# ingridscience outdoor science and math workshop ideas

| Grade | Biology | Physics | Earth Science | Math |
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| K | **Topic: Needs of Living Things**<br>· Woodbug/worm study<br>· Woodbug/worm habitat for the classroom (need cool location)<br>· Pond dipping (check availability)<br>· Plant features: Root shapes, Plant vessels, Leaf drip tips and waxy coatings<br>· At the beach: Seaweed study, Barnacles, Beach life bingo<br>· Bird feeders | **Topic: Motion, Pushes, Pulls**<br>· Playground forces: Forces on the equipment and Bouncing balls<br>· Rockets: Balloon rockets, Baking soda/vinegar demonstration rocket<br>· Balancing sculpture<br>· Catapult from popsicle sticks | **Topic: Weather and Seasons**<br>· Weather stations: Thermometers, Anemometers, Tornado in a bottle, Make rainbows<br>· Rain gauge<br>· Bird feeders (late Fall/Winter)<br>· Seed hunt and study (Fall) | **Topic: Patterning**<br>· Make repeating patterns from rocks and leaves<br>· Hunt for patterns on the playground<br>· Draw chalk patterns<br>**Topic: Measuring and Graphing**<br>· Sort rocks/leaves of different sizes<br>· Concrete graphing with leaves, pine cones etc. |
| 1 | **Topic: Classification, Behaviour**<br>· Woodbug/worm study<br>· Woodbug/worm habitat for the classroom (need cool location)<br>· Collecting and classifying life<br>· Pond dipping (check availability)<br>· Plant features: Root shapes, Plant vessels, Leaf drip tips and waxy coatings<br>· Flower colours<br>· Camouflage challenge<br>· At the beach: Seaweed study, Barnacles, Beach life bingo | **Topic: Light and Sound**<br>· Light stations: Rainbows from light, Colour filters, Mirror symmetry patterns, Shadow shapes and Shadows and mirrors (with sun), Mirror maze (with cloud)<br>· Sound: Glockenspiel notes, Sound vibration model and Duck caller, Sound sandwich, Hummer, String telephone, Speed of sound calculation<br>· Sound game: Sounds in a box<br>· Animal hearing: Hearing through our bones and Noise pollution game | **Topic: Weather and Seasons**<br>· Weather stations: Thermometers, Anemometers, Tornado in a bottle, Make rainbows<br>· Rain gauge<br>· Sundial<br>· Bird feeders (late Fall/Winter)<br>· Seed hunt and study (Fall) | **Topic: Patterning**<br>· Make repeating patterns from rocks and leaves<br>· Hunt for patterns on the playground<br>· Make chalk patterns<br>**Topic: Measuring and Graphing**<br>· Non-standard measurement of playground objects and plants<br>· Concrete graphing with leaves, pine cones etc.<br>· Count and graph pictorially: plant types/car colours |

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| 2 | **Topic: Life Cycles**<br>· Pollination: Flower colours, Posting game with pollinators, Pollen collection, Flower and apple dissection, Insects on flowers bingo (with availability), Bee vision UV patterns on flowers<br>· Seeds: Seed hunt and study and Paper helicopters (Fall), Seed dissection, Plant seeds (Spring)<br>· Nurse log study (with availability)<br>· Deer skeleton and life cycles (requirement: dry ground to work on)<br>· Egg structure study | **Topic: Types of Forces**<br>· Playground forces: Forces on playground equipment, Bouncing balls<br>· Forces in balance: Balancing pole, Balancing sculpture, Balance point on a stick or ruler, Mobile<br>· Flying hoopster<br>· Paper airplanes<br>· Pinwheel<br>· Catapult from popsicle sticks<br>· Rockets: Balloon rockets, Baking soda/vinegar demonstration rocket<br>· Friction on a bike<br>· On a sledding hill: Friction on snow | **Topic: Water cycle**<br>· Water cycle bracelet and Posting game with water cycle words. | **Topic: Patterning**<br>· Make repeating (positional) patterns with rocks, leaves and chalk<br>· Hunt for circular patterns in flowers and leaf growth patterns<br><br>**Topic: Measuring and Graphing**<br>· Measure leaf length, plant height and playground structure size<br>· Count and graph car colours or flower petal numbers |

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| 3 | **Topic: Biodiversity, Food Chains.**<br>· Woodbug/worm study and decomposers<br>· Habitat survey and food web or Soil habitat study and food web<br>· Pond dipping (with availability)<br>· Kingdoms of life hunt<br>· Native Plant Bingo (with availability of native plants)<br>· Nurse log study (with availability)<br>· At the beach: Habitat survey and food web, Seaweed study, Barnacles, Beach life bingo<br>· Plant feature biodiversity: Root shapes, Leaf drip tips and waxy coatings, Flower colours, Plant smell molecule game<br>· Animal feature biodiversity: Teeth, Eyes, Feet, Feeding methods<br>· Food web model<br>· Deer skeleton and food web (requirement: dry ground to work on) | **Topic: Thermal energy**<br>· Heat sensitive sheets (ideally full sun day)<br>· Heat convection demonstration | **Topic: Landforms**<br>· Build landforms from topography pattern (need dry weather or undercover space)<br>· Posting game with landform words<br>· Weathering rocks<br>· Erosion and Stream flow | **Topic: Patterning**<br>· Hunt for circular patterns in flowers and leaf growth patterns<br>· Use chalk to write number patterns<br><br>**Topic: Measuring and Graphing**<br>· Measure and calculate perimeter and area of rectangular outside areas<br>· Measure air temperature<br>· Make a sundial to measure the sun's position<br>· Count and graph car colours or flower petal numbers |

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| 4 | **Topic: Sensing**<br>· Eye activities: Eye study, Lens inverts an image, Blind spot and Colour reversal illusion<br>· Visual deprivation walk<br>· Eyes in predators and prey<br>· Insect sensing: Flower colours, Bee vision UV patterns on flowers, Bee pheromone molecules<br>· Animal hearing: Sound frequency detection, Hearing through our bones, Noise pollution game<br>· Smell matching games: Plant smell matches and molecules, Posting game with smell molecules, Smell pairs: herbs and plants<br>· Taste: Taste bud observation, Taste and smell for identifying candy flavours | **Topic: Energy transformation**<br>· Energy transformations on the playground: Playground equipment and Double bouncing balls<br>· Catapult from tin can<br>· Jumping stick<br>· Shooter (hazardous; needs a controlled environment)<br>· Rockets: Baking soda/ vinegar demonstration rocket, Mini film canister rockets, Stomp rocket, Air pressure rocket demonstration<br>· Sound calculations: Speed of sound calculation (need an open field next to a large flat wall), Doppler effect | **Topic: Earth's orbit, sun, moon**<br>· Scale model of Earth's orbit and its Moon<br>· Sun dial (need a sunny day) | **Topic: Patterning**<br>· Hunt for circular patterns in flowers and leaf growth patterns<br><br>**Topic: Geometry**<br>· mobius strips<br>· use mirrors to explore line symmetry in plants<br><br>**Topic: Measuring and Graphing**<br>· Calculate perimeters of outside polygons<br>· Measure air temperature<br>· Make a sundial to measure the sun's position<br>· Count and graph car colours or flower petal numbers |
| 5 | **Topic: Organ systems (digestive, musculoskeletal, respiratory, circulatory)**<br>· Muscles: Feel muscle contractions, Balancing and centre of mass in your body<br>· Circulatory system: Blood, pulse and hearbeat activities<br>· Comparative anatomy: Deer skeleton (requirement: dry ground to work on), Clam dissection, Worm study | **Topic: Simple machines**<br>· Lever for lifting a rock (note: need to find a good rock on the school grounds)<br>· Household levers<br>· Levers: how bats and rackets work<br>· Pulleys to lift a heavy load<br>· Catapult from tin can (lever)<br>· Simple machines on a bike | **Topic: Rock cycle, Resources**<br>· Sedimentary rock formation (need dry weather or undercover space)<br>· Rock studies: Sand study (need a dry space to work), Granite mineral study<br>· Mineral testing: hardness and streak colour<br>· Soil component study<br>· Erosion<br>· Water: Water pH testing and Filtering water<br>· Oil spill clean up model | **Topic: Geometry**<br>· mobius strips<br>· use flat mirrors and folding mirrors to find leaves and flowers with line and rotational symmetry<br><br>**Topic: Measuring and Graphing**<br>· Measure then calculate outside areas and perimeters.<br>· Measure air temperature<br>· Make a sundial to measure the sun's position<br>· Count and graph car colours or flower petal numbers |

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| 6 | **Topic: Organ systems (excretory, reproductive, hormonal, nervous)**<br>· Nervous system activities including Reaction time | **Topic: Newton's Laws**<br>· Rockets: Baking soda/ vinegar demonstration rocket/Mini film canister rockets / Stomp rocket / Air pressure rocket / Balloon rocket<br>· Catapult from tin can<br>· Paper airplanes<br>· Helicopter and launcher TEST<br>· Hoopster<br>· Forces in balance: Balancing pole, Balancing sculpture, Balance point on a stick or ruler, Mobile | **Topic: Solar system, Space exploration**<br>· Solar system scale model<br>· Gravity Assist Model<br>· Spectroscope to look at the sun's spectrum with Doppler effect analogy of red shift.<br>· Rockets: set off Baking soda/ vinegar demonstration rocket/ Mini film canister rockets. Model real rocket chemistry (need dry day).<br>· Moon regolith model | **Topic: Geometry**<br>· mobius strips<br>· use flat mirrors and folding mirrors to find leaves and flowers with line and rotational symmetry<br>· use folding mirrors and protractors to measure mirror angle and image number<br>· find trees positioned to make different triangle shapes<br>· measure angles between cracks in concrete<br>· measure tree height using protractor and ratios<br><br>**Topic: Measuring and Graphing**<br>· Measure then calculate outside areas and perimeters.<br>· Measure air temperature<br>· Make a sundial and measure the angle moved each hour<br>· Count and graph car colours passing at different times of day<br>· Count and graph flower petal numbers for different kinds of flowers<br>· Measure bounce heights for different balls<br>· Use a stopwatch to time the period of playground swings with different chain lengths |

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| 7 | **Topic: Evolution**<br>· Evolution by natural selection: Natural selection game and Camouflage challenge<br>· Evidence for evolution: Sedimentary uplifting and Lego evolution<br>· Animal adaptations: Mammal skeleton (requirement: dry ground to work on), Teeth, Eyes, Opposable thumbs<br>· Animal feeding method adaptations<br>· Flower colour evolution<br>· Plant adaptations: Root shapes, Leaf drip tips and waxy coatings, Plant smell molecules game, Plant smell matches and molecules<br>· Biodiversity: Kingdoms of life hunt | **Topic: Electricity**<br>· Electricity activities can be conducted outside if dry, or undercover. Electric circuits free play, Motor free play, Electromagnet, Electrolysis | **Topic: Fossils. Climate change and Human impacts.**<br>· Oil spill clean up model<br>· Fossil formation in sedimentary rock model (weather must be dry)<br>· Noise pollution game and Hearing through our bones<br>· Water filtration | **Topic: Geometry**<br>· mobius strips<br>· use flat mirrors and folding mirrors to find leaves and flowers with line and rotational symmetry<br>· use folding mirrors and protractors to measure mirror angle and image number<br>· find trees positioned to make different triangle shapes<br>· measure angles between cracks in concrete<br>· measure tree height using protractor and ratios<br><br>**Topic: Measuring and Graphing**<br>· Measure then calculate outside areas and perimeters.<br>· Measure air temperature<br>· Make a sundial and measure the angle moved each hour<br>· Count and graph car colours passing at different times of day<br>· Count and graph flower petal numbers for different kinds of flowers<br>· Measure bounce heights for different balls<br>· Use a stopwatch to time the period of playground swings with different chain lengths |