

USING THINKING SKILLS IN SCIENCE

Bloom's (Revised) Taxonomy can be used to make science work more challenging for high learning potential children who have already mastered, or can very quickly and easily grasp, the lower order learning activities.

Below are suggestions for activities at every Bloom's Taxonomy level for several science topics, as well as a Bloom's Experiment Form and suggestions for tasks at each level so you can create your own activities.

There are six levels in the taxonomy, moving from the lowest order processes (Remembering) to the highest (Creating):

Remembering – Level 1 – Lower Order Thinking Skill

Retrieving, recalling or recognising knowledge from memory, used to produce definitions, facts or lists, or recite or retrieve material.

Understanding – Level 2 – Lower Order Thinking Skill

Demonstrate understanding of facts and ideas by organising, comparing, translating, interpreting, giving descriptions, and stating main ideas.

Applying – Level 3 – Middle Order Thinking Skill

Use new knowledge in new situations by applying acquired facts, techniques and rules in a different way.

Analysing – Level 4 – Higher Order Thinking Skill (Critical Thinking)

Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalisations.

Evaluating – Level 5 – Higher Order Thinking Skills (Critical Thinking)

Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria.

Creating – Level 6 – Higher Order Thinking Skill (Creative Thinking)

Compile information in a different way by combining elements in a new pattern or proposing alternative solutions, through generating, planning or producing.



Insect Activities Using Bloom's Taxonomy

Level	Suggested Activities
Remembering	Think of all the insects you can, trying to find one beginning with each letter of the alphabet.
Understanding	From your list, choose an insect to research. Make a list of ten statements about your insect; five that are facts and five that are not facts. Show the statements to a friend and see if he or she can tell which ones are the facts!
Applying	Survey 10 people to find out which insect each dislikes the most. Put the results into a bar chart and draw conclusions from your findings.
Analysing	Choose the names of insects to finish these similes or comparisons: As noisy as a ..., As lovely as a ..., As fast as a ..., As funny as ..., As leggy as a ..., As annoying as a ..., As tiny as a ..., As popular as a ..., As unusual as a ..., As bright as a ...
Evaluating	If you had to become an insect, which would you be? Support your choice with at least five reasons.
Creating	Combine parts of several different insects to create a new kind of insect. Draw a picture of the insect and label the parts. Make a note of what the new insect's strengths, weaknesses, diet and predators would be.

Weather Activities Using Bloom's Taxonomy

Level	Suggested Activities
Remembering	Compile a glossary of the following weather-related terms and their definitions: fog, snow, wind, lightning, condensation, convection, cyclone, evaporation, forecast, front, humidity, meteorologist, precipitation, weather, climate.
Understanding	Using your own words, explain each of the following important weather concepts: <ul style="list-style-type: none"> • Hydrologic Cycle, • Beaufont Scale, • Coriolis Effect.
Applying	Construct four different cloud formations from card or sugar paper, felt pens and cotton balls. Label and describe each one: High cloud types: cirrus, cirrocumulus (rare) and cirrostratus Middle cloud types: altocumulus, altostratus and nimbostratus Low cloud types: stratus, and stratocumulus Clouds through all levels: cumulus and cumulonimbus

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Analysing	<p>Compare and contrast each of the following weather instruments used by meteorologists to make weather predictions:</p> <ul style="list-style-type: none"> • barometer, • anemometer, • wind vane, • rain gauge, • hygrometer. <p>This could be done using a 5-point Venn Diagram to help you.</p>
Evaluating	<p>Determine which geographic region of the world has the best weather or climate conditions on a regular basis. Which areas will you consider and what criteria will you use? Be able to defend your position.</p>
Creating	<p>In ancient times, people invented stories to explain natural phenomena such as weather conditions. Pretend you live in an ancient time and land. Compose a story that explains the falling of hail. Illustrate your story if you wish.</p>

Movement Activities Using Bloom's Taxonomy

Level	Suggested Activities
Remembering	<p>Investigate movement by listing:</p> <ul style="list-style-type: none"> • ways that objects can move, • directions that objects can move, • things that can make objects move, • places where objects could move, • times of day we could see objects moving.
Understanding	<p>Choose an example of movement from your list. Find out more about what happens and why. Describe in your own words how the object moves.</p>
Applying	<p>Could your chosen object be moved in a different way? Do environmental factors affect your object?</p>
Analysing	<p>Draw a flow-chart to show the processes in moving an object. Choose a different object from the one described above.</p>
Evaluating	<p>Compare your two moving objects using a Venn Diagram. What criteria would you use to decide which one is better?</p>
Creating	<p>Make an object move without touching it. You will need to create a plan, identifying the source of energy that will create the movement, the way and direction the object will move and whether it needs to be observed at a particular time of day.</p>

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Bloom's Experiment Form (can be used with any Science-related activity)

Remembering

Write a list of all the materials used in the experiment.

Materials:

Understanding

Record the procedure used in conducting this experiment.

Procedure:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Applying

Record the data observed and collected during your experiment.

Data:

Action	Observation

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Analysing

Examine your data and draw conclusions.

Conclusions:

- 1.
- 2.
- 3.

Evaluating

Describe how you would rate the success of your experiment. Establish a set of criteria for measuring the result.

Creating

Create a series of "What if..." statements about your data to show things that might be different should variables be changed.

What if...

What if...

What if...

The table below shows some of the verbs used to ask questions of learners at each of the different levels of the taxonomy:

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Thinking Skill	Verbs Used	Example Tasks
Remembering	Name Find Write Tell List State Recite	List Timeline Facts Recitation Quiz Flashcards Bullet points
Understanding	Describe Summarise Discuss Outline Predict Interpret Explain	Summary Explanation Mind map Presentation Timeline Scrapbook Examples
Applying	Demonstrate Solve Use Apply Illustrate Construct Examine	Illustration Project Roleplay Map Diorama Leaflet Newspaper Article
Analysing	Categorise Analyse Classify Compare Contrast Separate Relate	Diary Collection Illustration Questionnaire Flow-chart Model Diagram
Evaluating	Judge Critique Justify Debate Recommend Prioritise Experiment	Survey Graph Report List criteria Debate Essay Written case
Creating	Design Create Plan Construct Invent Devise Make	Story Poem Play Song Animation Invention Website

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