28, 2017

Bette Blinde
Colorado Foundation for Agriculture
PO Box 10
Livermore, CO 80536

Dear Ms. Blinde,

The Arkansas Basin Roundtable Public Education, Participation, & Outreach (PEPO) Workgroup is committed to developing community or children's water festival in locations throughout the basin that do not currently have a festival. The idea is to plant the festival seed the first year and then have the local community take this valuable program & grow it into the future. We have recently held two successful festivals; a community water festival in Salida in 2016 and a children's water festival in Colorado Springs this year. Both plan on holding festivals next year. We intend to work with Otero and Crowley counties on a combined festival in 2018. We are very interested in utilizing the Understanding Water Activity Book as a classroom resource for preparation for the water festival. We anticipate needing approximately 500 books. We are in support of the Colorado Foundation for Agriculture's Engagement and Innovation grant application to fund reprinting the Understanding Water Activity Book.

Sincerely,

Jean Van Pelt

Jean Van Pelt
Ark Basin PEPO Coordinator

ST. VRAIN AND LEFT HAND WATER CONSERVANCY DISTRICT

9595 Nelson Road, Suite 203 • Longmont, CO 80501 • 303-772-4060 • www.svlhwcd.org

August 7, 2017

Mara MacKillop
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Ms. MacKillop,

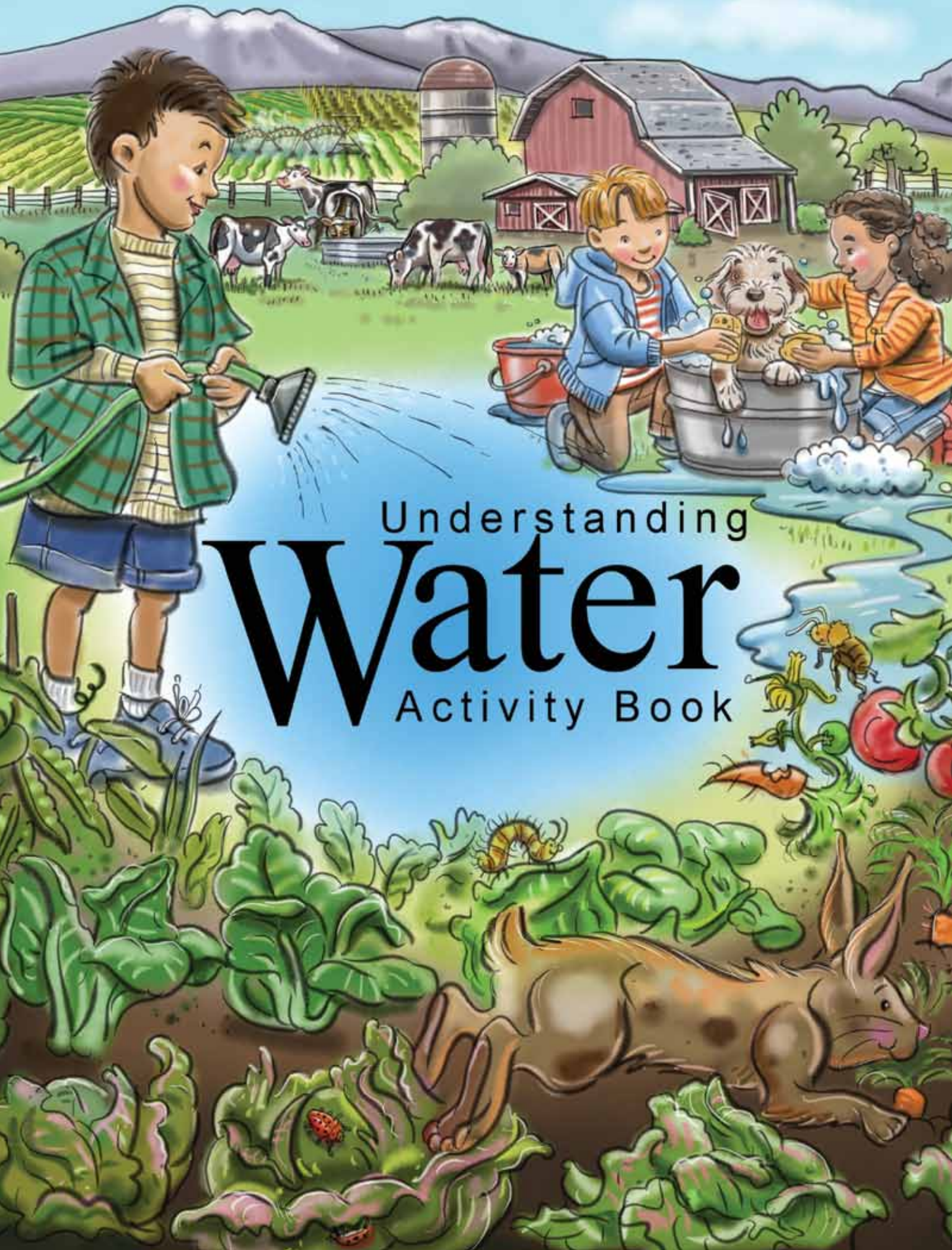
On behalf of the St. Vrain and Left Hand Water Conservancy District I would like to express support for the Colorado Foundation for Agriculture's application to the CWCB's Engagement and Innovation Activities grant. The Colorado Foundation for Agriculture has been providing natural resource educational materials to schools across Colorado since 1991. They have taken the lead in developing online interactive resources about Colorado agriculture and natural resource topics.

This grant request is for the reprinting of the *Understanding Water Activity Books* and for the printing and distribution of the *Colorado Reade*r on water. As you know I recently discovered these great materials and found them to be one of the more comprehensive education materials available to school children on Colorado's Water Plan.

As an active member of the South Platte Basin Roundtable, I believe these materials and their wider distribution is entirely consistent with the goals of the plan and this grant program and therefore fully support this request.

Sincerely,

Sean T. Cronin
Executive Director


Understanding
Water
Activity Book

UNDERSTANDING WATER ACTIVITY BOOK

This activity book is one of the agricultural literacy projects produced by the Colorado Foundation for Agriculture.
Individual copies or classroom sets are available.
Materials may be reproduced for educational use.

Produced by
Colorado Foundation for Agriculture
Bette Blinde, Executive Director
P.O. Box 10
Livermore, CO 80536

1st printing 1998
2nd revision 2009
3rd revision 2013

Note to educators: This book includes a variety of ready-to-use activities that integrate learning about water and academic subject areas. The activities are ideal for use in classrooms. Children can work through many activities in the book on their own, although some science experiments will require the assistance of an adult. We have tried to indicate when such help is essential to performing a task.

Why does an agriculture group want to teach about water?

Water is a finite natural resource. Demands on available water continually increase. It is essential that today's young people, who will be tomorrow's leaders, understand as much as possible about this vital resource. This activity book is intended to stimulate interest and awareness.

In the past, people were aware of the role agriculture played in their lives. It meant survival. Nearly everyone – men, women and children – worked the land. On average, today's youth are five generations removed from the land. No longer is there a grandfather or aunt on the farm. No longer do young people have first-hand contact with farms and farming. You may want to survey your class. How many of your students have a parent, grandparent, aunt or uncle who is living and working on a farm or ranch? Through projects like this activity book, students can begin to understand the effect agriculture has on our society and way of life. Water is a natural resource that requires our care and conservation for a bountiful future. Water is essential for growing our food. Seeds and soil will not feed the nation; seeds, soil and water can.

Importance of Agriculture

Agriculture, with its related occupations, is the nation's and the world's largest industry. It generates billions of dollars each year and one out of every five American jobs depends on agriculture in some way. Agriculture has a huge effect on the American economy and on the prices we pay for food, clothing and shelter. Agriculture positively influences the U.S. balance of trade and directly affects the number, as well as kinds, of jobs throughout the world.

An estimated 20 percent of our population is employed in agriculturally related occupations. However, only about two percent of U.S. citizens work in production agriculture. Production agriculture is the growing and harvesting of food. This small group meets the food and fiber needs of the entire nation as well as many people in other communities. Agriculture faces huge challenges to meet the needs of a growing world population. Tomorrow's citizens must be agriculturally literate in order to make responsible, moral decisions about the giant global lifeline. Building that literacy and awareness is the goal of the Colorado Foundation for Agriculture through its agricultural education projects and Agriculture in the Classroom programs.

You can survive for many weeks without food but less than a week without water. We see and use water every day. It is a common item. We drink it, bathe in it, play in it and grow our food with it.

This activity book takes you on a voyage to learn more about water.

CONTENTS

Educator,

We are pleased to provide your *Understanding Water* Activity Book. Please feel free to make copies of activities for use with your students.

Water is an important topic for students to understand. This volume introduces basic water concepts, supply, uses, water treatment (cleaning), pollution, conservation and wastewater treatment. The intent of this activity book is to help you prepare knowledgeable decision-makers. Vocabulary, reading, writing, geography, math, science and art are reinforced. We've included a page that shows the Colorado Academic Standards and Core Curriculum State Standards this book helps you and your students achieve. You will see that learning about water, like learning about agriculture, incorporates many academic subject areas. Each book contains the answers. An evaluation sheet is also included. Please take the time to answer the questions and drop it in the mail to us. Your thoughts and suggestions are helpful to us in our efforts to produce and supply additional educational materials.

We hope you and your students enjoy and benefit from this resource.

ADDITIONAL PUBLICATIONS AVAILABLE:

Wool and Sheep Activity Book (limited quantity)

Cattle in Colorado History

Colorado Reader subscription includes 25 readers and one teacher's guide in packets mailed monthly during the school year. The readers address different agriculture, food system and natural resource topics.

CFA Comics ~ Watershed Defender is a 16-page publication for middle school students to learn about polluted runoff and how they can work to prevent it.

For links to water educational materials
visit http://npscolorado.com/education.htm

Need a quick lesson? Go to our website: www.growingyourfuture.com and check out the E-lessons.

You can also learn about new resources by signing up for our E-newsletter
distributed September, December and March.

ON-GOING PROGRAMS:

Food, Fiber & More Agri-CULTURE in the Classroom Summer Institute. Earn 2 continuing education credits while learning about agriculture and innovative ways to incorporate agriculture topics with academic curricula. This is a one week course in June and takes you out of the classroom for hands-on learning.

Food, Land and People (FLP) Workshops introduce participants to an excellent activity resource. You will see how others interpret the activities and present them to students. You also have the opportunity to become a facilitator.

Colorado Foundation for Agriculture

PO Box 10 Livermore, CO 80536 970-881-2902 www.growingyourfuture.com

Water

Let's find out about water!

Put a check mark in the box of the statements that are TRUE

Bold words, like **vapor**, are defined on pages 64 & 65.

Water is

- ❑ wet (when it falls as rain)
- ❑ cold (when it is ice)
- ❑ hot (when it is boiling)
- ❑ hard to see (when it is **vapor**)

Water is found

- ❑ in the ground
- ❑ in the sky
- ❑ in lakes and streams
- ❑ in the oceans
- ❑ in water fountains
- ❑ in **glaciers**

Water is used by

- ❑ everyone
- ❑ my neighbors and me
- ❑ farmers and ranchers
- ❑ schools
- ❑ animals
- ❑ businesses
- ❑ wildlife
- ❑ plants

DIARY

Today I have used water to

_____

_____

_____

_____

_____

_____

I have seen water being used by someone else to

_____

_____

_____

_____

_____

_____

A diary is like a journal. You write and draw in it. You can put lists, pictures, plans, thoughts, feelings, ideas, dreams – pretty much anything – in a diary.

My family uses water

- ❑ to drink
- ❑ to cook
- ❑ to bathe
- ❑ to flush the toilet
- ❑ to grow vegetables

- ❑ to water the lawn
- ❑ to wash dishes
- ❑ to wash clothes
- ❑ to wash the car
- ❑ to water house plants

- ❑ to fill a fish tank
- ❑ for fun, like playing in the sprinkler, swimming, filling water balloons
- ❑ to brush teeth
- ❑ to wash faces and hands
- ❑ to make ice cubes
- ❑ to fill a bird bath
- ❑ for pets to drink

A farmer uses water

- ❑ to water crops (sugar beets, corn, vegetables, flowers)
- ❑ for livestock to drink
- ❑ for wildlife to drink
- ❑ to clean equipment

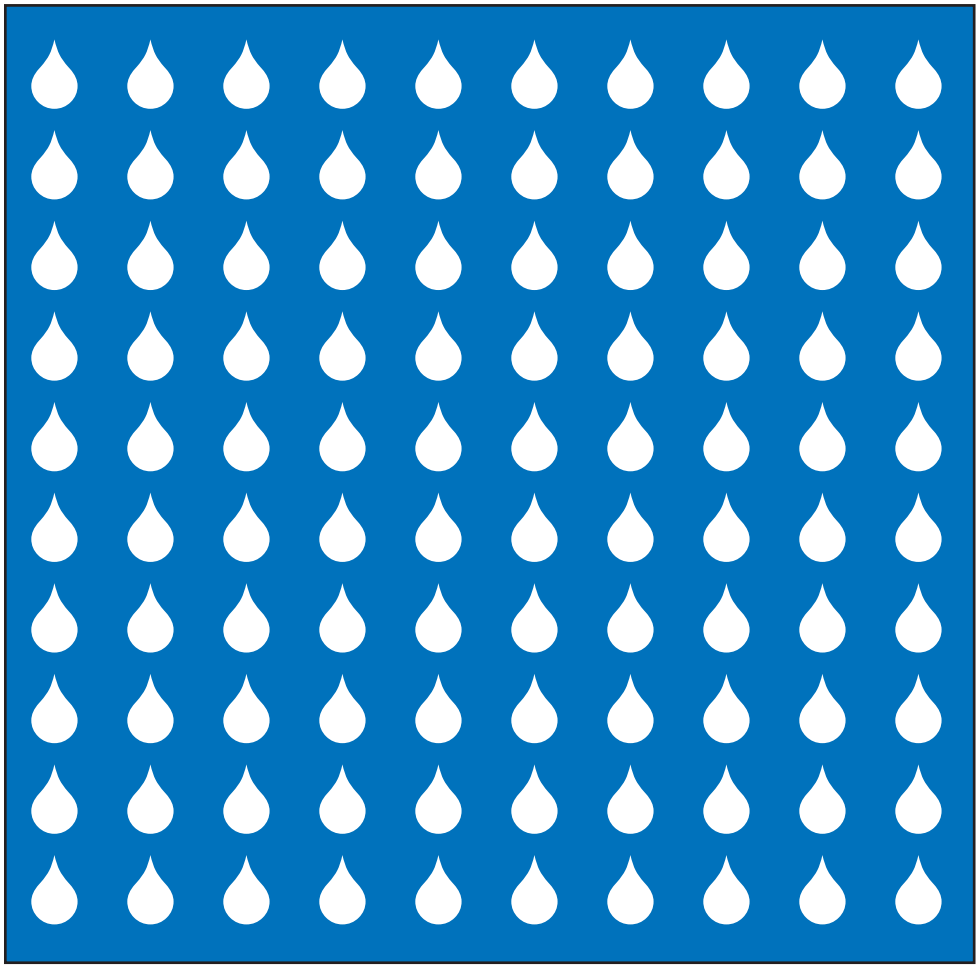
Water is important to life. We need water to live. When we look at a **globe** we see that most of Earth is covered by water. Most of the water on Earth is found in the oceans. Ocean water is **salt water.** We cannot drink ocean water because of the salt. Plants grown by farmers cannot use water from the ocean because it is too salty for plants.

Water is a **NATURAL RESOURCE.**

FRESH WATER

Plants and animals that live on land need **fresh water.** Fresh water is water that does not have salt mixed with it. We can drink fresh water after it is cleaned or goes through a treatment process. Fresh water is found in lakes and **reservoirs**, streams and **rivers**. It falls as **rain** from storm clouds and is in the **snowpack** in mountains. Fresh water is found under ground as **groundwater** and frozen as ice in **glaciers**.

All of something is 100%.
97% of the water on Earth is salt water.
3% of the water on our planet is fresh water.



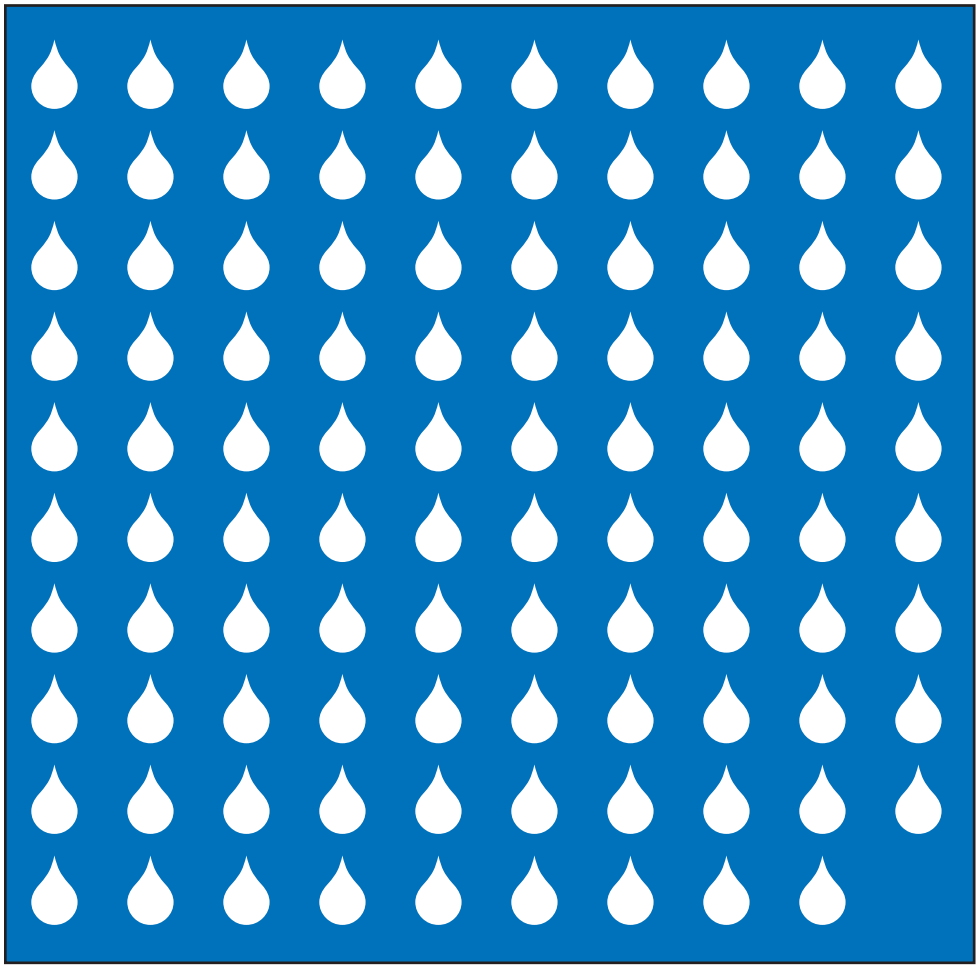
Here are 10 rows of 10 water drops.

How many water drops are there?

10
x10
_____

Color 97 of the drops red to show salt water.
Color 3 of the drops green to show fresh water.

Three percent of Earth's water is fresh water. Of the fresh water, two percent is frozen in polar ice caps and glaciers; one percent is available for our use.



The water drops represent all the fresh water on Earth.

Color the drops to show how much fresh water is available to use.

You will use two colors again – one color for ice, one color for water that we can use. Color frozen water red. Two of every three drops will be red. Color usable water green. One of every three drops will be green.

Most scientists believe there is the same amount of water on earth today that there was at the time of the dinosaur.

Do the math!

All fresh water = 99 drops or 100%

Two percent or 2/3 of the 99 water drops are frozen.

One percent or 1/3 of the 99 water drops are water that we can use.

Frozen water = ___ drops

Fresh water = ___ drops

A sentence is a complete thought.
A complete sentence needs a noun and a verb.

Snow is cold. "Snow" is the noun. "Is" is the verb.

Write an "S" on the line in front of each *complete sentence* you find in the list.

_____ Earth has a lot of water.

_____ Three percent of water on Earth is fresh water.

_____ Salt in ocean water

_____ Less than one percent of fresh water is available for people, plants and animals.

_____ Animals and plants water

_____ There is water in lakes and streams.

_____ Water wet

Rewrite the sentences from the list that you left blank. Make them into complete sentences.

_____

_____

_____

FRESH WATER

Water is found as **liquid, solid** or **gas (water vapor).** These are three states of matter. Liquid water is what comes out of your faucet, flows down rivers and is found in lakes. Solid water is ice. Ice is frozen water like ice cubes, the surface of a lake in winter, snow flakes or hail. Water can also be **vapor.** Vapor is created when water evaporates. You can make water vapor by boiling water.

Fill in the blanks in the sentences to name water pictured.

Water

_____

condenses to
form clouds.

Liquid water freezes into snowflakes.
It is then a _____.

Water that flows from a
faucet is

_____

SCIENCE EXPERIMENT

Identify water as liquid, solid or vapor.

To do this activity you need:

- a measuring cup
- 2 small paper cups
- a paper towel
- water
- an adult with a hot plate or stove
- a pinwheel

1 Put 1/4 cup of water in the measuring cup.

2 Pour the water into one of the small paper cups.

3 Write three words that describe a liquid.

_____

_____

_____

Water from a faucet is liquid.
Water in a lake is liquid.
Rain is liquid.

LIQUID ICE VAPOR

4 Put the cup in a freezer. Check it every two hours to see the stages of changing from a liquid to a solid. Once the water has changed to ice, remove it from the freezer.

5 Put a paper towel on a table and peel the cup away from the ice.

This is a **solid.**

Write three words that describe the solid form of water.

_____

_____

_____

6 Use the ice cube, the second cup and the paper towel. Try to turn the solid water back into a liquid.

Write about what you did.

_____

_____

_____

_____

_____

_____

7 Ask the adult helping you to set up a hot plate and tea kettle filled with water. Place the pinwheel above the tea kettle when the water begins to boil. What happens to the pinwheel?

What made the pinwheel turn?

Water vapor.

Write three words that describe vapor.

What caused the changes in the water?

LIQUID ICE VAPOR

Water is the most common **compound** on earth. A compound is made up of **elements**. Everything is made of **atoms**. Elements are different arrangements of atoms. An atom is the smallest particle of an element. Water is made up of three atoms: two atoms of **hydrogen** and one atom of **oxygen**. It is two hydrogen atoms and one oxygen atom. It is written **H_2O**.

PROPERTIES OF WATER

Water can make things wet. It can dissolve things. Water can "carry" things and flow through things.

Water acts differently with different materials. Water beads up on wax paper because of surface tension. Surface tension allows water to form a skinlike surface. Other materials allow water to flow through them or be absorbed. Paper towels and sponges absorb water. Sand and gravel are two earth materials through which water can flow.

Water can change almost any material. Everything from dissolved salts to huge boulders can be moved by water.

Water's ability to dissolve substances has an effect on water quality. Water carries dissolved solids. The characteristics of water make it a great "cleaner". Since many things dissolve in water, water can be used by itself or be combined with other products to clean surfaces and items.

Some things float on water.
Some things dissolve in water.
Some things sink in water.

Finish the sentence next to the picture.
Will the item float, dissolve or sink in water?

leaves will _____

salt will _____

an anchor will _____

Write a sentence about one of the objects pictured. Explain why you think it does what it does when it's put in water.

_____

_____

_____

_____

_____

DENSITY

Density is why objects do what they do with water.

Density is the measure of the weight and volume of an object.

The anchor, made of metals, is heavy. It is heavier than water. It will sink.
The leaves are light. They are lighter than water. They will float.
The salt, like sugar, will dissolve in water.

SCIENCE EXPERIMENT

You will need:

✓ A large bowl of water ✓ Paper clips ✓ Aluminum foil

Put water in the large bowl of water. Drop a paper clip in the bowl. Watch it sink. Make "boats" using the aluminum foil. Make different shaped boats from the same size pieces of foil. Put the foil boats in the bowl of water. They will float. Drop one paper clip at a time into a boat.

How many paper clips can the boat hold?

Why does a paper clip sink by itself in water yet several can float in a boat?

Why doesn't the paper clip float by itself?

?

What will happen when an ice cube and a marble that weigh the same are dropped into water?

Solve the code to answer the question!

Complete the math problems. Find the letter that matches the number of the "code". Write the letter on the line above the number to make the words and learn the answer to the question.

A	=	12 + 12 = ____		N	=	1 + 1 = ____
B	=	2 + 3 = ____		O	=	13 - 12 = ____
C	=	12 - 6 = ____		P	=	6 x 6 = ____
D	=	4 x 2 = ____		Q	=	17 - 14 = ____
E	=	3 + 9 = ____		R	=	7 x 1 = ____
F	=	12 - 1 = ____		S	=	3 + 6 = ____
G	=	3 x 5 = ____		T	=	7 + 6 = ____
H	=	3 x 6 = ____		U	=	8 + 8 = ____
I	=	9 - 5 = ____		V	=	82
J	=	40 + 3 = ____		W	=	30 - 13 = ____
K	=	30 + 30 = ____		X	=	6 x 5 = ____
L	=	5 x 2 = ____		Y	=	3 x 7 = ____
M	=	7 + 7 = ____		Z	=	22 - 2 = ____

13 18 12   14 24 7 5 10 12

17 4 10 10   9 4 2 60;   13 18 12

4 6 12   6 16 5 12   17 4 10 10

11 10 1 24 13.   4 6 12   4 9

10 12 9 9   8 12 2 9 12

13 18 24 2   10 4 3 16 4 8

17 24 13 12 7;   24

14 24 7 5 10 12   4 9

14 1 7 12   8 12 2 9 12.

DENSITY

A S L T WATER

S A L T WATER

_ _ _ _ WATER

Unscramble the water words!!

S I L O D

_ _ _ _ _

N A I R

_ _ _ _

V A P R O

_ _ _ _ _

I D E S Y N T

_ _ _ _ _ _ _

C E I

_ _ _

V I R E R

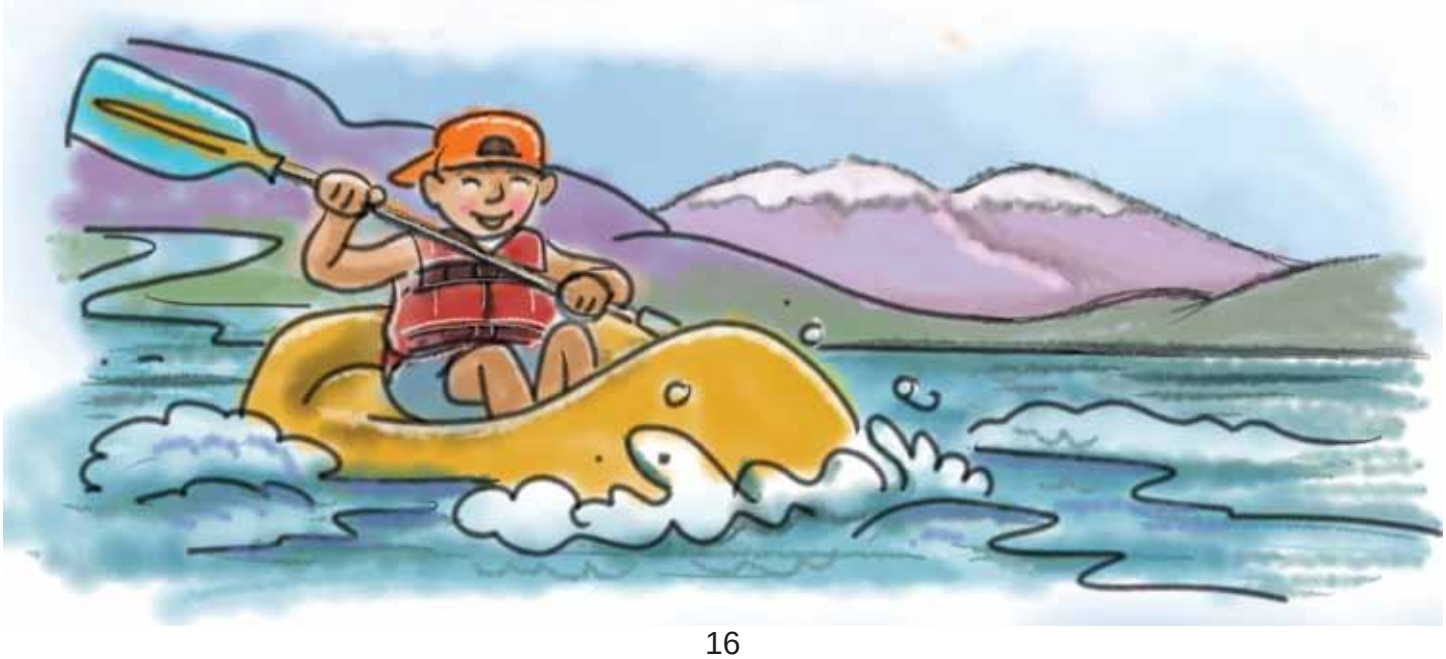
_ _ _ _ _

I L D U I Q

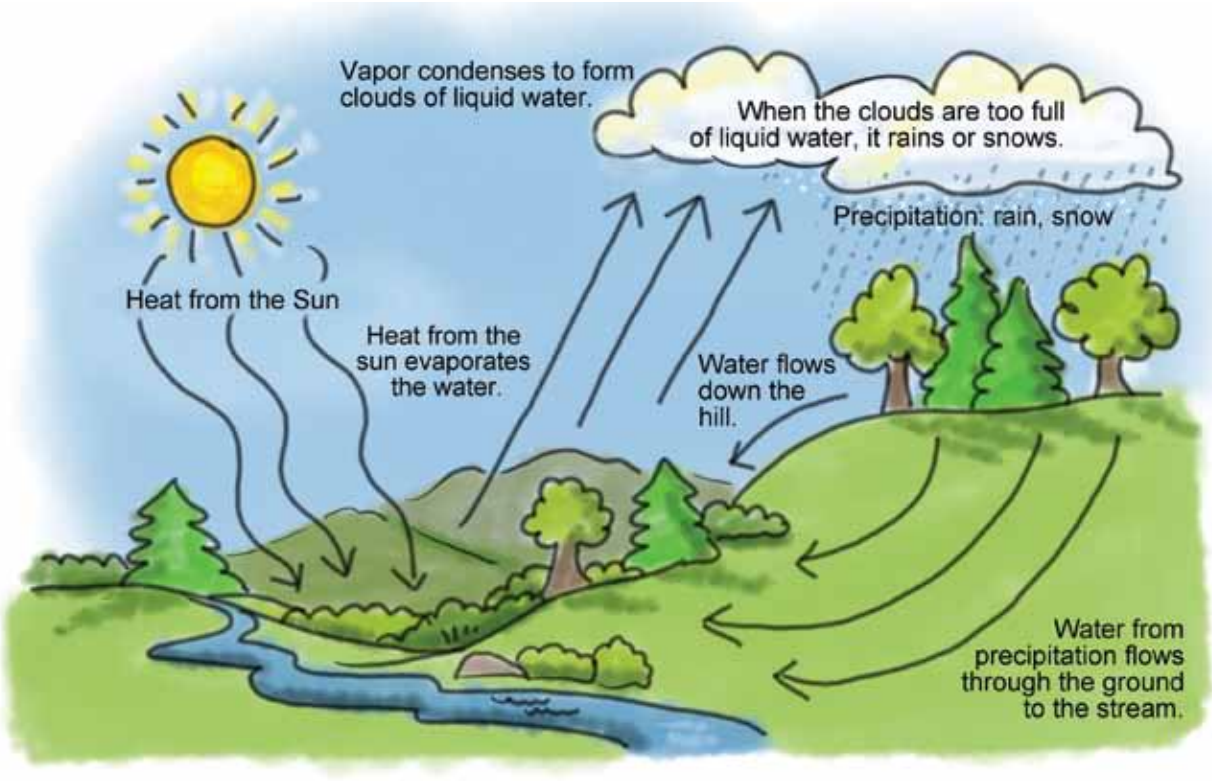
_ _ _ _ _ _

O E A N C

_ _ _ _ _



WATER CYCLE



Water goes through three states of matter (liquid, solid, gas) in the water cycle.

The water cycle is the movement of water from Earth to the **atmosphere** and back again.

Surface water is any water flowing or standing on the surface of the ground.

Water from lakes, rivers and oceans is warmed by the sun. The liquid water turns into water vapor (gas). When vapor is warmer than air, it rises up into the atmosphere. This is called **evaporation**.

Plants and trees also “breathe” water into the atmosphere in a process called **transpiration**.

Sunlight striking falling rain makes a colorful effect.

What is this called?

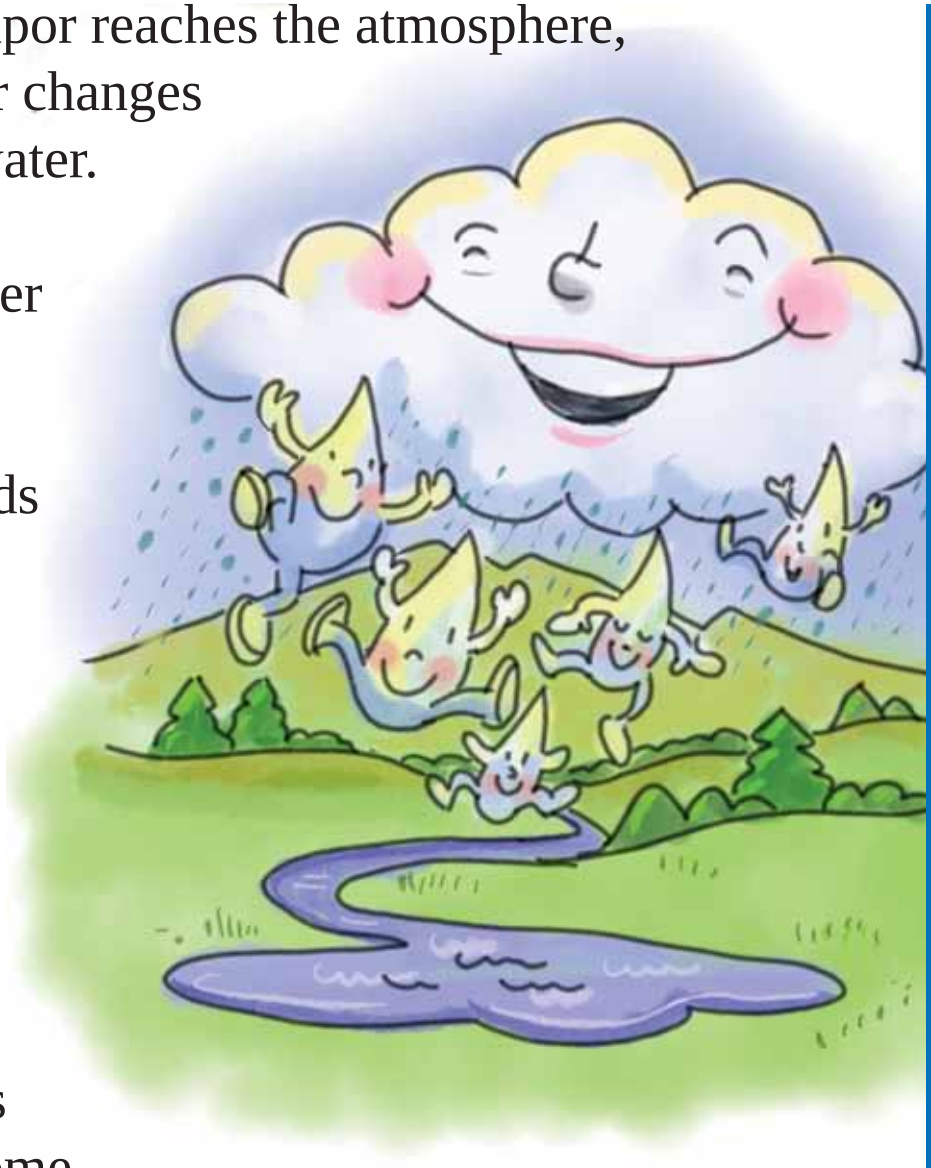
_____

WATER CYCLE

When water vapor reaches the atmosphere, it **condenses** or changes into drops of water.

The drops gather to form clouds.

When the clouds let go of the water as rain or snow, it is called **precipitation**.



The water falls back to Earth. Some of it falls into oceans. Some water runs off the land into lakes, rivers and streams. This is called **runoff**. Some water trickles beneath the surface of the ground to become **groundwater**, feeding into wells, springs and streams.

Then the cycle goes around again.

MATCH 'EM!

Match the words and the meanings

_____ EVAPORATION

_____ CONDENSATION

_____ LIQUID, ICE, VAPOR

_____ PRECIPITATION

_____ RUNOFF

_____ TRANSPIRATION

WRITE THE LETTER OF THE DEFINITION ON THE LINE

A When the rain reaches Earth it flows across the land into lakes, streams and oceans.

B The sun heats water. The water becomes vapor that rises into the atmosphere.

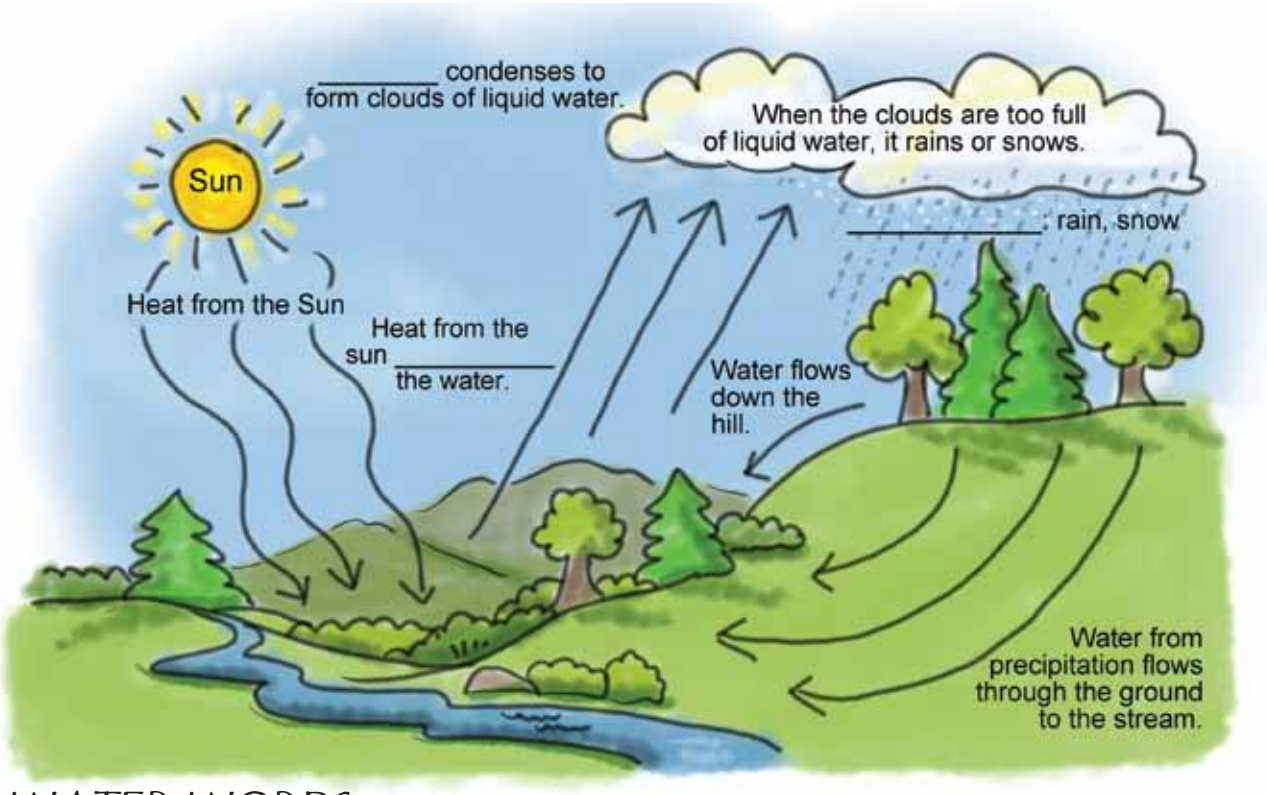
C Liquid is heavier than vapor. Gravity pulls the liquid down to Earth as rain or snow.

D Water vapor condenses to form clouds. When the clouds cool, the vapor becomes liquid.

E Plants take in water, then “breathe” the water out as vapor.

F Three states of water.

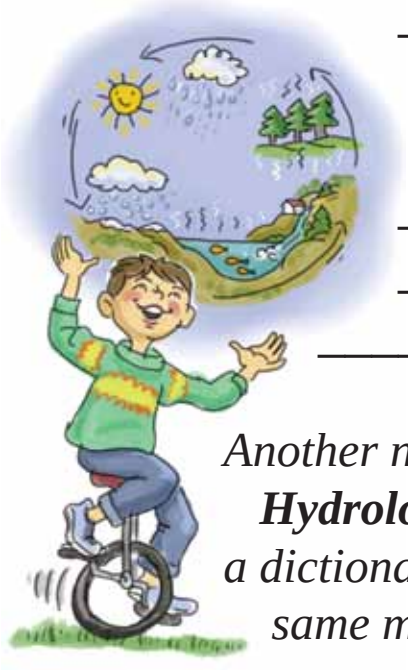
WATER CYCLE



WATER WORDS:

PRECIPITATION
VAPOR
EVAPORATES

Describe what happens in the water cycle:



Another name for the water cycle is ***Hydrologic Cycle.*** *Look for this word in a dictionary. Why do both terms have the same meaning?*

Snow falls in winter. Snow is frozen water. In states with mountains – like Colorado, Wyoming, Montana and California – snow piles up in the mountains in winter. This buildup of snow is called **snowpack**. The amount of snow and the water content in the snowpack determines how much water we will have in the summer and fall.

The snowpack begins to melt in spring when it gets warmer. The water from the melted snow flows into streams. The streams flow into rivers. Some of the water is caught and stored in **reservoirs**. The stored water can be used throughout the year.

Water stored in reservoirs and lakes is released when it is needed. The places needing water may include cities, businesses, homes or farms. Water can also flow to another state. Water is moved by letting it flow down rivers, through man-made **canals** or ditches, or through huge pipes that may sit above or below ground.

A **DAM** IS A STRUCTURE BUILT TO STOP THE FLOW OF WATER DOWN A STREAM. THE DAM CREATES A **RESERVOIR**. THE **RESERVOIR** IS BOTH THE CONTAINER THAT HOLDS THE WATER AND THE WATER THAT IS FILLS THE CONTAINER.

Your turn to be an artist!

Over the winter months snow has fallen; snowpack has built up. It is spring and the sun is shining and the days are longer. The temperatures are warmer both during the day and at night.

Show what happens to the water from the snow and where it goes…

Did your drawing show water going downhill? Did your water flow into a stream then into a lake or reservoir? If you drew water going downhill you drew a picture of a **watershed**.

A watershed is an area of land. It is the land area that drains water into a river. Another name for watershed is **drainage basin** or **basin**. A watershed is the land that drains water to a river or lake. A watershed can be large, like the Mississippi River drainage basin, or very small, like 20 acres that drain to a farm pond.

IN COLORADO:
The watershed in which you live might be named after one of these rivers:

South Platte River
Colorado River
Arkansas River
Rio Grande River
Yampa River
Cache la Poudre River

There are many more rivers and streams in Colorado. Use a map of the state to make a list of rivers and streams.

How many did you find?

We ALL Live Downstream

No matter where you live, you are in a watershed. Your watershed may be made up of mountains, farmland, houses, businesses, towns or rangeland.

Name a major river near you:

_____

Are there any small rivers near where you live?

_____

Does the small river run into a larger river?

_____

Watersheds are often named after the river that runs through an area. What is the name of your watershed?

_____

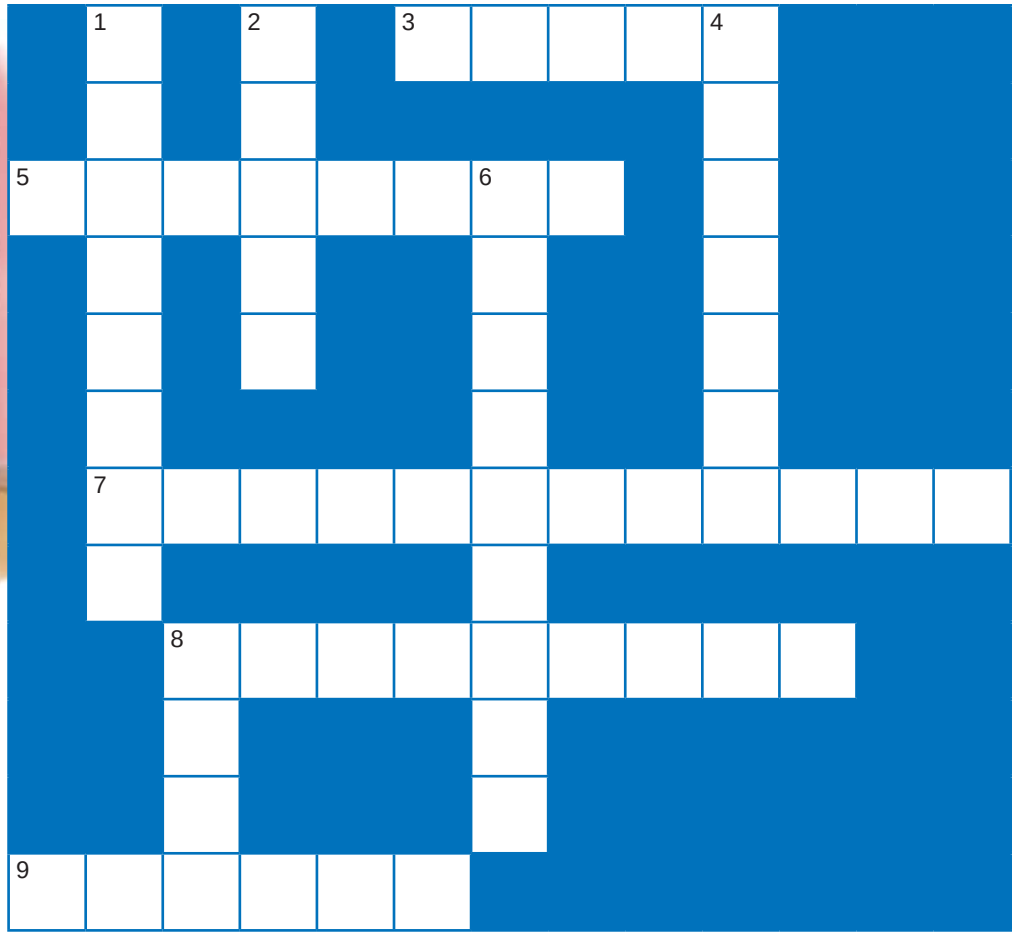
WATER SUPPLY

Water is not always where we want it to be. It does not always come in the amount we want. Sometimes there is not enough water; other times there is too much water. Storage reservoirs have been built to hold water to keep a constant supply.

Everything gets dry when there is not enough rain. Not enough rain can cause a **drought**. When an area has a drought, plants and the ground dry out.

A drought can result in water **rationing**. This means everyone uses no more than a set amount of water. Many towns and cities practice water **conservation**. The cities and towns themselves use less water and encourage residents to take steps to use less water.

Other times there is too much rain. When there is too much rain and the ground cannot soak it up, water will **flood** areas. The water that cannot soak into the ground will run into rivers and streams. When the rivers and steams are too full, water will run over the banks and flooding can happen.



Down

1. The buildup of snow that falls in the mountains in the winter.
2. Another name for a watershed is a drainage _____.
4. A dry condition from not having enough water.
6. A body of water held by a dam. This is one way to store water.
8. A kind of precipitation.

Across

3. Too much water all at once will cause this.
5. Wetness; i.e., the amount of _____ in the snowpack determines if there will be enough water in the summer and fall.
7. Using less water in order to save it for later use.
8. When everyone uses a smaller, fixed amount of water instead of the usual amount of water.
9. Kind of man-made ditches that carry water from place to place.

WATER WORDS

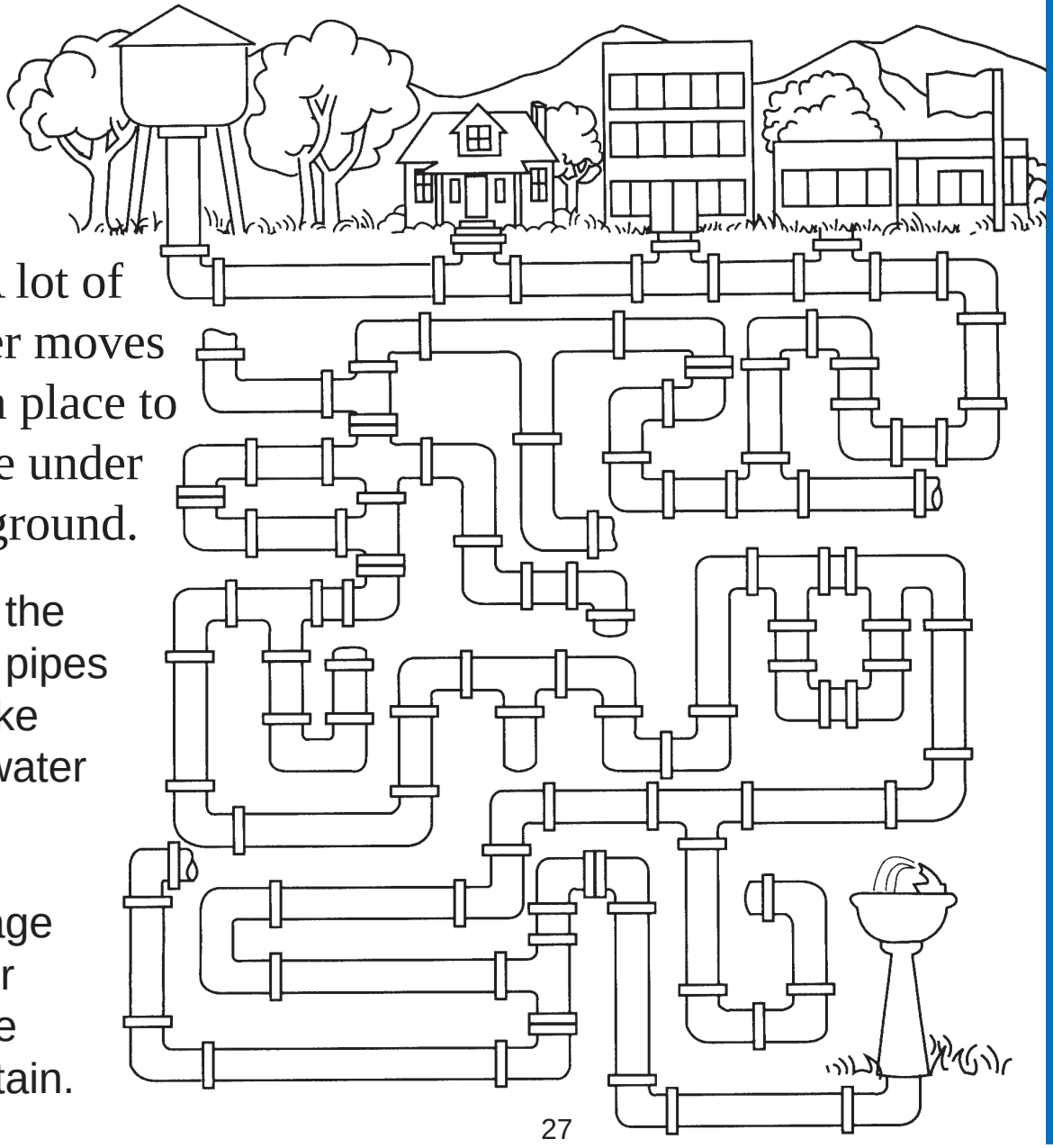
BASIN
CANALS
CONSERVATION
DROUGHT
FLOOD
MOISTURE
RAIN
RATIONING
RESERVOIR
SNOWPACK

WATER SUPPLY

Water is used over and over – as many as five to seven times – before it flows out of Colorado.

Communities will use water in many ways. Water that is used inside our homes, schools and businesses will be cleaned at a treatment plant and put back into the streams for other uses.

Most communities have a storage system, a delivery system, a wastewater system and a treatment plant.



A lot of water moves from place to place under the ground.

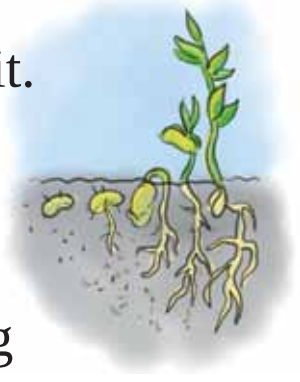
Find the right pipes to take the water from the storage tower to the fountain.

A lot of water, however, will be used and not go through a treatment plant. Water that is used on our lawns and gardens will flow back into the streams. The water we use to wash our pets or cars and to water our lawns flows through storm drains into rivers and streams for other uses downstream.

Another use...

Farms and ranches can be downstream or upstream from communities. Farms and ranches need water for animals and plants. Farmers **irrigate** crops.

Irrigation is a way to bring water to crops. Irrigation is giving water to plants when they need it. After seeds are planted in the ground, they need water to **germinate** into seedlings. The seedlings need water and sunshine to grow into big plants.



Water is given to plants throughout the growing season. It is important to give growing plants as much water as they need, but too much water can hurt them. Farmers watch the weather. If it rains a lot, they don't want to irrigate because plants can drown.

There are many ways to irrigate.

One way is to dig little ditches between rows of crops and let the water run between the rows. This is called **furrow irrigation.**

Another way to irrigate is to **flood** an area with water. Hay fields and pasture land are often flooded with water.

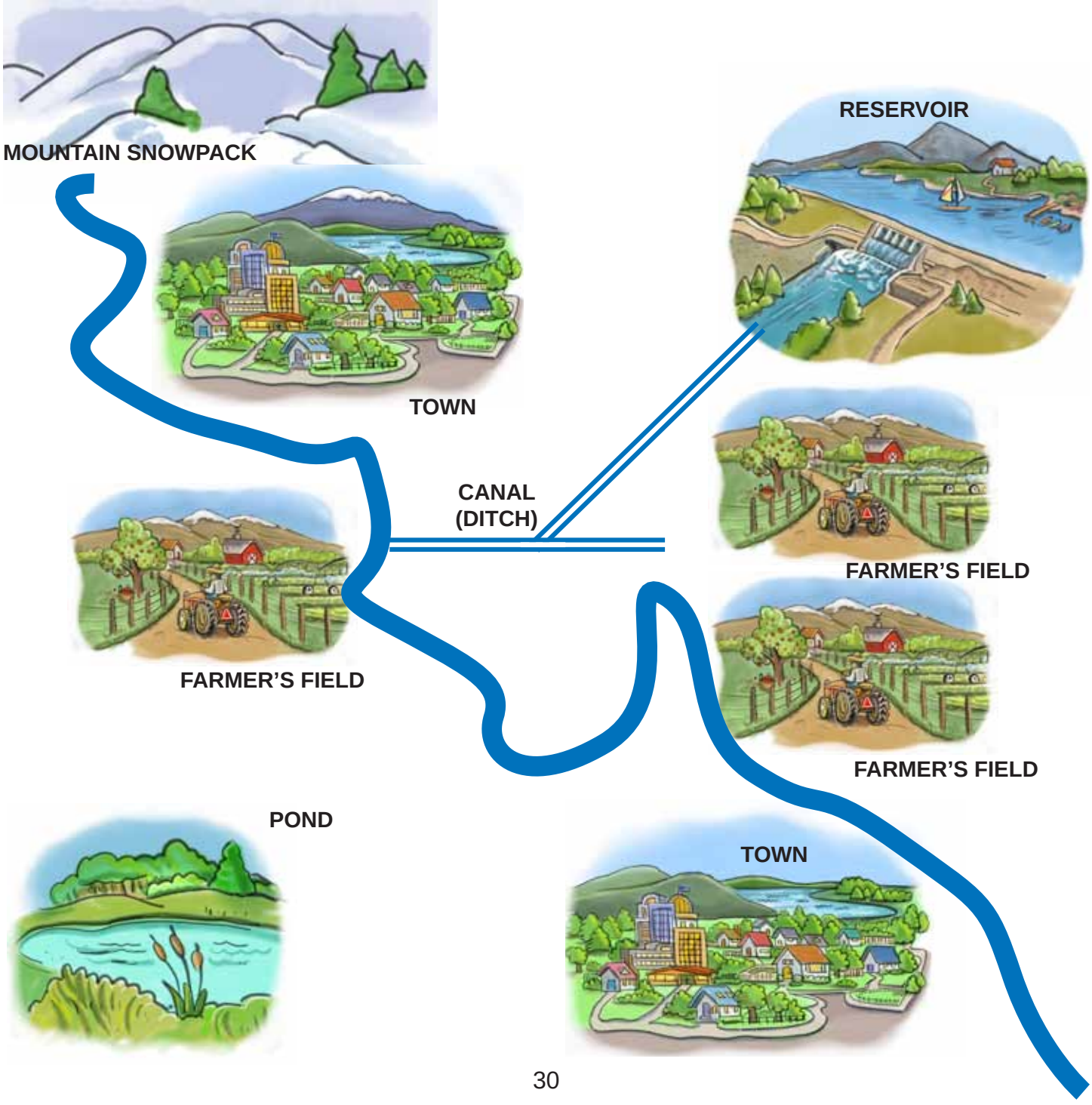
A third way to irrigate is to use a **"drip"** system of hoses. This is where water comes out of holes in the hose next to the plants.

A fourth way to irrigate is to use a **sprinkler** system.

Yet another way to irrigate is **surge irrigation.** A computerized valve turns the water supply to furrows on and off. This system is designed to allow water to soak into the ground before more is applied.

If we start where the crops are in the fields and go backwards we will find a web of ditches and canals that carry water to the fields. Supply ditches get their water from reservoirs or lakes. Reservoirs and lakes get their water from rivers, streams, rain and runoff from storms. Rivers get their water from melting snow, rain and runoff from storms.

Draw arrows where the water goes to make a “water web.”



What are other ways a farmer or rancher might use water?

Write answers on the line next to the picture.

WATER WORDS

WATERING LIVESTOCK
DRINKING
CLEANING
PROVIDING WATER FOR WILDLIFE
HAVING FUN

WATER USES

Businesses use water. Every business needs water. Different types of businesses will need different amounts of water. The amount of water a business needs depends on what they do or what they make. Every business has one or more people working and people need water.

Think about the businesses listed here.
List three ways they might use water.

Restaurant

_____

_____

_____

Recreation Center (with basketball courts, skating rink, swimming pool and weight room)

_____

_____

_____

Supermarket

_____

_____

_____

Car Dealership

_____

_____

_____

Farmer

_____

_____

_____

Water is used in schools every day.

Think of all the different ways water is used in your school. Some places to think about are the cafeteria, restrooms, and areas outside the school buildings where plants and grass grow.

1 If each student in your class drinks 16 ounces of water a day when you are at school, how many ounces of water will your entire class drink, at school, in a day?

2 How many ounces of water will your entire class drink in one school week (5 days)?

128 ounces = one gallon

Now, convert your answers to "gallons" of water!

1

2

People throughout the country have the same needs for water as Colorado residents. Businesses, schools, farms and communities need water. Since less than one percent of available water is fresh water, all of us must share the water. Remember the water cycle? Water is used over and over again. The water that falls as snow in the mountains can find its way to a community in Missouri.

Water used for irrigation flows to plants. About half of this irrigation water will return to the atmosphere. It will form clouds and fall to Earth as precipitation. Some of the irrigation water will soak into the ground, perhaps to be brought to the surface by a well for drinking water for people or animals. A drop of water in a puddle outside your house may find its way to Texas, New York or Canada. It may travel to Europe!

Imagine you are a drop of water.
Describe a trip you take starting from a garden hose.

Let's look at the entire country. Find your state and color it red.

Use an **atlas** (a book of maps) to find the large bodies of water that border the United States. Color them blue. Label oceans, the lake between Michigan and Wisconsin and the Gulf of Mexico.

Find the major rivers that flow through the United States. Draw them on the map in blue.

Nevada has the least amount of precipitation of all the states.

Hawaii receives the most precipitation.

Hawaii is the only state that water flows out of but not into.

Do rivers flow into other rivers?
Does the water ever reach the oceans?

The Mississippi River is the *LONGEST* river in the United States on which boats & ships can travel.

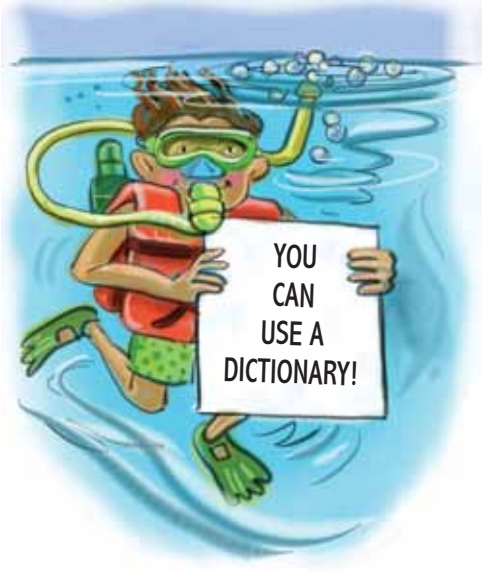
The water we use in our houses, schools and businesses is cleaned at a water treatment facility before we use it. Dirt and bacteria are removed from the water.

Let's explore how water is cleaned and learn some BIG WORDS!

The words we are going to learn are

coagulation (co-ag-u-lá-tion)
sedimentation (sed-i-men-tá-tion)
filtration (fil-trá-tion)
disinfection (dis-in-féc-tion)
storage (stór-age)

Four of our words end in **"-tion."** This is a **suffix.** It has a meaning that attaches to the root word. The suffix "-tion" added to a word makes a noun, meaning an act; a thing done, a process.



What are our root words?

coagulation = coagulate
sedimentation = __ __ __ __ __ __ __ __
filtration = filtrate
disinfection = __ __ __ __ __ __ __ __ __
storage = store

TREATMENT

Water to be cleaned is brought to a treatment plant. It flows into a container. Heavy **particles** settle to the bottom of the container.

There are fine particles that don't settle to the bottom of the container. These particles need to become heavy enough to sink. **Coagulation** is the process of combining small particles with other small particles to create larger solids. **Alum**, a chemical which makes the particles stick together, is added to the water. The water is mixed with rotating mixers at high speed.

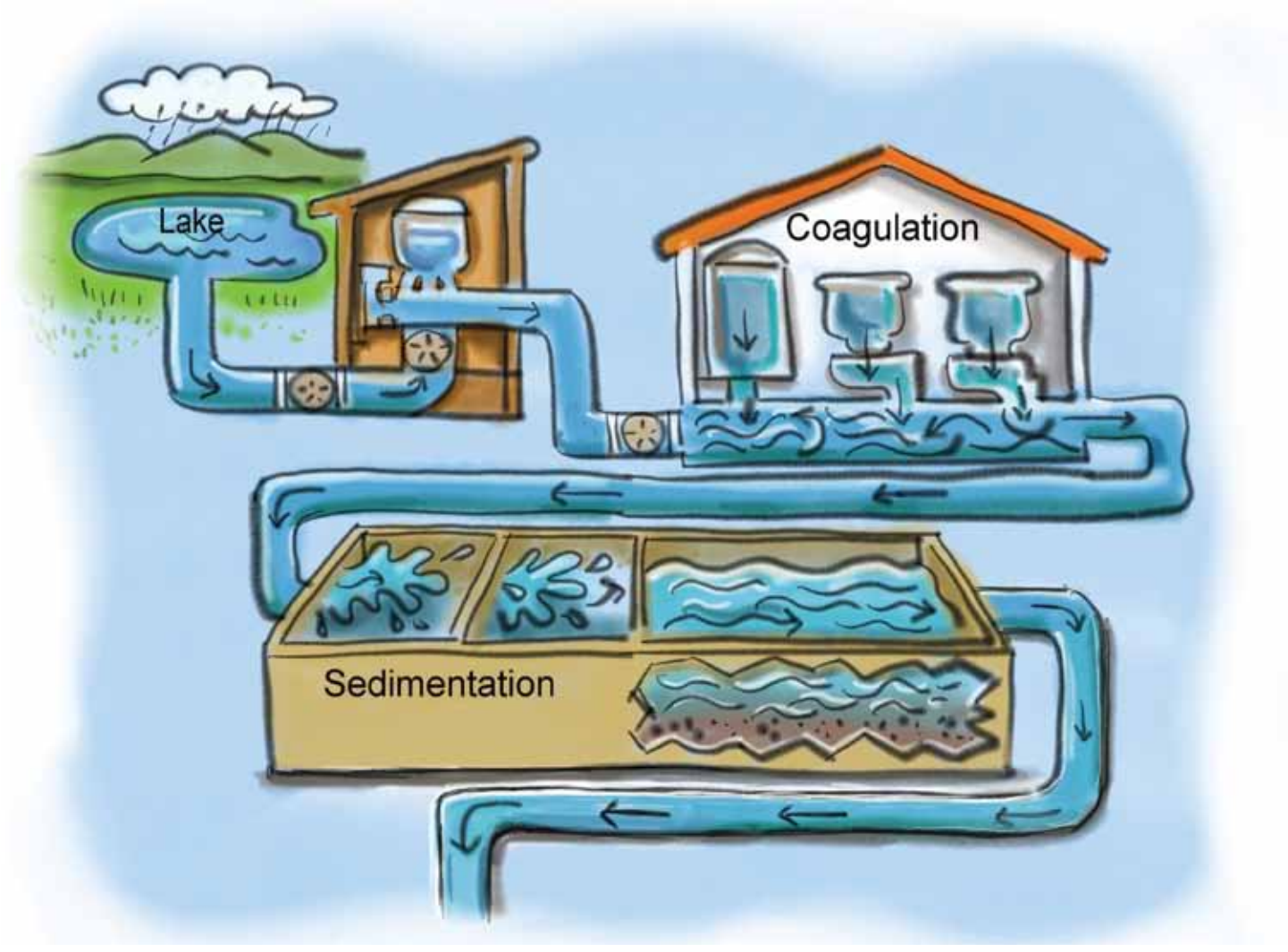
It is easier to remove big things from water than tiny things. If you can make the little things in water stick together or make them heavier than water so they sink, it will be easier to gather them together.

Which of the groups of paper clips will be easier to remove from the water?

1

2

The larger and heavier particles settle to the bottom of the container. They form **sediment**. The process is called **sedimentation**. The clean water moves to filtration.



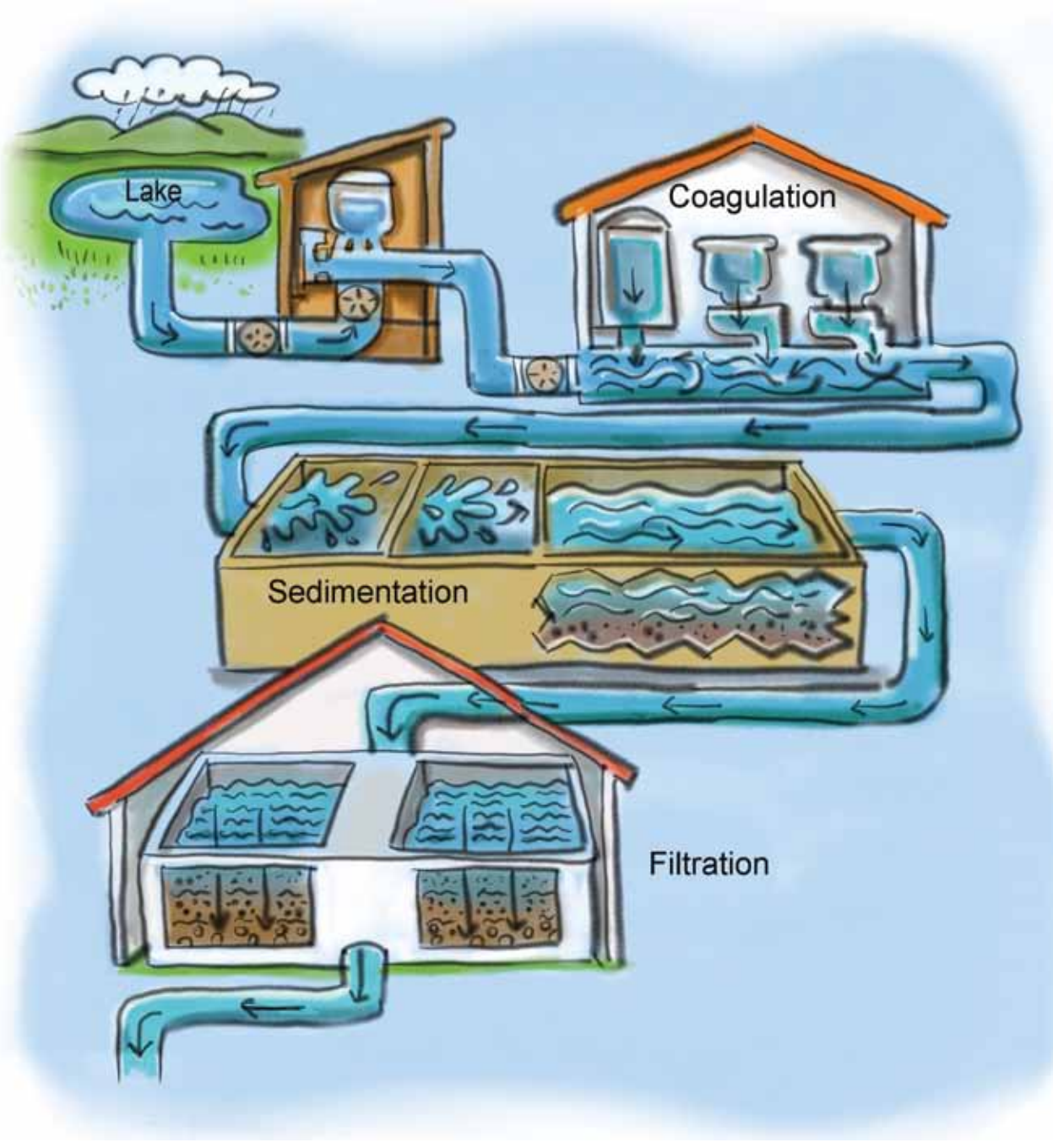
*Another name you might hear for this process is **"flocculation."***

*Coagulation causes the particles to stick together and form larger particles called **floc.***

kō-ăg′yə-lā′tion

flŏk′yə-lā′tion

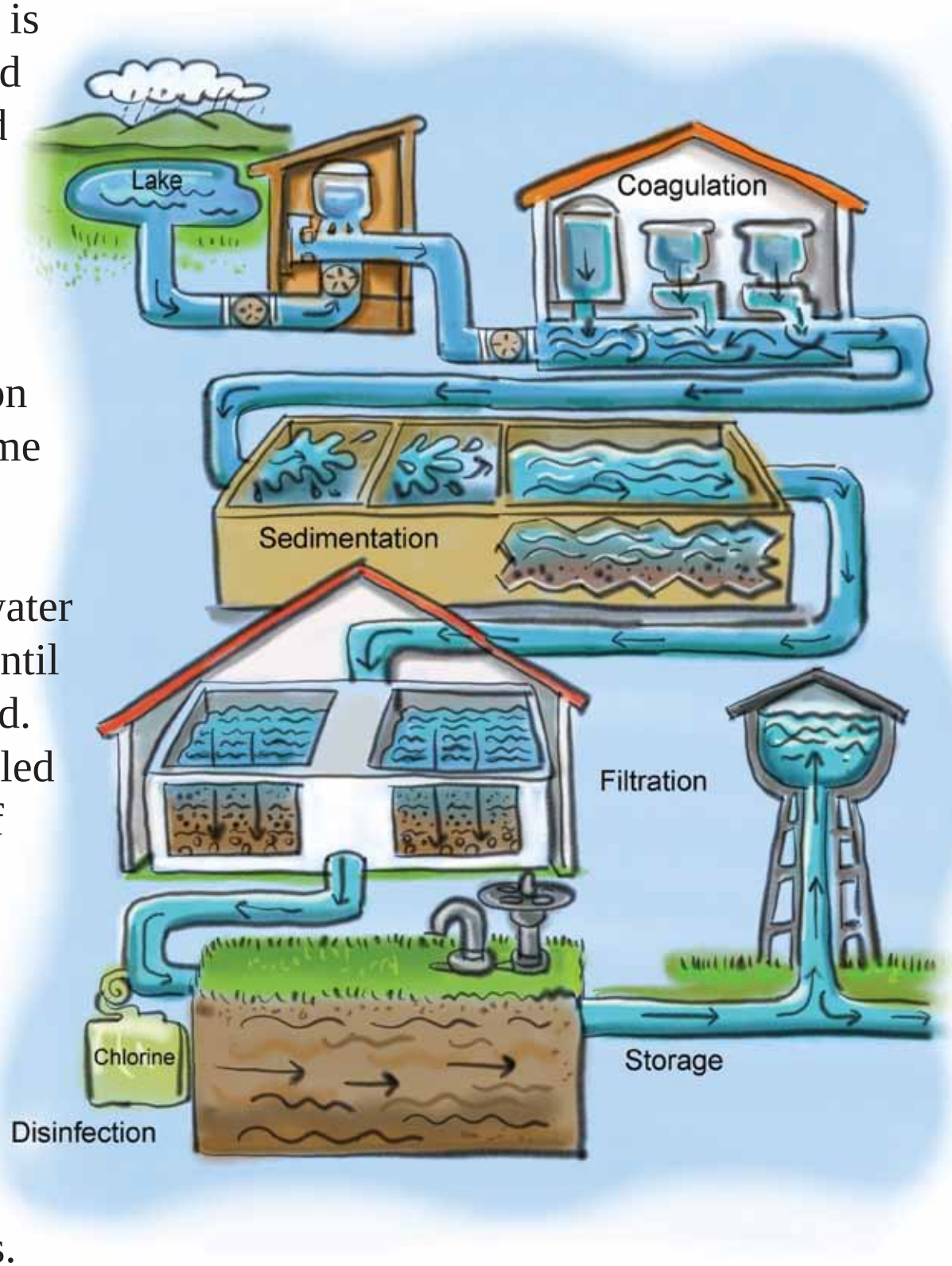
The water passes through filters made of layers of sand, gravel and charcoal. The filtering of the water helps remove smaller particles. This process is called **filtration.**



A small amount of chlorine (or another **disinfectant**) is added to the water to kill any bacteria or microorganisms that may still be in the water. This process is called **disinfection**.

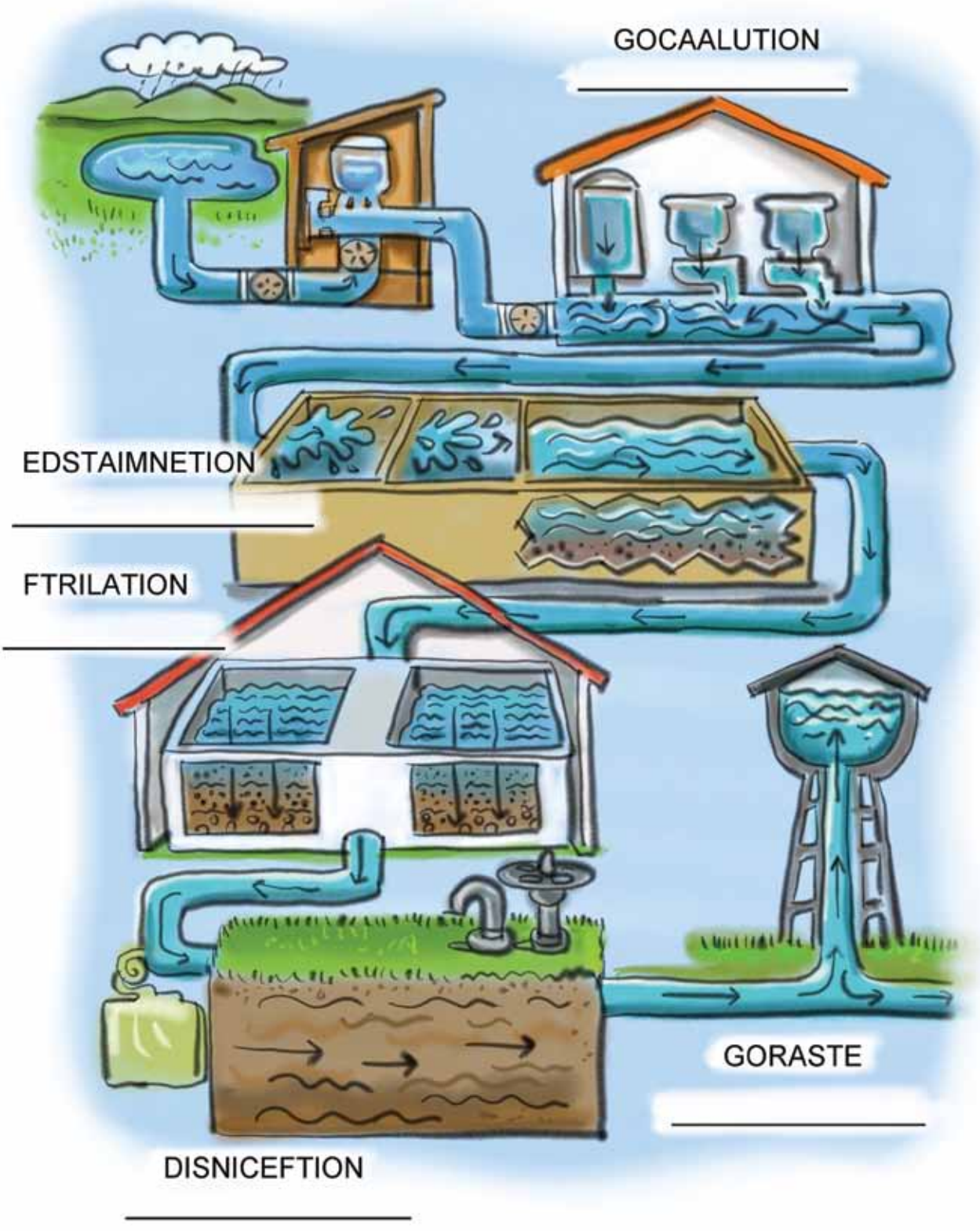
Water is then placed in a closed tank or reservoir. This gives the disinfection process time to work.

The water is stored until it is needed. This is called **storage** of the water. The water then flows through pipes to homes and businesses.



Use your new words to show how water is cleaned so we can drink it.

Stop at each treatment point and unscramble the words.

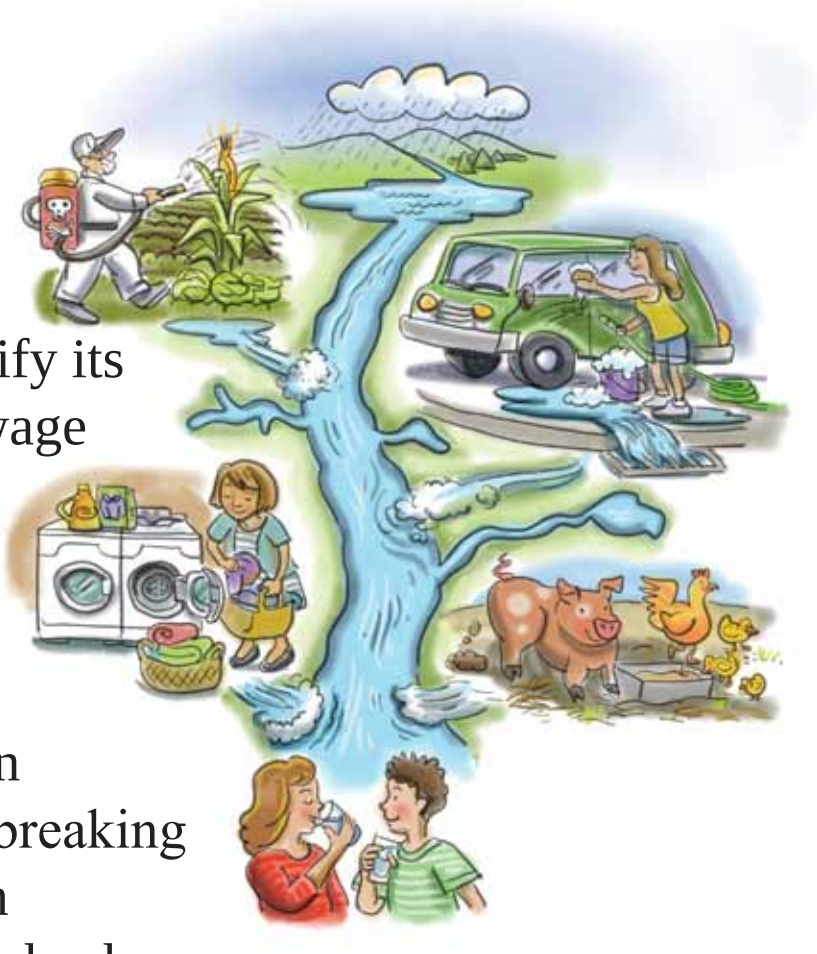


TREATMENT

What do you think of when you hear or read the word

POLLUTION?

There are two types of water pollution: **Point source pollution** and **nonpoint source pollution.**



Point source pollution can be traced to one source. You can easily identify its source. You can point at sewage flowing from broken pipes or see waste materials coming from a factory. Laws have been passed to stop this type of pollution. In addition to paying fines for breaking the law, polluters must clean polluted water before it goes back into rivers.

Nonpoint source pollution, also called runoff pollution, comes from many different sources. There are many possible sources of the dirty "stuff" in streams and lakes. For example, each time it rains, runoff from street picks up litter, motor oil, pet (animal) waste, leaves, grass clippings and spilled chemicals. These things are washed into storm drains and make their way to our rivers and streams.

Nonpoint source pollution (NPS) is also runoff from rainfall and snowmelt moving over and through the ground. The runoff carries natural and human-made pollutants into lakes, rivers, streams, wetlands and other water systems.

Nonpoint source pollution existed even before people started building roads, houses and businesses. Heavy rains carry dirt, soil and other things into rivers and streams.

Circle the items that can pollute water.

SOIL	MOTOR OIL	BOTTLES
PAINT	LITTER	PET WASTE
GASOLINE	LEAVES	CHEMICALS
PAPER	CANS	ABANDONED CARS

An extra word has been added to each sentence below.
Draw a circle around the word that does not belong in the sentence.

All living things need we water.

Dirty water is not need good.

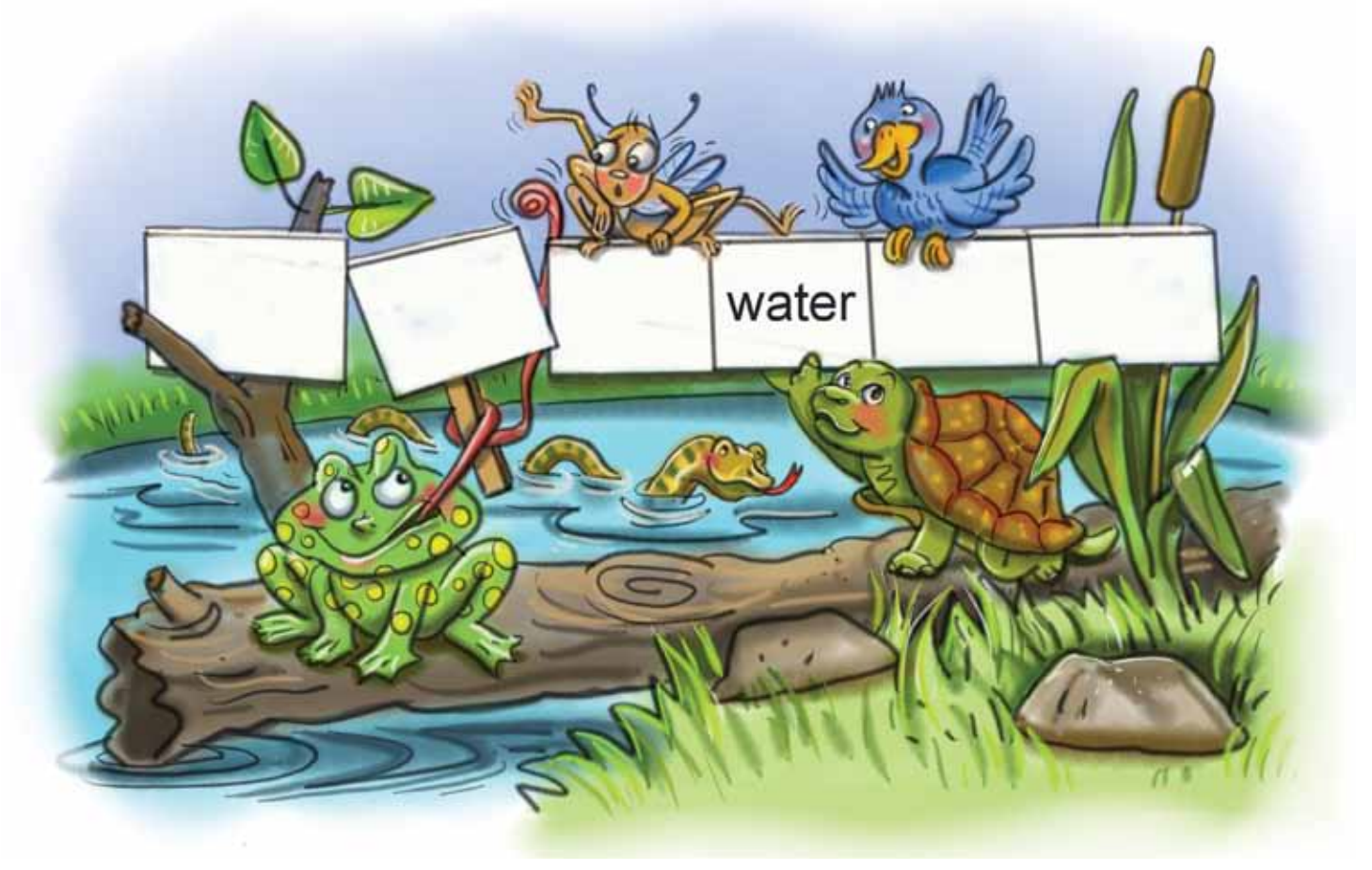
It clean can make you sick.

Keep our water water clean.

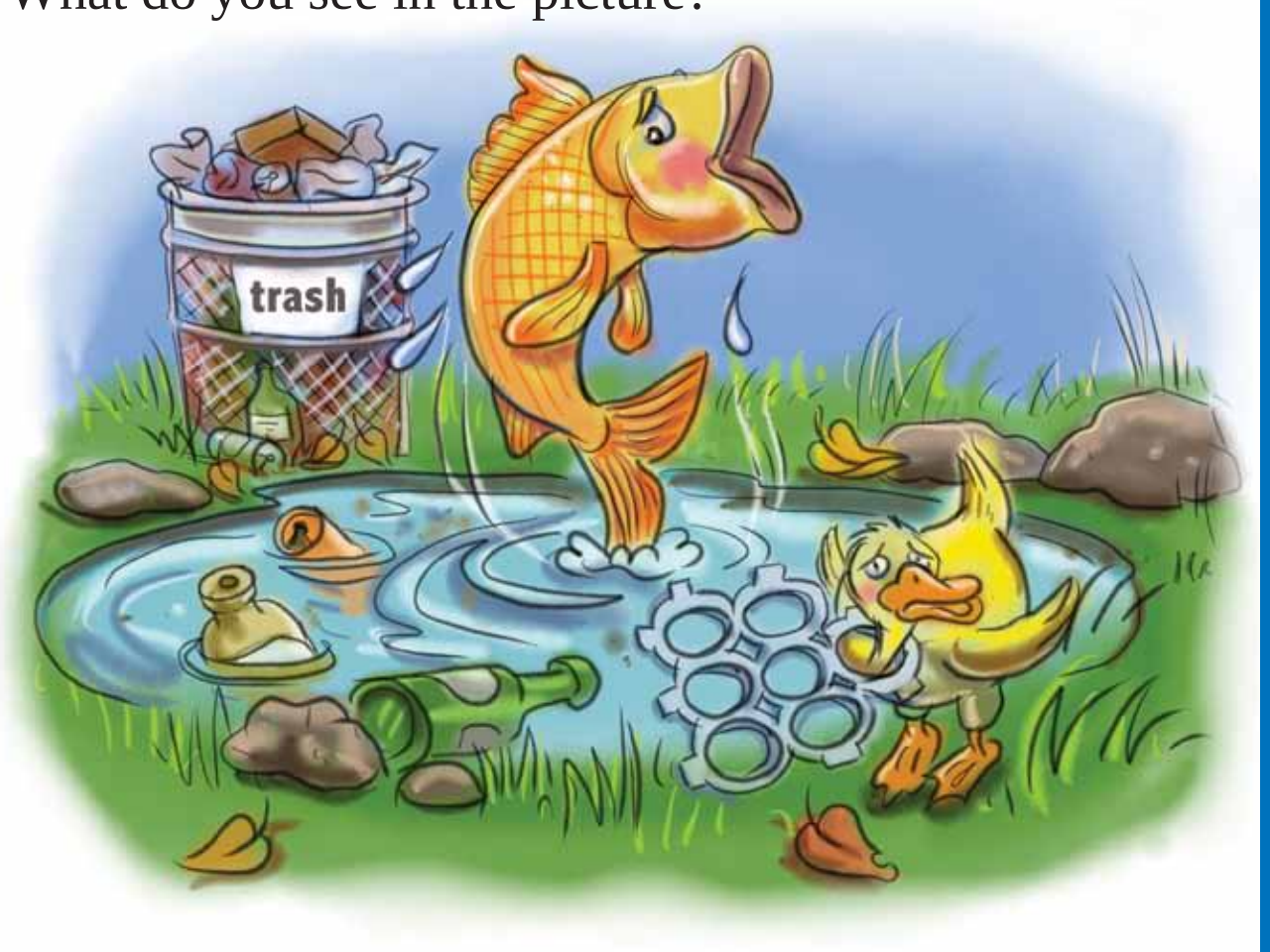
We clean water to at water treatment plants.

The steps for cleaning water are coagulation, sedimentation, drink filtration and storage.

Write the words you circled in the boxes below to make a complete sentence.



What do you see in the picture?



How can we help the fish?

The Environmental Protection Agency (EPA) says that nonpoint sources are the main cause of our water pollution.

Water is **essential** to our lives. It is important to keep it clean. We use water in many ways. Some ways we use water are easy to name. These uses of water include growing food and raising livestock, drinking, washing dishes and bathing. Some uses are not so clear because we don't see them happening.

Water is used to make many products, like clothes and cars. We use water as a means of transportation (shipping products across the ocean or down rivers). Water is used to build homes. It is used to light light bulbs. Water is used to make electricity which brings power to our homes.

Circle the items that need water to grow or be made.











NATURE

Some plants and animals need more water than other plants and animals. Generally, where there is a lot of water, there is a lot of life. Different types of animals live in different places. Deserts are home to plants and animals that use water differently than other plants and animals. Oceans and seas are home to plants and animals that need the environment provided by these large bodies of water.

Colorado is a semi-arid state. It experiences more rain than a desert area but less than a tropical area. Mountains, rangeland, wilderness areas, wetlands, parks and agriculture land are home to wildlife. Irrigation systems in Colorado move water from the western slope to the front range. Water stored in ponds, lakes and reservoirs have created new habitats for wildlife. Ditches and canals carry water to fields. Runoff can create wetland areas. Wetland areas provide homes and food to wildlife. Wetlands filter water and are one of nature's ways to clean water.

CLEAN WATER

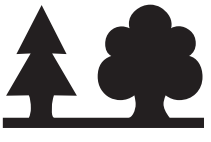
We know that nature can move dirt and sediment. Nature can normally, over time, take care of itself. However, we know that things people do can pollute water. Nature can clean its water by filtering it through different soils and by evaporation. We can also do things to keep water clean.

"Land use activities" is a phrase that is used to group man-made sources of pollution. Land use activities include any activities that disturb soil. These activities can provide pollutants that can be carried by runoff into rivers.

Study the "Land Use Activities" on the facing page, then circle any of the six categories of land use activities you have seen.

Agriculture

Construction



Forestry

Mining

Septic Systems

Urban Storm Runoff

(Ah, good news! You may not have seen pollution being created because the people doing these activities used good management practices to prevent pollution!)

Agriculture activities that can add to nonpoint source pollution are plowing, bug control, plant food, irrigation and raising livestock.

Construction activities – land clearing and grading – can add pollutants to the water system unless care is taken to prevent runoff.

Forestry, which includes timber harvesting, building roads, fire control and weed control can add pollutants to streams and rivers.

Mining moves dirt and gravel. The amount of minerals in an area can change. Toxic materials can result from mining methods. Care must be taken when mining minerals from the ground.

Septic systems are a form of human waste disposal that use land as a filter. Septic systems need to be managed and maintained to prevent adding pollution to our water system.

Urban storm runoff can include oil, animal waste, gas, antifreeze, fertilizers, pesticides, paints, etc. Lawns, gardens and landscaping are major sources of pollution. Rubber from our tires is left on roads every time we drive. Spilled household cleaners, paints, car fluids, etc., or their containers, can add to pollution.

But since we know pollution can happen, we can do things to help. We can learn which practices prevent pollution of our water resources.

Let's **review** a few of the new words we've seen so far.

Find the words listed on the chalkboard in the word search puzzle.

A D I S S O L V E W A T E R
T C X M E T Y O P X W S H U
L D V B M P O L L U T I O N
A I R R I G A T E O P A R O
S S C W A T E R S H E D X F
V S B N Q W E R T Y U I O F
N O N P O I N T S O U R C E
Y L C C O A G U L A T I O N
Q V R E D Z X A T Y O Q W S
S E D I M E N T A T I O N C

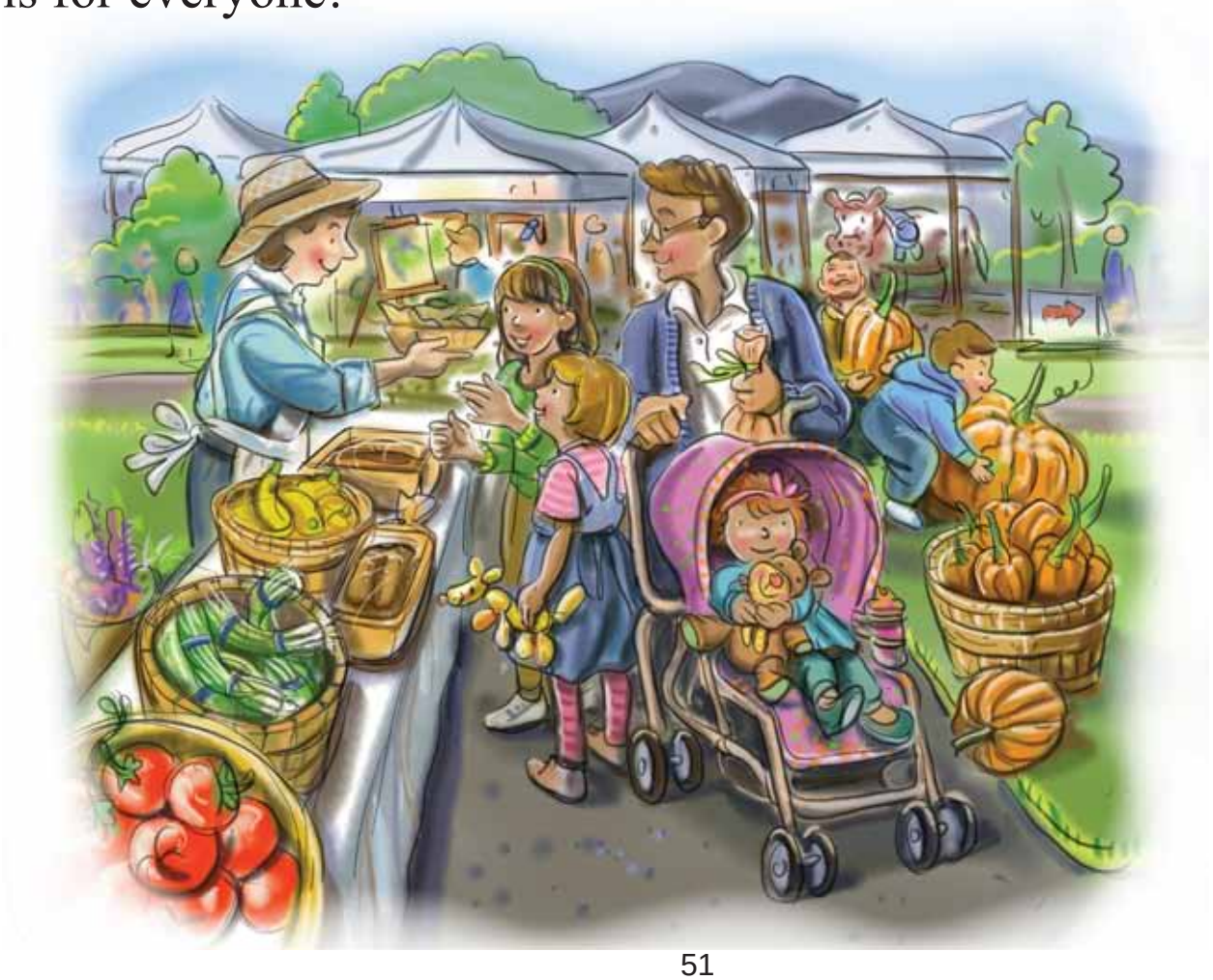
THERE ARE SOME "EXTRA" WORDS IN THE PUZZLE. FIND THE **WATER WORDS** THAT ARE NOT INCLUDED IN THE LIST ON THE CHALKBOARD!

Besides the air we breathe (oxygen), water is the most important element in the human body. An average person can survive over a month without eating; but less than a week without water. The human body is 65 to 70 percent water.

The basic ingredients of everything we eat comes from soil and water. Farmers raise crops and livestock that change soil and water into food.

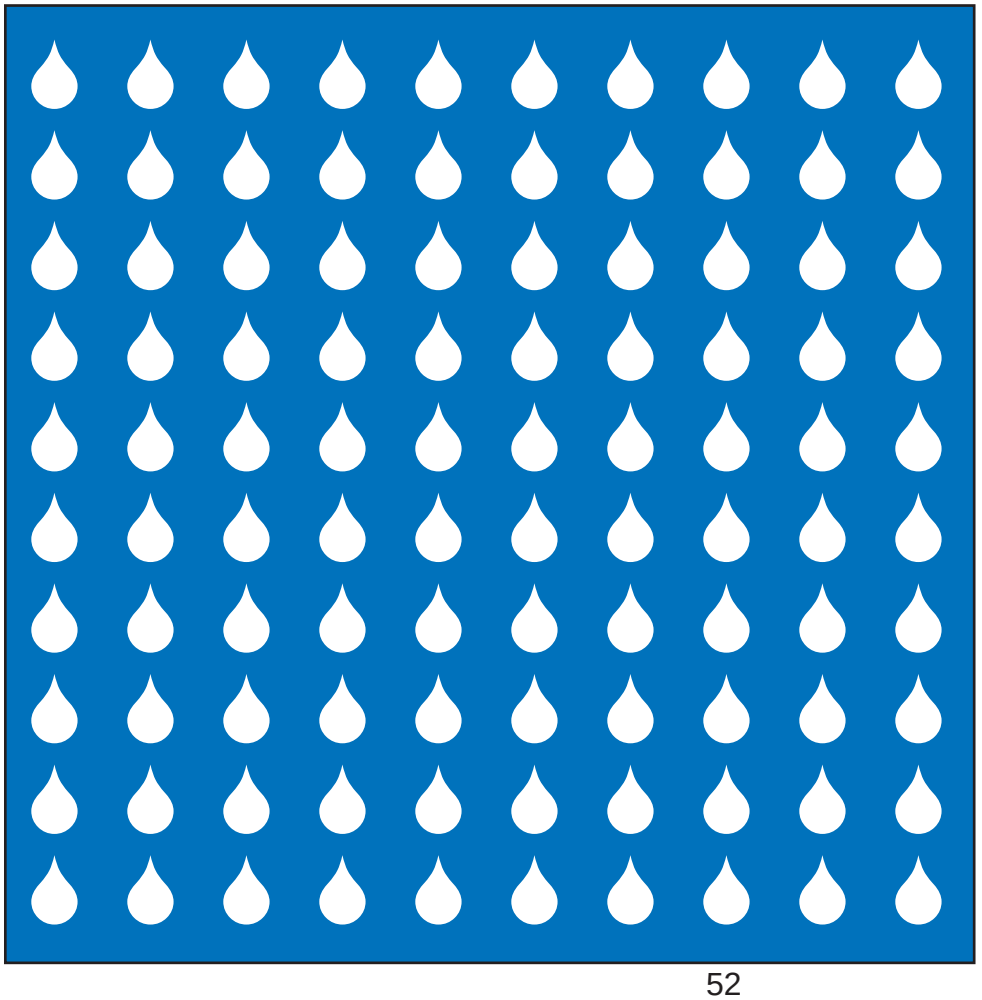
Water is an important part of food.

The water we drink and the water we use to wash our hands is cleaned at a treatment plant before we use it. The water used to irrigate farmland is not cleaned first. So the cleaner we can keep the water, the better it is for everyone!



Let’s look at a hamburger. This hamburger is made of ground beef, bun, lettuce, tomato and onion.

Start coloring each color from the top left corner. *Most of the water drops will end up being more than one color.*



Color drops for the **ground beef** brown.
Color drops for the **hamburger bun** blue.
Color the drops for **lettuce** green.
Color drops for the **tomato** red.
Color drops for the **onion** yellow.

How many drops have no color? These drops show how much of the hamburger is NOT water!

How many drops have all five colors?

How many drops have only one color?

LET'S MAKE A COLLAGE

You will need:
Magazines, scissors, glue, and a large piece of paper cut in the shape of a water drop.

Cut pictures out of the magazines that show water or something that needed water when it was made.

You have learned water is used to make products, to cook, to grow food and for fun and play. Animals use water in many ways, too!

Glue all the pictures on the large water drop-shaped paper to create a collage.
Look at the collage.

Could you go through the day without water?

REVIEW ~ PERCENTAGES

Circle the words that make the statements true.

It is true that
50% is the same as or more than half?

60% is more than or less than half?
36% is more than or less than half?
95% is more than or less than half?
95% is more than or less than 50%?

Look around your classroom or house.
Make a list of things that needed water to be made.

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

HINTS

A baseball glove is made of leather. Leather comes from animals. Animals drink water. What else do you see that uses leather?

Wood comes from trees. Trees need water to grow. What do you see that is made of wood?

Steel and other metals are made using water. What do you see that has metal or steel parts?

If you named 20 items write your name here

_____

We use water every day. We also use products that need water to grow or be made. The food we eat needs water to grow.

A farmer who lives downstream from you grows tomatoes, onions and lettuce. Pretend you had a salad using tomato, onion and lettuce for lunch. Where did the tomato, onion and lettuce come from? They came from the farmer who lives downstream from you. The farmer uses water you have already used to grow the vegetables. It is important to keep our water clean so the farmer has clean water to use.

Write a description of what you can do to help get clean water to farmers to irrigate the vegetables you eat for lunch...

We can do many things to help water stay clean. We learned urban runoff can add to nonpoint source pollution. Urban storm runoff can include oil, pet waste, gas, antifreeze, fertilizers, pesticides, paints, litter, and more. Lawns, gardens, and landscaping are major sources of pollution.

Some things we do to help include:

- Put litter and garbage in trash cans.
- Recycle aluminum cans, paper, glass, plastic, styrofoam and metal.
- Xeriscape with native plants.
- Recycle leaves and lawn clippings by making compost.
- Plant plants that encourage butterflies and birds that keep bug pests away.
- Clean up spilled motor oils.
- Pick up and throw away pet waste.
- Volunteer to help clean up your yard, your neighborhood, a park.
- Get a bunch of friends together to help clean up your school, neighborhood, park, canal, ditch, or wetland.
- Ride a bike, walk or take a bus instead of getting a ride in a car.

An **acre** is a measure of land area.
An **acre foot** is a basic measurement of water volume.

An acre foot of water is enough water to cover one acre of land one foot deep; or enough water to put 10 inches of water on a football field.

One acre foot of water is 325,851 gallons.

If an urban family of five uses **one acre foot of water** for all its needs **for one year**…

How many **gallons per person** is this?

How many gallons of water does **your family** use in a year?

CONSERVATION of water means using less water because you *want to* use less, not because you *have to* use less (rationing).

If your family can do things that will result in using 10% less water, how many gallons of water would be saved? What would you do to save water?

If your family can do things that will result in using 20% less water, how many gallons of water would be saved? What would you do to save water?

CONSERVATION

As a family activity, fill out the water conservation inventory form. Use your answers to learn what you can do to be a water conservationist.

INDOORS	YES	NO
Have you checked faucets, toilets and showerheads for leaks?	❑	❑
Have you fixed any leaks?	❑	❑
Do you use the toilet as a trash can?	❑	❑
Is your toilet a high-efficiency model?	❑	❑
Do you take baths?	❑	❑
Do you take showers?	❑	❑
Do you have a low-flow showerhead?	❑	❑
Do your faucets have low-flow nozzles?	❑	❑
Do you let water run while you brush your teeth?	❑	❑
Do you run your dishwasher when it's not full?	❑	❑
Do you let water run while washing vegetables or dishes?	❑	❑
Do you keep a pitcher of water in the refrigerator instead of running the faucet until the water gets cold?	❑	❑
When you wash dishes by hand, do you use two basins - one for washing and one for rinsing - instead of letting the water run?	❑	❑

OUTDOORS

	YES	NO
Do you sweep the driveways, walks and patio instead of cleaning them with a hose and water?	❑	❑
Have you checked faucets for leaks and fixed any you found?	❑	❑
Do you use a sponge and bucket to wash the car, or go to a commercial car wash, instead of using a hose with running water?	❑	❑
Do you water the lawn in the early morning or evening to avoid evaporation?	❑	❑
Do you water only when your landscape needs it?	❑	❑
Do you use drip irrigation to water slowly, deeply, thoroughly and infrequently to encourage root growth?	❑	❑
Do you mow your lawn to two inches or more and leave the clippings?	❑	❑
Do you water trees and shrubs separately from the lawn?	❑	❑
Do you use mulch to reduce evaporation?	❑	❑
Have you planted native plants in your landscaping?	❑	❑
Do you collect rainwater to use in the garden?	❑	❑
Do you put litter and garbage in trash cans?	❑	❑
Do you recycle?	❑	❑
Do you compost leaves and other garden growth?	❑	❑
Have you learned the right way to throw away leftover paint containers, garden chemical containers and cleaning product containers?	❑	❑

If you are a water conservationist your answers match the following:
INDOORS: yes, yes, no, yes, no, yes, yes, yes, no, no, no, yes, yes.
OUTDOORS: all yes.

CONSERVATION

Conserving water means we use less of it. It doesn't mean you quit washing the dishes and it doesn't mean you skip drinking a glass of water. Conserving water means not wasting water. Stopping a faucet from leaking, keeping cold water in the refrigerator to drink, turning off the water when you brush your teeth – all help conserve water.

Good things result from conserving water.

We like water to be clean when we use it. And we clean it up after we have used it and are ready to return it to the water cycle.

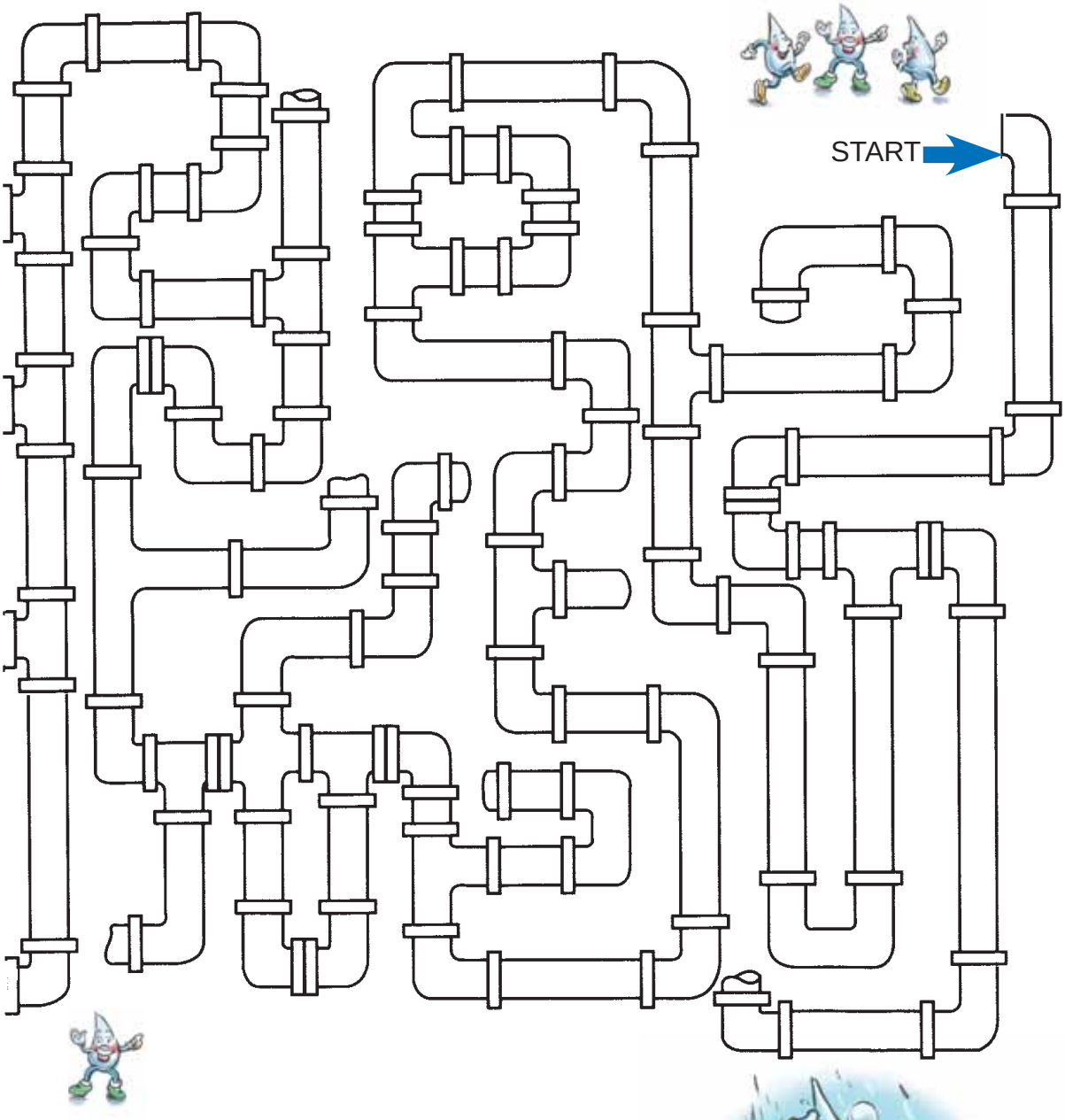
WASTEWATER TREATMENT PLANTS CLEAN OUR USED WATER.

USE WATER WISELY!

Sinks have drains. The bathtub has a drain. The toilet has a drain. Washing machines, dish washers and some refrigerators have drains. All the drain pipes in your house carry water into a larger pipe that is underground. It connects to another larger pipe that is part of the sewer system. The sewer system is a whole lot of pipes. They carry the waste water to a wastewater treatment plant.

Let's go down the drain…

Find which way the water flows through the pipes to reach the wastewater treatment plant.



Wastewater Treatment Plant

WASTEWATER

Wastewater flows through the sewer pipes to reach the treatment plant.

There are 3 steps to cleaning wastewater:

1 primary treatment 2 secondary treatment and 3 advanced treatment.

1 The first step uses bar screens to filter out large objects like sticks and rocks. Water flows easily through the bar screens but big stuff gets stuck and can be removed. Everything that passes through the bar screens flows into a tank. In this tank, dirt and particles settle to the bottom. This is called **sedimentation.** Solids settle to the bottom of the tank. The solids that collect are pumped from the bottom of the sedimentation tank into another settling tank.

2 The second step uses **bacteria** to break down wastes. (Bacteria are funny little critters. They can be good or bad. They are doing good things here.) The wastewater flows through tanks where air is added and the waste is stirred to help the bacteria grow. The bacteria and solids settle to the bottom in the secondary sedimentation tank.

3 The last step is the advanced treatment process. Water flows through sand and gravel. This is called **filtering.** The filtered water is disinfected. The most common disinfectants used are chlorine, ultraviolet light or ozone.

What is left over after wastewater has run through the treatment plant?

There is clean water. It flows into the river and goes on downstream.

There is sediment. The sediment settled on the bottom of the tanks. The sediment is made into **biosolids.** Once processed, the biosolids can be used as a fertilizer. Biosolids can be put on cropland to help plants grow.

Solve the crypto-puzzle!
(CLUE W = T, Z = W, R = O and V = S)

J R R G W K L Q J V D E R X W

F R Q V H U Y L Q J Z D W H U:

F O H D Q Z D W H U,

E L R V R O L G V,

O H V V S R O O X W L R Q.

WASTEWATER

Glossary & Water Terms

ACRE: a unit of measurement of land. It is equal to the area of land inside a square that is about 209 feet on each side (43,560 square feet).
ACRE FOOT: the volume of water required to cover one acre of land to a depth of one foot (43,560 cubic feet or 325,851 gallons).
AGRIBUSINESS: producers of agricultural goods and services, such as farm equipment makers, food and fiber processors, wholesalers, transporters, and retail food and fiber outlets.
AGRICULTURE: the science, art and business of cultivating the soil, producing crops, raising livestock and making products available to meet the world's food, and much of its clothing, shelter and other needs.
ALUM: a chemical used in the water cleaning process that makes particles stick together (coagulate) so they become heavy enough to sink to the bottom of a container.
AQUIFER: consists primarily of sand, gravel and porous rock through which water may move but which is surrounded by mainly impervious materials. Aquifers may be thin or thick, may be very small or may stretch for hundreds of miles. The refilling or replacement of water in aquifers is called recharging.
ATLAS: book of maps.
ATMOSPHERE: the gaseous mass or envelope surrounding Earth.

BACTERIA: microscopic organisms that live in water and on land. They help break down organic materials into simpler nutrients through a process called decay.
BASIN: the area of land that drains to a particular river.
BIOSOLIDS: solid materials of organic origin resulting from wastewater treatment (at one time called sludge); biosolids meet federal and state standards for use as fertilizers.

CANAL: a man-made waterway.
CLIMATE: the average weather conditions of a place or region. Includes the average rainfall, temperature, humidity and wind conditions.
COAGULATION: process of combining small particles with other small particles to create larger solids.
COAGULATE: to cause small particles to combine with other small particles.
COLLAGE: an artistic composition of materials and objects pasted over a surface.
COMMUNITIES: a group of people living in the same locality; common possession or participation.
COMPOSTING: mixing decaying organic matter (grass clippings, leaves, etc.) to form a rich soil conditioner.
COMPOUND: a combination of two or more elements or parts; atoms of two or more different elements combined.
CONDENSATION: the process of changing a gas into a liquid; for example, when steam or water vapor turns into water.
CONDENSE: to undergo condensation.
CONSERVATION (water): the wise use of water with methods ranging from more efficient practices in farm, home and industry to capturing water for use through water storage or conservation projects.
CONSERVATION (soil): a combination of land use and practices to protect and improve soil and to prevent soil deterioration from erosion, exhaustion of plant nutrients, accumulation of toxic salts, excessive compaction or other adverse effects.
CULTIVATION: to prepare and improve land for raising crops.
CYCLE: a periodically repeated sequence of events.

DAM: structure built to stop the flow of water down a stream.
DENSITY: the mass per unit of volume of a substance.
DIARY: a daily record, especially a personal record of events, experiences and observations.
DISINFECT: to cleanse of disease-carrying microorganisms.
DISINFECTANT: an agent that disinfects (like chlorine).
DISINFECTION: the process of cleansing pathogenic microorganisms (in our case, from water).
DISSOLVE: to reduce to liquid form; to break up or disperse.
DIVERSION: removal of water from any body of water by canal, pipe or other conduit.
DOWNSTREAM: in the direction of a stream's current.
DRAINAGE BASIN: see Basin; see Watershed.
DRIP IRRIGATION: a method of irrigating that is done by drilling holes in a hose or pipe so water flows to individual plants.
DROUGHT: a long period with no rain.

ELEMENT: a substance composed of atoms.
EROSION: a natural process by which rock and soil are broken loose from the Earth's surface at one location and moved to another by wind, moving water, ice and landslides.
ESSENTIAL: necessary.
EVAPORATE: to change a liquid to vapor.
EVAPORATION: the process of changing a liquid to a gas (vapor); for example, when water turns into steam or water vapor.
EVAPOTRANSPIRATION: the total moisture loss from an area controlled by climactic conditions and plant processes (evaporation and transpiration; ET).

FARMER: a person who operates or works on a farm for the purpose of producing a crop or livestock.
FERTILIZERS: materials added to soil to make it better for growing crops. Manure, composts from decayed leaves and certain chemicals are common materials used as fertilizers.
FILTRATE: to put through a filter.
FILTRATION: the process of putting water through filters to clean the water.
FLOAT: to remain suspended on the surface of water without sinking.
FLOC: a mass formed as a result of flocculation.
FLOCCULATION: the process of causing particles to form lumps or masses.
FLOOD: an overflowing of water onto land.
FLOOD IRRIGATION: a method of irrigating that is done by causing water to overflow onto land to reach crops.
FRESH WATER: salt-free water.
FURROW IRRIGATION: a method of irrigation in which water flows down small ditches (furrows) between rows of crops.

GAS: a state of matter distinguished from the solid and liquid states by very low density.
GERMINATE: to begin to grow; sprout.
GLACIER: a huge mass of compacted snow.
GLOBE: a sphere showing a representation of Earth.
GROUNDWATER: groundwater, as opposed to surface water, is water that does not runoff, and is not taken up by plants, but soaks down into an aquifer.

H_2O: water (2 hydrogen atoms with one oxygen atom).
HAZARDOUS: dangerous.
HYDROGEN: a colorless gaseous element.
HYDROLOGIC CYCLE: the cycle of water movement from the atmosphere to Earth and back again through evaporation, transpiration, condensation, precipitation, percolation, runoff and storage. See Water Cycle.

ICE: frozen water.
IRRIGATE: to supply with water by means of ditches, pipes, etc.
IRRIGATION: the artificial distribution of water on the land surface to establish a crop or to increase crop yield where the precipitation is inadequate.

GLOSSARY

LAND: one of the major factors of production that is supplied by nature and includes all natural resources in their original state such as mineral deposits, wildlife, timber, fish, water and the fertility of the soil.
LANDSCAPING: to adorn or improve an area of ground by contouring the land and planting flowers, shrubs, trees, etc.
LIQUID: the state of matter in which a substance exhibits a characteristic readiness to flow.
LIVESTOCK: domestic animals raised for home use or profit.

MOISTURE: wetness.
MOUNTAINOUS: a region having many mountains.

NATURAL RESOURCES: products and features of Earth that permit it to support life and satisfy people's needs; these include land, water, air, birds, animals, sand, soil, coal, etc.
NONPOINT SOURCE POLLUTION (sometimes called **RUNOFF POLLUTION):** pollution coming from a wide, non-specific source (car exhaust, oils, street salt, etc.)

ORGANIC MATTER: plant and animal material in various states of decomposition that may be part of the soil.
OXYGEN: colorless, odorless, tasteless gaseous element; essential for plant and animal respiration (breathing).

PARTICLES: very small pieces or parts.
PERCENT: per hundred; quantity with relation to a whole.
POINT SOURCE POLLUTION: pollution coming from a single source such as a factory smokestack or sewer.
POLLUTANT: something that makes land, water and air dirty and unhealthy.
POLLUTE: doing anything that makes something else dirty or impure.
POLLUTION: wastes contaminating the soil, water or air.
PRECIPITATION: rain, snow and other forms of water that fall to Earth.

RAIN: a form of precipitation falling to Earth in the form of liquid water.
RANCHER: a person who owns or operates a ranch. A ranch is any large farm on which a particular crop or kind of animal is raised.
RATIONING: allowing use of a fixed portion or amount.
RELATIVE HUMIDITY: the percentage of moisture saturation of the air.
RENEWABLE NATURAL RESOURCES: resources such as forests, rangeland, soil and water that can be restored and improved to produce the food, fiber and other things humans need on a sustained basis.
RESERVOIR: a natural or artificial place to store water; water storage created by building a dam.
RIVER: a large natural stream of water flowing into an ocean, lake, or other body of water.
RIVER BASIN: the land area surrounding one river from its headwaters to its mouth.
RUNOFF: includes rain and snow which is not absorbed into the ground; instead it flows across the land and eventually runs into streams and rivers. Runoff can pick up pollutants from the air and land, carrying them into the streams and rivers.

SALT WATER: water from oceans; water containing salt.
SEDIMENT: small pieces of matter that settle at the bottom of liquid; soil, sand and materials washed from land into waterways.
SEDIMENTATION: when soil particles (sediment) settle to the bottom of a waterway or water container.
SINK: to drop to the bottom of liquid.
SNOWPACK: accumulated snow in the mountains.
SOIL: the loose top layer of Earth's surface in which plants grow; a naturally occurring mixture of minerals, organic matter, water and air.
SOLID: of a definite shape and volume; not liquid or gaseous.
SPRINKLER IRRIGATION: a method of irrigation using sprinklers to distribute water to plants.
STEAM: the vapor phase of water.
STORAGE: keeping something (in our case, water) on hand and available for use as needed.
STORE: (noun) a stock or supply of something available for use; (verb) to collect and keep for future use.
STORM DRAIN: a drain used to direct runoff from streets to streams, ditches or lakes.
SURFACE WATER: water that is on top of the ground (lakes, rivers, oceans, etc.).
SUFFIX: an addition to the end of word to make a word with a new meaning.
SURGE IRRIGATION: a method of irrigation using computerized valves to turn the water supply on and off to allow extra time for water to soak into the ground.

TILLAGE: turning the topsoil over by plowing, spading or rototilling to create a seedbed for plants.
-TION: a suffix added to a word to create a word meaning an action or process.
TRANSPIRATION: the process by which plants remove soil moisture by losing water vapor through their leaves.

URBAN: city.

VAPOR: any barely visible or cloudy diffused matter, such as mist, fumes or smoke.
VOLUME: size.

WATER: a clear, colorless liquid; H2O; essential for most plant and animal life; most widely used of all solvents.
WATER CONSERVATION: the wise use of water with methods ranging from more efficient practices in farm, home and industry to capturing water for use through water storage or conservation projects.
WATER CYCLE: water is always in one stage or another, in one place or another, of the endless water cycle - the cycle involves evaporation, precipitation and runoff. The water cycle has no fixed speed or distribution - the only constant is the total amount of water on Earth.
WATER RIGHT: a right to use, in accordance with its priority, a certain amount of water.
WATERSHED: the region draining into a river, river system or body of water; the total land area, regardless of size, above a given point on a waterway that contributes runoff water to the flow at that point; all the land that serves as a drainage for a specific stream or river.
WATER STORAGE: the locations in which water is stored. Water storage can be above ground in lakes, reservoirs and other "containers" or below ground as groundwater.

XERISCAPE: the use of plant materials and practices that minimizes landscaping water use; usually native plants.

Resources & References

The following publications and materials provided reference information for *Understanding Water Activity Book.*

Utah Agriculture and Me - Ag in the Classroom Elementary Curriculum: Utah Farm Bureau Federation, Salt Lake City, UT
Water Education Calendar: International Office for Water Education, Utah Water Research Office, Utah State University, Logan, UT
Minnesota Agriculture Magazine and Ag-tivities for Fun and Learning: Minnesota Ag in the Classroom, St. Paul, MN
Colorado Model for Conservation Education Resources: by George Ek, David Loth and Helen Loth, Colorado Dept. of Education, Colorado Dept. of Natural Resources, Colorado Division of Wildlife
Conserving Soil: National Assn. of Conservation Districts
Water Conservation and Nonpoint Source Pollution: Utah State University Cooperative Extension
WET, Water Education for Teachers: The Western Watercourse, Montana State University, Bozeman, MT
Farm Facts (Agriculture - An American Success Story): American Farm Bureau Federation, Park Ridge, IL
4-H Ecology Project Leader's Guide: Cooperative Extension Service, Kansas State University, Manhattan, KS
Colorado Water: League of Women Voters of Colorado, Denver, CO
Conservation in Colorado: State of Colorado Dept. of Natural Resources Soil Conservation Board
Water Water Water Water Water and Bank Balance: Managing Colorado's Riparian Areas (Bulletin 553A): Colorado State University Cooperative Extension, Fort Collins, CO
Colorado Water Citizens Water Handbook (Information Series No. 67: Colorado State University Cooperative Extension, Fort Collins, CO

The following entries, in addition to being reference sources, have materials available for educators. Confirm availability and cost (if any) of the materials.

American Water Works Association (AWWA)
6666 W. Quincy Ave.
Denver, CO 80235
303-794-7711; www.awwa.org
Educational materials, *The Story of Drinking Water, Our Water Cycle*

Central Colorado Water Conservancy District
3209 West 28th Street
Greeley, CO 80634
970-330-4540; Fax: 970-330-4546;
www.ccwcd.org
Glossary of water terms

City of Aurora Utilities Department
1470 S. Havana, #400
Aurora, CO 80012
303-695-7387
The Story of Drinking Water booklet, other educational materials, water conservation information, displays, exhibits

City of Fort Collins Natural Areas
www.fcgov.com/naturalareas
naturalareas@fcgov.com
970-416-2815; Fax 970-416-2211
Educational materials, nature tours

City of Fort Collins Water Utilities
P.O. Box 580
Fort Collins, CO 80522
970-221-6681
www.fcgov.com/utilities/community-education/youth
Educational materials, videos, speakers, tours

CoCoRaHS
Colorado State University
1371 Campus Delivery
Fort Collins, CO 80523-1371
970-491-1196; www.cocorahs.org
Rain, hail, and snow collection data

Colorado Blue Thumb Club
nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=20005590.txt
Drinking water Activities for Students, Teachers, and Parents

Colorado CattleWomen Education Project
Colorado Beef Council
789 Sherman St., Suite 105
Englewood, CO 80203
303-830-7892; Fax 303-830-7896
Educational materials

Colorado Climate Center
Department of Atmospheric Science
Colorado State University
1371 General Delivery
Fort Collins, CO 80523-1371
ccc.atmos.colostate.edu
Educational materials

Colorado Farm Bureau
9177 E. Mineral Circle
Centennial, CO 80112
303-749-7500; Fax 303-749-7703;
www.colofb.co
Email: info@colofb.com
Educational materials, speakers, displays

Colorado Foundation for Agriculture
P.O. Box 10
Livermore, CO 80536
970-881-2902; www.growingyourfuture.com
Email: bblinde@growingyourfuture.com
Educattional materials: Colorado Readers, Activity Books, e-lessons

Colorado Office of Water Conservation
1313 Sherman Street, Room 721
Denver, CO 80203
303-866-3441; www.cwcb.state.co.us/
Water Fact sheets, brochures, educational materials

Colorado River Water Conservation District
P.O. Box 1120
Glenwood Springs, CO 81602
970-945-8522; Fax 970-945-8799;
www.crwcd.org
Educational materials, quizzes, videos

CSU Cooperative Extension materials are available by contacting:
Resource Room
Colorado State University
Fort Collins, CO 80523
970-491-6198; www.extcolostate.edu/
Educational materials

Colorado WaterWise
PO Box 40202
Denver, CO 80204-0202
www.coloradowaterwise.org.
Educational materials

National Assn. of Conservation Districts
509 Capitol Court, NE
Washington, D.C. 20002-4937
(202) 547-6223 (NACD); Fax (202) 547-6450
www.nacdnet.org
Educational materials, merchandise (catalog)

National Cattlemen's Association & Beef Board
9110 E. Nichols Avenue, #300
Centennial, CO 80112
303-694-0305; www.beef.org
Educational materials, brochures

Northern Colorado Water Conservancy District
220 Water Ave.
Berthoud, CO 80513
800-369-7246 (RAIN); Fax 877-851-0018
www.ncwcd.org
Tours, speakers, educational materials
On-line info: Colorado Water Knowledge

Soil and Water Conservation Society (SWCS)
945 SW Ankeny Road
Ankeny, Iowa 50023-9723
515-289-2331; Fax 515-289-1227
www.swcs.org
Water in Your Hands; Wetlands Activity Guide

U.S. Geological Survey
(Water Resource Education)
2150 Centre Avenue
Fort Collins, CO 80526
970-226-9100
water.usgs.gov/education.html
Topics: coastal hazard, watersheds, hazardous waste, wetlands, water use, wastewater, navigation, ground water, water quality

Water Information Program
Southwestern Water Conservation District
841 E. Second Ave.
Durango, CO 81301
970-247-1302
Fax 970-259-8423
http://www.waterinfo.org
Email: water@frontier.net
Geographic area: La Plata, Montezuma, Archuleta, San Juan, San Miguel, Dolores and parts of Montrose, Hinsdale and Mineral counties.
Speakers, educational materials, water festival assistance, displays

Answers

Page 3
All the statements are true. All the boxes will be marked.

Page 4
All the statements are true. All the boxes will be marked.

Page 5
10 x 10 = 100

Page 6
Frozen water (polar) = 66 drops; Fresh = 33 drops

Page 7
The incomplete sentences are:

Salt in ocean water.
Animals and plants water.
Water wet.

Answers will vary; they can be:

Salt **is** in ocean water.
Animals and plants **need (drink)** water.
Water **is** wet.

Page 8
Water **vapor** condenses to form clouds.
Liquid water freezes into snowflakes. It is then a **solid.**
Water that flows from a faucet is **liquid.**

Page 9
Answers will vary. Adjectives describing liquid may include wet, cold, warm, moist, etc.
Answers will vary for how they attempted to change ice to liquid.

Page 10
Answers will vary. Adjectives describing solid may include cold, hard, slippery, etc.

Page 11
The pinwheel will turn. Answers will vary. Vapor may be described as light, airy, invisible, etc.
A change in temperature (either hotter or colder) causes water to change form.

Page 13
leaves will **float**
salt will **dissolve**
an anchor will **sink**
Object answers will vary.

Page 14
The paper clip, by itself, will sink because it is heavier than water. The aluminum boats float because they are lighter than water. The boat will hold several paper clips because the area of the boat in contact with the water disperses the weight of the objects it contains.
The marble will sink while the ice cube will float – even if they weigh the same. The ice cube contains air within its shape that makes it lighter (less dense) than the marble and water.

Page 15
A=24; B=5; C=6; D=8; E=12; F=11; G=15; H=18; I=4; J=43; K=60; L=10; M=14; N=2; O-1; P=36; Q=3; R=7; S=9; T=13; U=16; V=82; W=17; X=30; Y=21; Z=20
THE MARBLE WILL SINK; THE ICE CUBE WILL FLOAT. ICE IS LESS DENSE THAN LIQUID WATER; A MARBLE IS MORE DENSE.

Page 16
solid
vapor
ice
density
liquid
river
ocean

Page 18
A rainbow.

Page 20
Evaporation: B. The sun heats water. The water becomes vapor that rises into the atmosphere.
Condensation: D. Water vapor forms clouds. When the clouds cool, the vapor becomes liquid.
Liquid, Ice, Vapor: F. The three states of water.
Precipitation: C. Liquid is heavier than vapor. Gravity pulls the liquid down to Earth as rain or snow.
Runoff: A. When the rain reaches Earth it flows across the land into lakes, steams and oceans.
Transpiration: E. Plants take in water, then “breathe” the water out as vapor.

Page 21
Vapor condenses to form clouds of liquid water. Heat from the sun **evaporates** the water. **Precipitation:** rain, snow
Answers will contain these elements:
The sun heats the water on Earth. The water evaporates. It turns to vapor and rises. In the atmosphere it cools and condenses to form clouds. When the drops of water get too heavy to stay in the air, they fall as precipitation (rain, snow, sleet). They fall to the ground. The water either soaks into the ground or runs off into streams and rivers.
Hydro in hydrologic cycle come from the Greek word “hydro” meaning water. Hydrologic cycle = water cycle.

Page 23
Answers will vary depending on location.

Page 26
Down
1. snowpack
2. basin
4. drought
6. reservoir
8. rain

Across
3. flood
5. moisture
7. conservation
8. rationing
9. canals

Page 30
Answers will vary.

ANSWERS

Page 31
Top to bottom: having fun; watering livestock; cleaning; drinking beverages; providing water for wildlife.
Farmers and ranchers do many of the same things as urban residents.

Page 32
Answers will vary but may contain the following:
Restaurant: washing dishes; preparing food; drinking water; making beverages; washing hands; restrooms.
Recreation Center: showers; swimming pool; to make the ice for the rink; drinking fountains; restrooms.
Supermarket: in the produce section to keep the fruits and vegetables fresh; in the bakery to cook; in the deli to cook; for employees to wash hands; restrooms; sell bottled water.
Car Dealer: washes cars; restrooms; to make the coffee in the service waiting room.
Farmer: irrigation; for animals; and every way that a non-farmer might use water: to wash dishes; prepare food; shower; laundry; drink; etc.

Page 33
Answers will vary.
16 ounces times number of students = number of ounces of water (per day.) This answer times 5 days = number of ounces the class will drink in one school week.
There are 128 ounces in a gallon of water. Both the above answers divided by 128 will give the gallons.

Page 34
Stories will vary.

Page 35
Bodies of water: Atlantic Ocean; Gulf of Mexico; Pacific Ocean; Lake Michigan.
Rivers: Mississippi River; Platte River; Colorado River; Missouri River.
Rivers flow into other rivers or into the oceans. Yes.

Page 36
Coagulation = coagulate
Sedimentation = **sediment**
Filtration = filtrate
Disinfection = **disinfect**
Storage = store

Page 37
Group 1 will be easier to remove from water (coagulated paper clips!).

Page 38
It is easier to remove larger pieces than small ones.

Page 41
Coagulation; Sedimentation; Filtration; Disinfection; Storage.

Page 42
Answers will vary.

Page 43
All items will be circled.

Page 44
We need clean water to drink.

Page 45
The pond is polluted. There is litter in the water. There are bottles and cans floating in the water. The plants are sick. The frog is leaving the pond. Answers will vary on how we can help but will include cleaning up the litter.

Page 46
All items will be circled.

Page 47
Answers will vary.

Page 50
The words are there. You get to have fun solving this one, too! Some water words in the puzzle that are not on the chalkboard include: water and sedimentation.

Page 51
Five drops will have no color.
36 drops will have all five colors (the hamburger bun has the least amount of water of all the foods - 36%).
One drop has one color (the difference between lettuce 95% and tomato 94% is one).

Page 53
60% is more than half.
36% is less than half.
95% is more than half.
95% is more than 50%.
Answers to water use will vary.

Page 54
Answers will vary.

Page 55
Answers will vary.

Page 56
325,851 divided by 5 = 65,170.2 gallons per person.
65,170.2 times the number of family members = answer.
Answer times 10% (.10) = number of gallons conserved.
Answer times 20% (.20) = number of gallons conserved.

Page 57 and 58
Answers will vary. See page 56 for answers most likely given by an active water conservationist.

Page 63
Answer: Good things about conserving water: clean water, biosolids, less pollution.

Colorado Academic Standards and Common Core State Standards

Understanding Water Activity Book includes a variety of activities that integrate learning about water and academic subject areas.

Following is a summary of prepared graduate competencies addressed in the development of and by materials included in this activity book.

MATHEMATICS

1. Number Sense, Properties, and Operations

Understand the structure and properties of our number system. At their most basic level numbers are abstract symbols that represent real-world quantities

Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error

Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency

Make both relative (multiplicative) and absolute (arithmetic) comparisons between quantities. Multiplicative thinking underlies proportional reasoning

Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations

Apply transformation to numbers, shapes, functional representations, and data

2. Patterns, Functions, and Algebraic Structures

Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency

Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations

Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data

Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics

Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

3. Data Analysis, Statistics, and Probability

Recognize and make sense of the many ways that variability, chance, and randomness appear in a variety of contexts

Solve problems and make decisions that depend on understanding, explaining, and quantifying the variability in data

Communicate effective logical arguments using mathematical justification and proof. Mathematical argumentation involves making and testing conjectures, drawing valid conclusions, and justifying thinking

Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

4. Shape, Dimension, and Geometric Relationships

Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error

Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data

Apply transformation to numbers, shapes, functional representations, and data

Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics

Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

HISTORY

Develop an understanding of how people view, construct, and interpret history

Analyze key historical periods and patterns of change over time within and across nations and cultures

GEOGRAPHY

Develop spatial understanding, perspectives, and personal connections to the world

Examine places and regions and the connections among them

ECONOMICS

Understand the allocation of scarce resources in societies through analysis of individual choice, market interaction, and public policy

Acquire the knowledge and economic reasoning skills to make sound financial decisions

READING, WRITING, AND COMMUNICATING

1. Oral Expression and Listening

Collaborate effectively as group members or leaders who listen actively and respectfully pose thoughtful questions,

acknowledge the ideas of others, and contribute ideas to further the group's attainment of an objective
Deliver organized and effective oral presentations for diverse audiences and varied purposes
Use language appropriate for purpose and audience
Demonstrate skill in inferential and evaluative listening

2. Reading for All Purposes

Interpret how the structure of written English contributes to the pronunciation and meaning of complex vocabulary
Demonstrate comprehension of a variety of informational, literary, and persuasive texts
Evaluate how an author uses words to create mental imagery, suggest mood, and set tone
Seek feedback, self-assess, and reflect on personal learning while engaging with increasingly more difficult texts
Engage in a wide range of nonfiction and real-life reading experiences to solve problems, judge the quality of ideas, or complete daily tasks

3. Writing and Composition

Write with a clear focus, coherent organization, sufficient elaboration, and detail
Effectively use content-specific language, style, tone, and text structure to compose or adapt writing for different audiences and purposes
Apply standard English conventions to effectively communicate with written language
Implement the writing process successfully to plan, revise, and edit written work
Master the techniques of effective informational, literary, and persuasive writing

4. Research and Reasoning

Discriminate and justify a position using traditional lines of rhetorical argument and reasoning
Articulate the position of self and others using experiential and material logic
Gather information from a variety of sources; analyze and evaluate the quality and relevance of the source; and use it to answer complex questions
Use primary, secondary, and tertiary written sources to generate and answer research questions
Evaluate explicit and implicit viewpoints, values, attitudes, and assumptions concealed in speech, writing, and illustration
Demonstrate the use of a range of strategies, research techniques, and persistence when engaging with difficult texts or examining complex problems or issues
Exercise ethical conduct when writing, researching, and documenting sources

SCIENCE

1. Physical Science

Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects
Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions
Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable

2. Life Science

Analyze the relationship between structure and function in living systems at a variety of organizational levels, and recognize living systems' dependence on natural selection
Explain and illustrate with examples how living systems interact with the biotic and abiotic environment
Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment
Explain how biological evolution accounts for the unity and diversity of living organisms

3. Earth Systems Science

Describe and interpret how Earth's geologic history and place in space are relevant to our understanding of the processes that have shaped our planet
Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system
Describe how humans are dependent on the diversity of resources provided by Earth and Sun

EVALUATION FORM

UNDERSTANDING
WATER
ACTIVITY BOOK

USER INFORMATION

Name _____

School or educational affiliation _____

Address _____

City, State, Zip code _____

County _____ Email _____

Grade Level _____ Subject Area _____ Number of Students _____

Describe how you used *Understanding Water Activity Book* with your students _____

_____

_____

_____

_____

	Great			Good	Poor
Content Standards	5	4	3	2	1
COMMENTS: _____					
Introduction (p. 3)	5	4	3	2	1
COMMENTS: _____					
Salt Water (p. 4)	5	4	3	2	1
COMMENTS: _____					
Fresh Water (p. 5-p. 7)	5	4	3	2	1
COMMENTS: _____					
States of Matter (p. 8-p. 12)	5	4	3	2	1
COMMENTS: _____					
Density (p. 13-p. 16)	5	4	3	2	1
COMMENTS: _____					
Water Cycle (p. 17-p. 21)	5	4	3	2	1
COMMENTS: _____					
Watersheds (p. 22-p. 24)	5	4	3	2	1
COMMENTS: _____					
Water Supply (p. 25-p. 35)	5	4	3	2	1
COMMENTS: _____					
Water Treatment (p. 36-p. 41)	5	4	3	2	1
COMMENTS: _____					
Pollution (p. 42-p. 45)	5	4	3	2	1
COMMENTS: _____					

	Great			Good	Poor
Uses of Water (p. 46)	5	4	3	2	1
COMMENTS: _____					
Clean Water (p. 47-p. 55)	5	4	3	2	1
COMMENTS: _____					
Conservation (p. 56-59)	5	4	3	2	1
COMMENTS: _____					
Wastewater (p. 60-p. 63)	5	4	3	2	1
COMMENTS: _____					
Glossary & Water Terms (p. 64-p. 65)	5	4	3	2	1
COMMENTS: _____					
Resources (p. 66)	5	4	3	2	1
COMMENTS: _____					
Answers (p. 67-p. 68)	5	4	3	2	1
COMMENTS: _____					
Student response to activity book	5	4	3	2	1
COMMENTS: _____					
Academic integration	5	4	3	2	1
COMMENTS: _____					

Do your students understand the importance of water?

Understanding Water Activity Book Evaluation Form is on the reverse side of this page. Please complete the evaluation information, remove this page from your book, and mail to

Colorado Foundation for Agriculture
PO Box 10
Livermore, CO 80536

Your response and comments are important to us
and to the development of additional resource materials.

Use this space for any additional comments including topics or resource materials you would like to have available for use in your classroom.

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Water's roles are endless. Water quenches our thirst, and is the liquid that accounts for seventy percent of our body mass. It also provides habitat for fish, animals and plants, gives life to crops and offers recreation. Water lends incredible beauty to our landscapes and helps generate electric power. It's used to manufacture the goods and products we all use.

From
Water: Colorado's Precious Resource
Colorado Water Conservation Alliance

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