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WATER

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WATER

Introduction

Where does my water come from and where does it go?

Water is essential for life on earth. An understanding of and appreciation for water is important for students as users and stewards of this critically important resource. Through learning about the water cycle, its different states and water issues, students will recognize social and ecological interdependence. Students should understand what is happening with water on local, national and global scale. Where does their water come from and where does it go? These questions should lead them to an understanding of a possible water crisis. The understanding and awareness of water issues should help students respect water as a precious resource and understand how to use water respectfully and safely. These will have positive impact on their personal health, the health of the community and the health of the world.

The students should understand that there's enough water for everyone if we work together to keep it clean, use it wisely, and share it fairly. To address crucial water issues we need students to think broadly and understand systems, connections, and causes.

Topics

In this unit, students will focus on the properties of water and the role of water in their lives including identifying local, national, and international systems. Political conflict. Hydropower and kinetic energy. Conservation and pollution. Class projects will address rain water harvesting. Focus on microorganisms, importance of cleanliness and hygiene. Students will think about: Where does my water come from and where does it go? Perhaps take a walking tour to local springs. Traditional medicine components on water element. Continuation of vegetable garden.

About water in Buddhism

Water is believed to be one of the best offerings you can make to the Buddha and Bodhisattvas. Water is an abundant resource that even a poor man can afford at all times. There is no feeling of miserliness associated with its offering, and an offering made with a pure heart is the greatest practice. One can accrue merit and wash off one's sins. The water offering in seven bowls have each a deeper meaning than it appears to our eyes. That is why if a person living up stream somehow contaminates the water and if this water is being offered to Buddhas and Bodhisattva by a person living down the stream unknowingly, the person contaminating the water will be committing a sin. The importance of keeping the water clean is also because there are so many aquatic lives that have to be considered. If the water is polluted or dries up due to human activities, these aquatic lives will die and taking life is the greatest negative action in Buddhism.

"People usually consider walking on water or in thin air a miracle. But I think the real miracle is not to walk either on water or in thin air; but to walk on earth. Every day we are engaged in a miracle which we don't even recognize: a blue sky, white clouds, green leaves, the black, curious eyes of a child -- our own two eyes. All is a miracle."

- Thich Nhat Hanh

"When the well is dry, we learn the worth of water."

- Benjamin Franklin

"Rain is a blessing when it falls gently on parched fields, turning the earth green, causing the birds to sing."

- Donald Worster

"We have the ability to provide clean water for every man, woman and child on the Earth. What has been lacking is the collective will to accomplish this. What are we waiting for? This is the commitment we need to make to the world, now."

- Jean-Michel Cousteau

"Water is critical for sustainable development, including environmental integrity and the alleviation of poverty and hunger, and is indispensable for human health and well-being."

- United Nations

"Some people feel the rain. Others just get



Know | Understand | Do

QUALITIES AND CHARACTERISTICS



Know:

At the end of the unit, all students should know...

- What water is made of: what we experience as one substance is made of many tiny parts
- Properties
 - requires more energy to change temperature
 - Density relative to other substances including air, oil, and how salinity affects density.
- Water is one of the most common substances on the surface of earth.
- three fourth of the Earth's surface is covered by oceans, rivers and lakes
- Water is also found below the surface as ground water
- In the air, it is present as water vapour, mist and cloud
- Water cycle and terms related to it, including evaporation, precipitation, etc.
- What percentage of water is available? what percentage is fresh and drinkable?
- what a glacier is

Understand:

At the end of the unit, all students should understand...

- the concept of the table of elements and atoms
- 3 states of water (liquid, solid, and mist) and the temperature at which they change
- percentages of water types in the world (insert Dawas Water in the World Lesson plan)
- water cycle- how does water move
- water crosses political borders
- water flowing nearby is part of a global system
- Water makes the processes of life possible
- What makes water drinkable

Do:

At the end of the unit, all students should be able to...

- identify the three states of water in everyday life- ice, water, and steam (perhaps from a hot drink).
- Visualize and diagram the percentages of available water
- monitor the quality of local water and stream through bio-indicators
- Measure water in various measures

wet."
- Bob Marley

"When one man drinks
while another can only
watch, Doomsday fol-





Know:

At the end of the unit, all students should know...

- About 70% of our body is water
- How to protect and take care of water
- Water crisis
- sources of water pollution and its effects
- prevention of water pollution
- How water is used
- Why humans need water
- The essence of clean water
- water is shared by everyone

Understand

At the end of the unit, all students should understand...

- the human interventions that affect water quality and quantity
- Explore causes of pollution and its consequences
- Investigate the relationship between water treatment and public health
- different water issues in Bhutan and in other parts of the world
- the importance of preserving water sources and its system
- How water energy works: principles of hydroelectric power (use a finger to cover a faucet or hose to spray water faster)
- How we can harvest rain water
- Fluid pressure and its application
- how adverse changes to the water quality of one stream can impact all the bodies of water downstream – rivers, lakes, or even the ocean.
- How degraded water affects entire food chain

Do:

At the end of the unit, all students should be able to...

- Save and respect water
- Don't waste or misuse water
- Take as many small steps as possible to conserve water
- Tell how much water we need in a day
- Be mindful of using water to keep healthy and prevent disease
- Use water as healing source to treat different ailments
- Speak clearly about symptoms of illness related to water borne diseases
- maintain good health through hygiene
- Explain Pascal's law and Archimedes principles and applications
- Don't pollute water
- Teach others to respect water and not pollute



Know | Understand | Do

LOCAL INTERDEPENDENCE



Know:

At the end of the unit, all students should know...

- Research where local drinking water comes from and where it ends
- Examine what happens when water goes down a toilet, down the drain, and into sewers
- Become familiar with the laws that govern drinking water
- Basic Bhutanese geography including rivers and streams in Bhutan
- Traditional Bhutanese hot spring(menchhu and tshachhu) to cure various ailments
- How much water they use, and why

Understand:

At the end of the unit, all students should understand...

- regional weather as part of larger water cycle
- understand the Bhutanese rivers as part of the Himalayas
- how does water change from glaciers to rivers-
- how is this related to elevation and mountains in Bhutan
- Importance of water in daily life

Do:

At the end of the unit, all students should be able to...

- Value and appreciate local water resources
- Locate rivers monks may know from prayers on a map- ganges, brahmaputra, etc.
- locate Chukha power dam on a map
- identify area landforms linking Bhutan by water- the Himalayas and Sea of Bengal
- discuss how Bhutanese navigate rivers- boats, bridges, etc. How is water a part of everyday life.
- relate back to existing local knowledge- rivers and streams they know already.

lows.”
- Turkish Proverb

“Water is the only drink
for a wise man.”
- Henry David Thoreau





Know | Understand | Do

VIEW: DHARMA

Know:

At the end of the unit, all students should know...

- Mamaki is the water dakini
- Significance of water vase
- Two kinds of water vase (tso bum/mainbumpa and le bum/activity bumpa)
- The significance of the seven water bowl offerings
- How to properly offer water on the shrine
- Why we offer seven bowl water on the shrine
- Feng Shui of water

Understand

At the end of the unit, all students should understand...

- Good water should have eight qualities: cool, tasty, lightweight, soft, clean, odorless, does not affect stomach and does not affect throat
- All water and moisture in the universe in true nature is the dakini Mamaki, not just water

Do:

At the end of the unit, all students should be able to...

- Make water offerings
- Explain two kinds of water vase
- Carry out mindfulness practices while using water





Classroom assessment may be defined as the process of gathering, recording, interpreting, using and communicating information about a child's progress and achievement during the development of knowledge, concepts, skills and attitudes. Assessment, therefore, involves much more than testing. It is an ongoing process that encompasses many formal and informal activities designed to monitor and improve teaching and learning in all areas. Assessment should reinforce the intrinsic motivations of play, passion, and purpose versus the extrinsic reward system. Some things can be assessed by tests but other essential skills must be observed or assessed in other ways. The purposes of assessment may be summarized as follows:

- Record keeping;
- Supporting pupils in their own learning
- Providing feedback
- Measuring what pupils know, understand and can do
- Motivating pupils
- Diagnosing learning difficulties.

Summative Assessment: post test, picture dictionary on culture, documentary film on culture or self.

Formative Assessments: Use formative strategies to keep projects on track; Gather feedback; Focus on Teamwork; Share what student know; Reflect, revise, revisit; Do-It-Yourself. Reflection activities, participation in discussion, vocabulary, portfolio, individual records, class participation, homework, observation, remedial classes, observation, one to one conference.





Assessment

In project based learning: Students don't just memorize facts and recall information; they learn more deeply by doing; or that's the goal at least. To set the stage for success, invest in planning before you bring students into the project. The planning stage is when you establish learning goals about the content and skills you want students to master.

Values to instill:

- 1.Learning to work collaboratively (innovation is a team sport!).
- 2.Learning to understand problems from a multi-disciplinary perspective.
- 3.Learning to take risks and learn from mistakes.
- 4.Focusing on creating versus consuming.

Pre-Assessments:pre-test, one to one conference (see index)

Self Evaluation, Sharing:

- 1.Blogging
- 2.Presentations to the public
- 3.Publications - For instance, create dictionaries or field guides
- 4.posters
- 5.water information in community guide book

Continuous Evaluation/Ongoing

Journaling:

- 5.Three things your grateful for (every day)
- 6.Highlights of the day
- 7.Understandings and misunderstandings

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molu ptaque pra conet, veri-
bus, omnis nonsequo conessin
numque velendam aut et am
dellest, corat.*

*Con cupta dolorum naturiate
voluptus explati beaqui culles
as si ipis volor sed et restiatus
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cus, tem sunt ipsam fugiae
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tem quatem venimpo reraect
eniam, nem hil ipiciendis sunt.*

*Ist et inctur maximus rerum
enis ex et denesti oreiciur?*

*Quid quis volut es ex-
erumquis essimi, que laboreri
dit aut doluptio. Qui delic to
vid qui odit voluptus minventi
cum si apis il est laut officit
optatem quidiorem nus.*

*Iquiae lanimust quia quide
volo elitia di aut ea corescit et
essit occat.*

*Officimaxim eriae. Berum
sequam, quas illaut mi, ut etur,
omnias a culpa poritibus.*

*Arciam volut velendit, sime
volorae. Nempor atem volup-
taepe re etur aliquis voluptios
prestru mendis ventur molo-
rumqui nat.*

*Net aut descii sunt volup-
tatest, aut de eos eos volupta
nus ipsaper feriberiae parum
dolo conse que maio in pa
dite aut derum di doluptati
illa sim*





Learning Outcomes

Math

Volume, liquid measurement, units, mile, addition, division, place value, multiplication, division, celsius, degree, accelerate, fahrenheit, temperature, velocity, litre, millilitre, teaspoon (tsp.), tablespoon, three teaspoon is equal to one tablespoon, an ounce of water,

Science

What is water? . Genetics: How do our genes influence who we are? The Brain: How does our brain function. Germ theory. What's in that sponge? Transfer of disease. Infectious and non infectious diseases, first aid, microscope

body of water, boil, canal, channel, condensation, confluence, damp, depth, dew, dew-drop, down-pour, drain, drainage, drop, evaporation, drinkable, flood, flow, freezing rain, fresh water, frost, gravity flow, H₂O, humidity, hurricane, hydrology, hydropower, ice, irrigation, lake, meander, moist, moisture, monsoon, ocean, oxbow, pipe, pond, pool, precipitation, puddle, pure, rain, reservoir, river, rivulet, saltwater, saturated, sea, seep, snow, snowfall, snowflake, snowstorm, soak, steam, stream, tide, tributary, water, water cycle, water drop, waterfall, waves, well, wet, wetlands, Spring, bath, solute, solvent, crystallization, universal solvent, soft water, hard water, heat capacity, water pollution, infiltrate, algal bloom, boiling point and freezing point, solubility, solution, saturated solution

Social Studies

Understanding our personal histories by investigating our homes, regions, customs and traditions. Local knowledge as part of who we are. map key/legend, river, lake, weather, climate, oceans, seas, bays, lakes, rivers, peninsula, glacier, environment, degrading, preserve, nature, mountain, stream, hills, water body, pollution, crisis, water system

Health

Correct use of water to prevent and treat diarrhoea. Protect drinking water sources from animals and human. When water is contaminated one have to boil water for drinking and cooking. Personal health care. Drink plenty of water. Breathe hot water vapour. Scrub with soap and clean water. hot soak or compresses, cold compresses, gargle with warm salt water, flood eye with cool water at once, sniff salt water, hold ice on blister for one hour. history of and system of hospital, temperature, thermometer, local healing plants, water borne diseases, contaminated water, diseases, illness, antiseptic, cream, bandage, treatment, dirty, injection, vaccination, healthy, medicine, dehydration, rehydration, drink, diarrhea, worms, gut infection, boil water, filter water, skin infection, wound becoming infected, tetanus, cholera, infectious, non-infectious, acute, chronic, washing hands, sanitation, bacteria, virus, fungi, chemical, scabies, typhoid, clean clothes, kidney diseases,

Technology

Traditional technology. Think about how technology shapes us. Even the clothes we wear. Media literacy, commercials
l-pad, download, computer, camera, projector, microscope, internet, internet, hydropower,





Learning Outcomes

Bhutanese Buddhist culture & concepts

The five skandas, compassion, scientific and practical benefits of mind training, meditation on five senses, heart sutra GNH indicators, the 9 domains as indicators of GNH-good governance, time management Mindfulness, water dakini, offering bowl, vase, blessed, holy water, spring water, impurity, purity, ecological mindfulness, aesthetic, ultimate nature, calmness, clarity, purity, water rituals, pure motivation, cultivate generosity, reduce selfishness, no attachment, painless, seven aspects of prayer, prostrating, offering to the Buddha's, confessing, rejoicing, beseeching, dedicating, merit, accumulate, virtue, inauspicious, shrine, mantra, sincere wish, antidote, loving kindness, compassion, dispelling, darkness, crystal clarity, coolness, sweetness, lightness, softness, freedom from impurities, merit

Arts

Theater, role play, putting yourself in others shoes. Art, self portraits, projection, seeing what we want to see, Body charts: what's inside? What's outside? poster

English

Flow, clear, transparent, fluidity, wave, current, ater is evasive, wishy-washy

*Sed et fuga. Axim iderestem
ea venduci untibus alia non
ea nonse dipsant officae com-
molu ptaque pra conet, veri-
bus, omnis nonsequo conessin
numque velendam aut et am
dellest, corat.*

*Con cupta dolorum naturiate
voluptus explati beaqui culles
as si ipis volor sed et restiatus
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cus, tem sunt ipsam fugiae
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Ist et inctur maximus rerum
enis ex et denesti oreiciur?*

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volorae. Nempor atem volup-
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prestru mendis ventur molo-
rumqui nat.*

*Net aut descu sunt volup-
tatest, aut de eos eos volupta
nus ipsaper feriberiae parum
dolo conse que maio in pa
dite aut derum di doluptati
illa sim*





Resources:

- **Local figures:** ask health officials to talk about water- Dr. Tshering Norbu and health workers of Dewathang hospital
- **Media** Read up on current events in Kuensel, Bhutan Observer, and other papers for stories about water issues in Thimphu and other parts of Bhutan.
 - Watch BBS News for stories about water.
 - BBC (programs TK).
 - CNN (programs TL)
- **Books:**
 - Where There Is No Doctor
 - Wide Awake
- **Internet**

Need links!

- **Video**
 - TED-Ed Water related video clips
 - <http://ed.ted.com/search?utf8=%E2%9C%93&q=water>
 - Five-Minute Film Festival: Celebrate World Water Day
 - http://www.edutopia.org/search/apache-solr_search/water

Reference

Hands-On Activities from The Water Sourcebook:
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