

# Animal cell creation

**Secondary: (ages 11 – 14)**

**Science**

Students are encouraged to identify, compare, appraise, and create representations of animal cells. They begin by assessing existing images according to a number of different criteria before working as a group to create their own animal cell.

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**Time allocation**      Around 6 lesson periods

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**Subject content**      Identify and represent parts of an animal cell  
Develop awareness of the variety of mediums used to present data

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**Creative and critical thinking**      This unit has a **creativity** and **critical thinking** focus:

- Consider several perspectives on a scientific problem
- Generate ideas and propose how to solve a scientific problem meaningfully
- Explain strengths and weaknesses and reflect on chosen approach relative to alternatives

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**Other skills**      Communication, Collaboration, Persistence/Perseverance

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**Key words**      cells; cytology; biology; cytoplasm; ribosome; nucleus; cell wall; membrane; genome

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## Products and processes to assess

This approach allows students to situate their learning in animal cell production whilst asking them to apply creativity to produce a model of an animal cell. Students assess themselves according to the rubric. At the highest levels of achievement, their outputs are imaginative and radical or unusual. They are able to analyse other possibilities and perspectives and compare their work to other ideas and products. They show a clear understanding of the strengths and limitations of their chosen approach and can appraise it using a number of different criteria. There is good awareness of personal novelty and risk and the student is open to the ideas, critiques, and feedback of others.

## Teaching and Learning plan

This plan suggests potential steps for implementing the activity. Teachers can introduce as many modifications as they see fit to adapt the activity to their teaching context.

Step	Duration	Teacher and student roles	Subject content	Creativity and critical thinking
1	Prior to lesson period 1	Teacher works on content on animal cells before challenging the students to create a model of an animal cell.	Unit on animal cells	
2	Lesson period 1	Texts, videos, images of cells in Science/Biology that define an animal cell to be used as theoretical basis. The rubric should be presented to make students aware of what should be reflected throughout the process. The teacher may choose to discuss with students different ways of representing cells and perhaps to compare different images, appraising them according to a variety of criteria (e.g. scientific accuracy, beauty, as a way to learn about cells, most unusual)	Comparing images of cells	Explaining the strengths and limitations of representations of cells according to different criteria  Considering several perspectives on a scientific problem
3	Lesson period 2, 3 and 4	Students then use their knowledge about cells to creatively apply art techniques and create an animal cell using different materials. The teacher may decide to build on the discussion in step 2 to assign or encourage students to select particular criteria for their cell.  This process can be repeated across a number of lessons as required.	Working in group to discuss and represent animal cells	Using their imagination to make connections  Generating ideas and proposing how to approach and solve scientific problem
4	Lesson period 5 (this could extend into a further lesson period if required)	At the date set to present their productions and assess themselves on the creativity rubric, the students should go around the classroom to get to know their classmates' productions. After that, the teacher should offer the students a new opportunity to improve their production if they want to change something in their work or change the level on the rubric.  The teacher should engage the students in dialogue about whether something is missing in certain works and what could have been added or improved in each one, so they could reach a better level on the rubric and show the main parts of an animal cell.	Working independently from the teacher to plan their work and ensure the first draft of their cells are finished on time.	Reviewing the work of others, appraising, and explaining its strengths and limitations  Considering several perspectives and reflecting on chosen scientific approach relative to possible alternatives
5	Final lesson period	After having completed the work, the students will turn to the rubric. They assess themselves orally as well as observing whether the goals were achieved. When they are finished they should can questions of each other, make suggestions for improvement or discuss issues that arise.	Commenting on representations of cells and assessing their scientific accuracy	Reflecting on steps taken to pose and solve a scientific problem

## Resources and examples for inspiration

### Web and print

- Various representations of cells for students to discuss and compare

### Other

- Paper, pencils and rulers
- Any material the students want to use to create their animal cell

### Opportunities to adapt, extend, and enrich

- Further links could be made to art by asking students to create artistic representations of a number of biological phenomenon.

**Creativity and critical thinking rubric for science**

• Mapping of the different steps of the lesson plan against the OECD rubric to identify the creative and/or critical thinking skills the different parts of the lesson aim to develop

	<b>CREATIVITY</b> Coming up with new ideas and solutions	<b>Steps</b>	<b>CRITICAL THINKING</b> Questioning and evaluating ideas and solutions	<b>Steps</b>
<b>INQUIRING</b>	Make connections to other scientific concepts or conceptual ideas in other disciplines	2,3	Identify and question assumptions and generally accepted ideas of a scientific explanation or approach to a problem	2
<b>IMAGINING</b>	Generate and play with unusual and radical ideas when approaching or solving a scientific problem	3,4	Consider several perspectives on a scientific problem	2,4
<b>DOING</b>	Pose and propose how to solve a scientific problem in a personally novel way	3,4	Explain both strengths and limitations of a scientific solution based on logical and possibly other criteria (practical, ethical, etc.)	2,4
<b>REFLECTING</b>	Reflect on steps taken to pose and solve a scientific problem	2,3,5	Reflect on the chosen scientific approach or solution relative to possible alternatives	2,4