

Student Investigative Questions
for use with the FOSS Science Curriculum
Grades 1 – 4

FIRST GRADE

Air and Weather

Does the material a parachute is made from affect the way a parachute falls?

How can make a parachute fall more slowly?

Does the “number of passengers” affect the way a parachute falls?

What kind of devise can you make to push air from one place to another?

What can you make, similar to the balloon rockets made in class, that uses pressure from compressed air to make it move?

What kind of weather have we had in the last month? What kind of information will you record, maybe the temperature, cloud cover, amount of rain? Use a scientific journal to record your observations. Think about the best way to share this information.

What kind of a rain gauge can you make? Be sure to record the amount of rain we have had for several weeks. Use a scientific journal to record your observations. Think about the best way to share this information.

What evidence can you find of air moving? Take photos or draw pictures that show what it looks like when air is moving.

How can you make a kite from scratch that flies in the wind? Show pictures or drawings of your different designs.

What can you do to a kite to make it fly higher? Show pictures or drawings of the changes you tried.

Balance and Motion

How many different ways can you balance an arch (or a different shape) using only one clothespin as a counter weight?

Does the weight of the paper make a difference in how a shape balances?

Does a heavier top spin differently from a lighter top?

Does a wider top spin differently than a top that is not as wide?

How does the motion of a zoomer change if you change the length of the string?

What happens to the speed of the rollers (paper cups taped together used in class) if you increase the slope of the ramp?

How can you create a runway for a marble? Is it possible to put more than one loop in the runway and still have the marble reach the end?

New Plants

Do seeds germinate better in the light or in the dark?

What would happen if you put a growing plant in a box that had a hole punched at one end for light?

What is the best amount of water to give bean plants?

What happens if a seed starts growing and you turn it upside down?

What other seeds are like the brassica seed, because they send up one blade and two little leaves? Try corn, beans, radishes, and barley.

What kind of plants can you grow from stems?

Does a plant grow faster from a seed or from a stem?

What kind of plants can grow from both a seed and from a piece of stem?

If you cut a bulb in half, does it still grow?

Does temperature make a difference in how fast bulbs grow?

What happens if bulbs receive different amounts of sunlight? Is there an amount that makes them grow best?

SECOND GRADE

Insects

Choose a common insect to search for in your yard. It might be pill bugs or beetles. Where do you find them? Take photos, draw pictures or record observations. Think about the best way to share your findings.

Find a small insect in your yard. Without doing the insect harm, test to see if it will move faster on a smooth or rough surface. How did you do the test? Take photos, draw pictures or record observations. Think about the best way to share your findings.

Find a small insect in your yard. Without doing the insect harm, test to see if it prefers a moist or dry place. How did you do the test? Take photos, draw pictures or record observations. Think about the best way to share your findings.

Choose an insect you would like to know more about. Learn about its life cycle. Compare its life cycle to the life cycle of the butterfly or mealworm studied in class.

Pebbles, Sand and Silt

What happens if I rub rocks on different surfaces?

What is inside a rock if I crack it open? You will need adult help to try this!

How can rocks be sorted by size using water?

How do you make silt or clay from a rock?

How can you sort rocks found on a beach?

How can you sort the sand, gravel and pebbles found on a beach?

How can you compare rocks from different beaches on Bainbridge Island?

How can you sort a sand sample from a beach?

How can you compare sand samples from different beaches on Bainbridge Island?

How are different earth materials used inside and outside your home? Take pictures, draw or record observations.

Collect and compare different soil samples. How are the soils alike? different? What kind of tests can you do to compare the soils? What was growing where you collected the soil sample?

Will a seed grow better in sand or soil?

Which gets warmer in the sun: sand or soil?

Solids and Liquids

Investigate different solid materials and test which makes the strongest bridge. You might try cardboard, craft sticks, soda straws, or foil.

Take pictures or draw the different designs you tried.

How can you make a tunnel that will not collapse when you build over it?

Take pictures or draw the different designs you tried.

How many different-shaped containers can you find that hold exactly the same amount of water?

How can you make a collection of liquids to demonstrate the different properties of liquids (bubbly, has color, colorless, foamy, translucent, transparent, and viscous)?

Create a mixture of solid particles, like the soup mixture in class. How many different ways can you find to sort them? Show pictures or drawings of your different ways.

Before doing the following, make a prediction before testing the materials.

What will happen if ____ is put in water? Test several different materials.

Take pictures, draw or record observations to share the results.

Is peanut butter a solid or liquid? What did you do to test the properties of the peanut butter that helped you arrive at your conclusion?

What happens when liquid soap (or a different liquid) is put into the freezer?

Does it turn into a solid?

How much water is in an orange (or pick a different fruit)

THIRD GRADE

Human Body

Investigative Questions

Compare the reaction time between your two hands. Test several people.

How did you do the test? Take photos, draw pictures or record observations.

Think about the best way to share your findings.

Test the foot-response time and/or the hand-response time of several people.

How did you do the test? Take photos, draw pictures or record observations.

Think about the best way to share your findings.

Is foot-response time or hand-response time faster in most people? How did you do the test? Take photos, draw pictures or record observations.

Think about the best way to share your findings.

Additional ideas

Ask your teacher for a copy of the Mr. Bones skeleton pieces. Show how each part of your skeleton moves when you are eating, riding a bike, or doing something you like to do.

How are the leg bones (or hand bones) of the human skeleton like the bones of a chicken or a different animal? How are they different?

What models could you make that show how skeletal systems work with muscles? Could you model a leg of a cat? dog? What about a bird?

Make a bone display using the bones you may have found in the forest or at the beach. Which animal do you think they came from? Which bones are they i.e. leg, arm, etc.

Which part of the skeleton do joint diseases like arthritis and bursitis affect?

Which joints can doctors replace with artificial substitutes? What limbs can be replaced with prosthetic devices?

Cut pictures from magazines or use a digital camera to show people in motion. Place the pictures under headings describing the three basic types of joints: hinge, ball and socket, and gliding.

Play Twister with your family. Take pictures of your family in interesting positions while playing. Identify the joints that make it possible to assume those positions.

Astronauts can lose bone and muscle tissue while in space. What measures are taken to prevent this loss?

A cramp is a painful condition caused by a muscle that contracts and does not relax. What causes cramps, what happens during a cramp, and how can they be prevented?

Physics of Sound

Vibrations & Pitch

Does a plastic jump rope have the same pitch as a jump rope made from rope?

Do different materials of the same length have different pitches?

How can you improve on the design of the string beam used in class?

Notate the proper pattern in centimeters (or inches) to play “Old McDonald” or a different song.

Create a rubber band guitar. What can you play on the guitar? How can you record the “music” so your friends can play the same tune?

Compare a rubber band guitar to a real guitar? How does each instrument make different pitches?

How can you make some bottles of water so when they are tapped they play a familiar tune?

How sound travels

How can you stop sound from traveling through water?

If you hit two rocks together under water and listen with a stethoscope, does the size of the rocks affect how loud the sounds are?

Will sounds travel through milk? syrup? Try several different liquids.

How can you make your own ukulele thinking about the FOSS-ulele used in class?

How can you make your own kalimba?

How can you improve the design of the string telephones used in class?

Can you design a phone line for three or four listeners at a time?

What kinds of materials muffle loud sounds? How did you do the test?

Take photos, draw pictures or record observations. Think about the best way to share your findings.

How can you adapt the mini-gutbucket used in class to imitate different animal sounds?

Additional ideas

How do different types of animals make sounds? You might research crickets, frogs, hummingbirds or whales.

How do marine mammals communicate under water?

How do bats use sound to find food and navigate?

How do the ears of different animals compare? Why do some have flaps and others don't? What kind of outer ears do water dwellers have?

How can you design specialized human ear flaps for different purposes? What kind of flap is designed for listening to sounds: on the ground, in the air, behind the head?

How do hearing aids work?

Earth Materials

Investigative Questions

How can you make salt or sugar crystals? What happens to the crystals if they are cooled slowly (in a bath of warm water)? What happens if the crystals are cooled quickly (in a bath of ice water)?

How does the depth of the saltwater solution (or sugar solution) make a difference in the size of the crystals left when the water evaporates?

Are there rocks in your yard (or on Bainbridge Island beaches) that contain calcite? You will need vinegar to do this investigation.

How does using warm vinegar rather than cold vinegar affect the results of the calcite test?

Additional ideas

How can you display a rock collection using some of the rock properties investigated in class?

Can you find examples of weathering in rocks? Take photos, draw pictures or record observations. Think about the best way to share your findings.

How can you make a model of a glacier?

How can you make a fossil with plaster?

How are different earth materials used in your home? on Bainbridge Island? Take photos, draw or record observations.

How are caves formed? Where can you visit interesting caves in the US?

How can you make a model of stalactites and stalagmites? Where could you go to see these formations?

How is limestone formed? How is limestone used?

What is a sinkhole? How is it formed?

How can you create a display to show the kind of rock fossils are found in? If you own some fossils include them in your display.

What kinds of rocks were once used by humans as tools? Are there rocks currently used as tools?
What kinds of rocks and minerals were found on the moon?

FOURTH GRADE

Magnetism and Electricity

Investigative Questions - Magnets

What would happen in The Force investigation if you used washers instead of plastic chips for spacers?
What would happen if you put two magnets in the cup in The Force investigation?
What kind of objects work best for “induced magnetism”?
How can you conduct an investigation to compare the force of attraction between different kinds of magnets?

Investigative Questions - Circuits and Batteries

Does the battery last longer in a circuit with two bulbs connected in series or in parallel?
How many lights can you connect in parallel and still have the bulbs shine brightly?

Investigative Question- Electromagnets

How can the strength of an electromagnet be improved? Identify the variables and conduct an investigation.

Additional Investigations

How can you construct a water compass?
Where are magnets used in your home? Take photos or draw pictures to share your findings.
How can you design a magnetic message board?
What can you invent that uses magnets?
How can you make a quiz board that lights up when someone has chosen the right answer?
How can you build a cooker that uses solar energy?
How can you build a model ...
flashlight?
lunch box alarm?
telegraph?
motor?

device used to collect wind energy?
How can you create a display that teaches about ...
the circuit designs used in homes?
safety with electricity?
where electricity in our homes comes from?
how hydroelectricity is generated?
the amount of electricity required to run different appliances?
energy star appliances?
ways to conserve electricity?
alternative energy sources (solar, wind, tidal, etc.)?

Structures of Life: Investigating Seeds

Investigative Questions

Do some seeds absorb more water than others before they sprout?
Do some seeds sprout faster in water than in soil?
What are the best (optimum) conditions for a specific type of seed to germinate?
Do certain seeds germinate faster in the dark than in light?
Does the color of light affect seed growth?
What is the effect of light on the growth of seedlings?
Do certain seeds grow better when given fertilizer?
Is there a specific fertilizer that makes seedlings grow faster?
How much fertilizer is best for seedlings?
How does temperature affect seed germination?
How are seedlings alike and different?
How do seeds respond to different pollutants?
How tolerant are seeds to different levels of salt?
What are the best conditions for growing sprouts used on salads and sandwiches?

Additional Investigations

What are the different ways plants disperse their seeds?
Where do the fruits purchased in a grocery store come from?
How can you create a display that teaches about the...
difference between fruits and vegetables?
major fruit types we eat?
seeds we eat?
importance of seeds to people?
nutrients provided by different parts of the seeds we eat?

Water

Investigative Questions

How much water can a sponge absorb? What kind of sponges absorb the most?

How much water can a paper towel absorb? What kind of paper towels absorb the most?

What materials, in addition to soap, can change the surface tension of water?

What happens when you freeze different types of liquids? Do they expand, contract or stay the same volume when they freeze?

How can you make ice sink in water? Take photos or draw pictures to record your findings.

How do objects float in different kinds of liquids?

How does the speed of moving air affect the rate of evaporation?

How is condensation affected by temperature?

What happens if you use colored water in the condensation chamber?

What type of earth material does water flow through fastest? Why is this information important?

How does the action of a waterwheel change using a heavy load? a light load?

Additional Investigations

What happens when you put salt water in the freezer?

How much salt is there in a specific volume of salt water surrounding Bainbridge Island? What will you do to measure only the salt?

How can you create a tall glass of red, white (clear) and blue water? Take photos or draw pictures to report your findings.

How can you make a model of a waterwheel?

How can you make a model of a septic system? How can septic systems impact water resources?

How can you conduct a taste test to see if people can taste the difference between bottled water and water from the tap?

How can you conduct a taste test comparing different brands of bottled water? Do people think the most expensive bottled waters taste the best?

How can you create a display that teaches ...

how hydroelectricity is generated?

how water is used by humans?

how humans can affect water resources?

water resources on Bainbridge Island? Where do we get drinking water?

What happens to storm water runoff? What happens to the wastewater we make in our homes?

what you think is an important water issue for Bainbridge Islanders?

water conversation and what we all can do to protect our water resources?

the effects of flowing water and erosion on Bainbridge Island?

the polar ice caps? What do scientists have to say about the effects of global warming on the polar ice caps?

how NASA is working to recycle water for astronauts in space?