1. We sow cress

Equipment and preparation

TIME
Sow seeds: 30 min
First seedlings: A few days
Cress: About 1 week

EQUIPMENT
Cress seeds
Small bowls to sow seeds in
Soil or cotton wool
Plastic

INSTRUCTIONS
We put cress seeds on damp cotton or in moist soil and cover with plastic.

REMEMBER
Cress sprout very easily, so this can be done throughout the year. Do not let cress dry out.

IDEAS TO TEST
Place the cress with varied access to the sun (e.g. full sun, shade) and see what happens to the seeds. You could try covering them with a paper hat, for example.
Place the seeds in a pattern.
Draw or create animals, with cress as their fur, or the grass they're standing on, for example.

IDEAS TO DISCUSS
What is needed for plants to grow properly?
Why are there many things that do not grow in your country?

WHAT WE CAN LEARN
The sun is our main source of energy.
The sun makes things grow.

2. Whipped cream

Equipment and preparation

TIME
30 min

EQUIPMENT
Whipping cream
Large mixing bowl
Hand whisk and electric hand mixer
Stopwatch

INSTRUCTIONS
Let everyone take a turn mixing until we get thick cream.

REMEMBER
The cream must be chilled.
This activity will only work with whipping cream (not single cream etc)
If you whip the cream for too long, it will turn into butter.

IDEAS TO TEST
Measure the time taken – how long do we have to whip to make whipped cream?
Compare the time taken by hand and with the electric mixer.

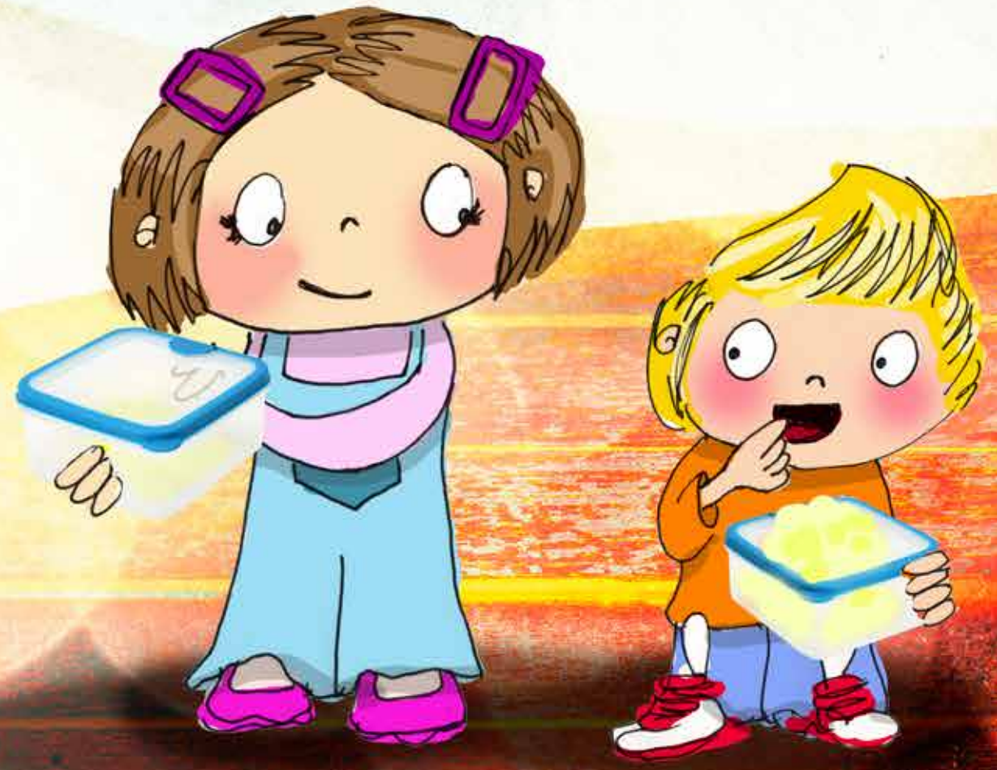
IDEAS TO DISCUSS
Why is there more cream when we've finished whipping than when we started?
When we eat the cream, we give energy back to our muscles again.

WHAT WE CAN LEARN
Muscular energy makes the whisk go round.
We get tired when we use our muscles.
Electrical energy is more powerful than muscular energy.

3. Making butter

Equipment and preparation





TIME
About 1 hour

EQUIPMENT
Cream
Plastic box (es) with a very tight lid
Marbles

INSTRUCTIONS
Pour the cream into the box and put on the lid.
Take turns shaking the box vigorously.

REMEMBER
The cream must be chilled.
This activity will only work with whipping cream (not single cream etc). There must be plenty of space in the box.
A little salt makes the butter tastes better.

IDEAS TO TEST
Record the time – how long do we have to shake the box for to make butter? Use two boxes, and put a marble in one of them. In which box does butter appear first? Why? How does the butter taste?

IDEAS TO DISCUSS
There seems to be more and more cream as we whip – what's happening here?
Why is there less butter than cream?
When we eat the butter, we give energy back to our muscles again.
How is butter made in factories today, and how it was made before?

WHAT WE CAN LEARN
Muscle energy is transferred to the box when we whip the cream.
We get tired when we use our muscles.

4. Rub your hands and feel the heat

Equipment and preparation

TIME
15 min

EQUIPMENT
Not required

INSTRUCTION
Rub your hands together and feel what happens.
Put your hands on another person's back.
Rub each other's backs.

IDEAS TO TEST
Put your hands close together but without touching each other. Breathe on your hands, how does it feel?

IDEAS TO DISCUSS
What happens if we rub our hands for a very long time? Do they catch fire?
Is there a difference when we rub and when we keep our hands still?
Why is it hot in our hands?

WHAT WE CAN LEARN
The body produces heat.
We make extra warmth when we move, and when we rub two things together.

5. Food that rots

Equipment and preparation

TIME
1 hour start-up
Daily follow-up for 1-2 weeks

EQUIPMENT
3 slices of bread with pate (or another topping)
3 thermometers
3 plastic bags

INSTRUCTIONS
Place a slice of bread in each plastic bag with a thermometer. Close the bags.
Keep two bags at room temperature: one in daylight and one in an opaque box.
Put the third bag in the refrigerator.

REMEMBER
Use the same type of bread and pate for all thee slices, and make them as equally sized as possible.
Read the temperature without opening the bags!

IDEAS TO TEST
Observe the color.
What changes the most?
Is there a difference in temperature between the bags?

IDEAS TO DISCUSS
What will happen?
Which bag is going mouldy first? And last?
Why? Rotting garbage can provide us us with warmth, what can we can use it for?

WHAT WE CAN LEARN
Food keeps best when it is dark and cold. Light and heat are types of energy that do something to the food.
When food rots, it creates energy in the form of heat.

6. What is electricity?

Equipment and preparation

TIME
30 minutes

EQUIPMENT
Domino pieces

INSTRUCTIONS
Line up the dominoes in a row. Give the last domino a gentle push.

REMEMBER
The distance between each should be slightly less than the length of the domino.

IDEAS TO TEST
How far apart can the dominoes be before the 'circuit' stops working.

IDEAS TO DISCUSS
Can we see electricity?
Try doing this activity together with the activity, "Connecting an electrical circuit with battery" to help increase understanding.

WHAT WE CAN LEARN
Electricity behaves like dominoes.
Electricity is made up of tiny particles that push each other forward very quickly.
Electric current and electricity are the same thing.

7. Counting devices that use electricity

Equipment and preparation

TIME
About 1 hour

EQUIPMENT
'Counting equipment', for example duplo blocks. Decide which rooms should be included.

INSTRUCTIONS
We count how many electrical appliances are in each room. Let each room have its own colour. Place one duplo block on or next to each electrical device.

REMEMBER
It is not so easy for kids to see which devices need electricity. Some have wires that are hidden – they can look for on/off buttons instead. Cordless appliances should also be counted.

IDEAS TO TEST
Make towers with the different coloured blocks to see which room had the most electrical devices.

IDEAS TO DISCUSS
How does electricity flow into the devices?
Do all devices use the same amount of power/ electricity?
Is there a difference between the different rooms?
What would we do without these devices?

WHAT WE CAN LEARN
We need electricity for a lot of what we do in everyday life.

8. Making a water wheel

Equipment and preparation

TIME
1 hour to build,
1 hour for testing

EQUIPMENT
Potato or Styrofoam ball (core of the water wheel)
Sticks
Plastic spoons (turbine blades)

INSTRUCTIONS
We make a water wheel that we can test under the tap, under a gutter or in a small stream.

REMEMBER
For inside, use a small water wheel.
For outside, it is better to use a large water wheel.

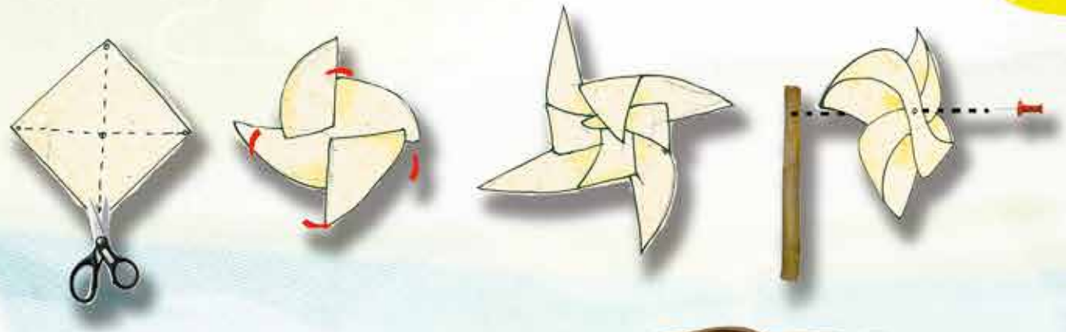
IDEAS TO TEST
Try the wheel first under a thin stream of water and the under a powerful jet – what is the difference?
When does the wheel spin slowly, and when does it spin fast?
Create different water wheels and observe the differences.

IDEAS TO DISCUSS
Can the energy from the water wheel be used for anything?
Can you connect a machine or an appliance to the water wheel?
We can create electric current in a hydropower plant by using flowing water.

WHAT WE CAN LEARN
Water makes the wheel spin around.
There is energy in flowing water.

9. Making a Windmill

Equipment and preparation



TIME
12 hours

EQUIPMENT
Scissors
A piece of thick paper, about 20 x 20 cm
Pencil or a thin stick/rod
Pin
One or two beads
Tape
A hair dryer

INSTRUCTIONS
We fold the paper to construct a windmill, and we get it to spin around.

REMEMBER
The sheet of paper needs to be a square.
The beads are not necessary, but they get the windmill to spin better.

IDEAS TO TEST
What is it that causes the windmill to go around?
Is it easier to get it to spin when the wind is coming from the front or the side?
Is there a difference when you blow on the windmill, use the wind outside, or use a hair dryer?

IDEAS TO DISCUSS
Wind power is renewable energy.
Windmills should be in a place where there is a lot of wind. Where could that be?

WHAT WE CAN LEARN
There is energy in the wind.
Wind makes the rotor blades of windmills spin around. Electric energy is created in a windmill by using wind power.

10. Pop balls storing energy

Equipment and preparation

TIME
20 minutes

EQUIPMENT
Pop balls in various sizes
Stopwatch
Tape measure

INSTRUCTIONS
We use rubber pop balls to learn about storage of energy. Turn the pop balls inside out.
Measure how high they jump, and how long it takes before they pop.

IDEAS TO TEST
How long does it take for the pop ball to jump?
Turn a pop ball inside out and press it together for a few seconds. Does it take more time before it pops when we do this?

What happens if we test the pop ball on different surfaces? For example, on a sponge, in a bowl filled with water, on a book?
What happens if we warm up or cool down the pop balls first?

IDEAS TO DISCUSS
There are many ways to store energy.
It is the energy from our muscles that is used to turn the pop ball inside out.

WHAT WE CAN LEARN
When the pop ball is turned inside out, one side of it becomes stretched. In this stretch is stored energy.
The pop ball does not want to keep the energy, so it turns itself back to its original position.

11. Connecting an electric circuit to a battery

Equipment and preparation

TIME
30 minutes

EQUIPMENT
Wires with alligator clips
Lamp Holder E10
3.5 V light bulb
4.5 V battery

INSTRUCTIONS
Put the light bulb into the lamp. Keep trying to connect the circuit until the lamp lights.

REMEMBER
Electricity is difficult to understand. It can help increase understanding if this activity is done right after "What is electricity?"

IDEAS TO TEST
How should the wires be connected to get the lamp to light?
Is just one wire enough?
Is the light bulb hotter when it lights up?

IDEAS TO DISCUSS
Why is there no light in the light bulb when the circuit is open?
Why is the light bulb hot?
What can we use batteries for?

WHAT WE CAN LEARN
We learn that batteries can store energy in the form of electricity, and we learn to connect an electric circuit so that we can use it.

12. Storing heat in a thermos flask

Equipment and preparation

TIME
From 1 hour

EQUIPMENT
Thermos (min 1 litre)
Soda bottle (min 1 litre)
Hot water from the tap
Two similar jars or cups
Two thermometers
Paper to record the measurements on

INSTRUCTIONS
Fill the soda bottle and thermos with hot water, measure temperature and close.
Pour some water from the bottle and thermos into the jars every 10 minutes and measure the temperature, replacing the lid each time. Record the temperature on paper each time.

REMEMBER
Leave the thermometers to stand in each glass at all times. Divide testing over a longer time to get larger temperature differences.

IDEAS TO TEST
Fill the bottle and thermos with cold water. Measure the temperature and let them sit for a few hours before you measure again.

IDEAS TO DISCUSS
Can a thermos be used for other things?
How can we keep the drink cold?
When is it a good idea to use the thermos?
How do we get the plastic bottle to keep the drink warm?

WHAT WE CAN LEARN
A thermos flask is made of two “bottles” – one inside the other. The area between the two bottles, the vacuum (no air), keeps the heat from escaping.

13. Keeping warm with insulation

Equipment and preparation

TIME
30 minutes

EQUIPMENT
Different materials, eg:
Wool blankets
Fur
Sheets
Aluminum foil

INSTRUCTIONS
We find out how good different materials are as insulation, and we learn to keep warm by using appropriate clothing.

REMEMBER
Children often need some time to really notice the difference. Make sure they sit quietly when they try the various materials.

IDEAS TO TEST
Lay one of the materials over the back and shoulders. Try each of the materials one at a time. Find out which of the materials makes you feel warmest.
Is there a big difference between any of the materials?
Try against a bare forearm?

IDEAS TO DISCUSS
Why do some materials insulate better than others? Which materials should be used in our winter clothes?

WHAT WE CAN LEARN
The warmest materials, like wool, have many tiny air pockets.
The heat from our body is stored in these air pockets and keeps us warm.

14. Water saving shower heads and taps

Equipment and preparation

TIME
30 minutes – 1 hour

EQUIPMENT
Regular shower head or tap
Water-saving shower head or tap
10 litre bucket
Stopwatch

INSTRUCTIONS
We compare water-saving shower heads with normal shower heads or taps.
Test how long it takes to fill up the bucket when the water is on full.
We measure how long it takes for the two different shower heads.

REMEMBER
Use cold water!

IDEAS TO TEST
Feel the water jets. Is there a difference?

IDEAS TO DISCUSS
What is the difference between a regular shower and a water-saving shower head?
It is a good idea to switch to water-saving shower heads? Why?
Are we as clean with whatever shower head we use?
Do we really need to take long showers?
How long does it take to fill the bucket? If it takes more than 45 seconds, then it is a water-saving shower head!

WHAT WE CAN LEARN
It looks like there is a lot of water coming out of the water-saving shower head, but it's not as much as from a regular shower. So we save a lot of hot water using the water-saving shower head.

15. Electricity Police

Equipment and preparation

TIME
1 hour to make rules and signs
Ongoing activity

EQUIPMENT
Signs for the Electricity Police

INSTRUCTIONS
Two children will be appointed to the Electricity Police.
Everyone has responsibility for a week each.
The children make the rules with the adults.
The Electricity Police make sure that rules are followed.

Example of rules:
Turn off lights in rooms that aren't being used.
Take care not to waste water when washing.
Use just one paper when you dry your hands.
Outside light is turned off during the daytime.
Windows and doors must be closed.

IDEAS TO TEST
Using role play where the adults do the opposite of what children have learned.

IDEAS TO DISCUSS
Where does the electricity come from?
Reasons to save electricity.
Why do we need the Electricity Police?

WHAT WE CAN LEARN
Electrical energy is a resource.
We practise energy-saving behaviour.
Environmentally friendly behaviour becomes a habit.

16. Dark day

Equipment and preparation

TIME
1 hour preparation
1 day implementation

EQUIPMENT
Torches (preferably shaking torches and LED lights, as they are the most environmentally friendly)
Headlamps
Parents should bring flashlights.

INSTRUCTIONS
Try to get through an entire day at preschool without electric light or electrical equipment.

PLEASE NOTE:
This activity is best carried out during the winter.

IDEAS TO TEST
How can we manage to read?
Can we have hot food or drink?
Can we change nappies and go to the toilet with a torch?
Play hide and seek. Make music and theatre instead of using the CD, PC and other electrical equipment.
Use old tools that do not need electricity.

IDEAS TO DISCUSS
Do we need to have electricity?
How do people live without electricity?
Has anyone ever been to a place (e.g. a house) which didn't have electricity?

WHAT WE CAN LEARN
We learn which appliances use electricity.
We can focus on saving electricity.
We learn to get by without electricity.

17. Studying different types of light bulbs

Equipment and preparation

TIME
30 – 60 minutes
Equipment
A normal 40-watt light bulb
An energy-saving bulb (about 9 W) with the same brightness as the other bulb
Lamp with switch
Thermometer

INSTRUCTIONS
We find out if there is a difference between light bulbs. An adult changes the light bulbs.

REMEMBER
Conventional light bulbs can get very hot, wait until they are cool before removing them.
Make sure children are not sitting for too long looking directly at the light.

IDEAS TO TEST
Keep your hands about 20 centimetres (6 inches) above the light to find out which one is hottest. Hold the thermometer there for about one minute to check.

IDEAS TO DISCUSS
Which light bulbs do we use in the preschools?
What do we use at home?
Maybe some can be replaced?
What happens in a warm room if we use regular light bulbs?
Energy-saving bulbs emit less heat and therefore use less power.

WHAT WE CAN LEARN
There are different types of light bulbs. In addition to light, some of them also create a lot of heat, which maybe we don’t need.