Wooroolin State School

SCIENCE PROGRAMME

2012- 2014
WOOROOLIN STATE SCHOOL
STATEMENT OF BELIEFS

Working together to ensure that every day, in every classroom, every student is learning and achieving

At Wooroolin State School we believe that today’s students face complex social, environmental and economic futures. Within this context however, we believe that every student is capable of learning and is expected to demonstrate ongoing progress. To ensure progress, we believe there should be close alignment with systemic curriculum intent. We believe that skills and knowledge must be explicitly taught across the curriculum and in increasing sophistication as students progress through their schooling.

At Wooroolin State School we believe that we should establish ambitious but realistic goals that promote high expectations for every student in the school. To meet these goals, we believe that student progress should be monitored regularly. Planning should be sequenced and occur with reference to agreed standards and targets which align to system, school and individual priorities and needs.

We believe that assessment is an ongoing process. By using a range of assessment tools and data we believe we can create a picture of a student’s achievement and learning needs in order to determine priorities and planning for the next step in learning.

We believe that teachers should provide specific, ongoing and quality feedback to guide student learning and so that students can take an active role in reflecting their own learning and identifying steps they can take to improve.

These beliefs are acknowledged and reflected in the five Dimensions of Teaching and Learning illustrated overleaf.

---

2008

*Melbourne Declaration on Educational Goals for Young Australians.*

The Melbourne Declaration commits to supporting all young Australians to become successful learners, confident and creative individuals and active and informed citizens, and promotes equity and excellence in education.
THE DIMENSIONS OF TEACHING AND LEARNING

Our students
Working together to ensure that every day, in every classroom, every student is learning and achieving.
**CURRICULUM INTENT – WHAT DO WE WANT OUR STUDENTS TO KNOW?**

What we want our students to know about Science and what we want them to do to achieve deep understanding about what they are learning is outlined in departmental documents including the Australian Curriculum, Essential Learnings and Standards, Education Queensland Roadmap including the Scope and Sequence. These curriculum documents reflect what we are expecting all students at Wooroolin State School to achieve at appropriate year levels.

**SEQUENCING TEACHING AND LEARNING - HOW DO WE TEACH THEM WELL?**

In order to teach our students well, we believe teachers should:

- have a sound knowledge of what we want our students to learn
- have a sound knowledge of the theories of science and the models of science which inform our teaching
- are able to combine those knowledges
- translate those knowledges into teaching strategies.

**ASSESSMENT - HOW DO WE KNOW WHAT THEY KNOW?**

In order to know what our students know, teachers at Wooroolin State School:

- observe students carefully and record observations
- ask a range of questions
- keep anecdotal records
- complete checklists
- assess the depth of understanding that students are achieving as they use a variety of investigations across all areas of Science.

Whole-class testing at particular junctures is also useful to track progress from year to year. The Wooroolin State School Assessment, Standards and Targets document sets out this cycle and is available as a separate document.
FEEDBACK - HOW DO WE RESPOND IF THEY DON’T KNOW?

Teachers at Wooroolin State School analyse records, observation checklists and authentic assessment data to gives them the exact information needed to pinpoint where students are experiencing difficulty with any of the concepts or strategies that have been taught. Daily feedback is provided verbally and by checking written work through marking and written feedback. Formal feedback is provided to parents and carers twice a year through the Report Card, parent teacher interviews and 3-way conferences. Specific feedback is provided to students after each assessment piece and students are encouraged to take an active role in formal feedback sessions with their teacher. This is an opportunity to set individual goals for learning and completes the feedback cycle.

MAKING JUDGEMENTS - HOW DO WE RESPOND IF THEY ALREADY KNOW?

Pre-testing student knowledge means that we can refrain from teaching those students who already know what we are planning to teach. Students who already know specific science learnings would not need to participate in the lessons involving investigation of these. In this way we are fulfilling our purpose as teachers, which is to maximise the learning for all students.
THE AUSTRALIAN CURRICULUM - SCIENCE

Please refer to the ACARA website for information on Maths and the Australian Curriculum, www.australiancurriculum.edu.au

HOW DOES THIS RELATE TO WOOROOLIN STATE SCHOOL?

OUR SCHOOL VISION

Wooroolin State School’s vision is to provide quality education in a safe and supportive learning environment so that each student strives for and achieves his or her best every day.

Wooroolin State School has at its core a set of values that we hope all who are part of our community will acknowledge and model. These values, our PROUD values, are set around our motto, Make Wooroolin Proud. Staff, students and our community believe these values can be expressed in many ways.

Our school purpose is set out in the Annual School Operational Plan which is a product of self-reflection by our school community and is a strategic planning and accountability document. It details the way in which the school will improve student learning, how it will monitor performance as it works towards the achievement of:

- Systemic planning priorities outlined in the Education Queensland Strategic Plan
- School-based developmental priorities
- School purpose and vision statement

The plan is monitored and reviewed annually to ensure flexibility and continuity of purpose.

A copy of the current Operational Plan is available on our website or on request.

Students undertake simple questionnaires on personality traits and preferences to help with teaching and learning strategies. Once profiled, a student’s personality is given an animal totem according to AUS IDentities. Howard Gardner’s Multiple Intelligences (or SMARTS) are used to understand a student’s preferred learning style. More information on these are outlined in our Gifted and Talented Framework.
BELIEFS ABOUT SCIENCE AT WOOROOLIN SS

We believe there are five areas which can impact a student’s development and attitude towards Science. These are discussed below.

Beliefs about the Student
We believe that students:
- Come to school with a unique set of prior experiences/strengths about Science and different knowledge
- Have the potential to improve their Science skills and knowledge with continual support and sufficient time
- Develop the skills needed to be a confident student in Science at their own pace

Beliefs about Learning
We believe that the learning of Science
- Builds from early scientific experiences
- Is enhanced through a whole school approach to Science
- Should occur frequently in the classroom and at home
- Is developmental and best practice would take into account individual strengths, weaknesses and interests
- Is an important component of the teaching of the eight Key Learning Areas

Beliefs about Leadership
We believe that the role of the Principal is to:
- Lead curriculum change
- Motivate and engage staff in change
- Provide adequate resources to fulfil the school’s responsibilities to students, staff and the community
- Maintain focus and momentum to improve student outcomes
- Take an active role in curriculum planning
- Encourage collaboration

The Role of Staff and the School Environment
We believe that the role of staff is to:
- Create a science-rich environment that is safe, varied, enhanced and supported
- Scaffold student’s learning experiences to meet their developmental needs and build upon their strengths so that each student reaches their potential
- Set high expectations for each student’s learning and target teaching to the student’s levels of readiness and need
- Provide resources suitable for the needs of the individual
- Be a positive role model for readers by exhibiting high expectations, deep knowledge, targeted teaching and continuous monitoring
- Integrate Information Communication Technologies into the teaching of Science
- Participate in professional development to enhance knowledge of the teaching of Science
- Understand individual differences including those of Aboriginal and Torres Strait Islander students, gifted and talented students, students who have English as a second language (ESL) and students with additional learning needs

Productive Healthy Partnerships
We believe:
- Families, teachers and students are active partners in the learning of writing
- People must feel comfortable to actively participate in writing at our school
- Active participation by all will produce better Science outcomes for the every student
THE TEACHING AND LEARNING OF SCIENCE AT WOOROOLIN STATE SCHOOL

Through the study of Science, we believe that teachers can develop a student’s capacity for Science Understanding, Science as a Human Endeavour and Science Inquiry Skills.

At Wooroolin State School we believe that the teaching of Science must be taught in uninterrupted block times. Times vary from class to class but will consist of 1x1 hour block for Year 1-3 and 2x1 hours blocks for Years 4-7.

TEACHING AND LEARNING MODEL

Children learn science best when they construct personal explanations for questions that they regard as important. This program is based on an inquiry-orientated teaching and learning model. Students use their prior knowledge and literacies to develop explanations for their hands on experience of scientific phenomena. They must be actively engaged in the learning process. Students develop investigation skills and an understanding of the nature of science. The vital role of the teacher is to structure learning experiences that prompt important questions and guide the learners to valued insights.

Making the connections between what students already know and new information can be assisted through progression through five inter-related phases, known as the 5Es constructivist learning model:

Engage

Designed to spark students’ interest, stimulate their curiosity, raise questions for inquiry and elicit students’ existing beliefs about the topic. Students’ writing, drawing and talk provide an opportunity for the teacher to assess students’ prior knowledge, including any alternative conceptions. The teacher then takes account of students’ existing ideas when planning future learning experiences.

Explore

Provides students with hands-on experiences of the topic’s science phenomena; explore ideas, collect evidence, discuss observations, keep records. The Explore phase ensures all students have a shared experience that can be discussed and explained in the Explain phase.
Explain

Students discuss and identify patterns and relationships within observations and develop scientific explanations. Students consider the current views of scientists and deepen their own understanding. Students develop a literacy product to represent their developing understanding. The representations enable the teacher to monitor developing understanding and provide feedback to learners.

Elaborate

Students plan and conduct an open investigation to apply and extend their new conceptual understanding in a new context. The teacher can use students’ reports of their investigation to assess the extent to which students have achieved the investigating outcomes for the unit.

Evaluate

Students reflect on their learning journey and create a literacy product to represent their conceptual understanding. The teacher can use evidence from this lesson to assess the extent to which students have achieved the conceptual learning outcomes for the unit.

EFFECTIVE SCIENCE CLASSROOMS

Learners

In effective science classrooms, the learners are active participants. They

• understand that the knowledge they have will influence their current learning, and are prepared to challenge their own beliefs and the beliefs of others
• recognise that understandings are dynamic and can be modified
• take responsibility for their own learning

Teachers

In effective science classrooms, the teachers are active participants. They

• facilitate learning experiences, challenging students to think critically and creatively
• assist learners to develop understandings by using clear unambiguous language to explain ideas
• plan learning opportunities to meet the needs of the students, and assist all students to achieve the intended learnings
SAFETY

Learning to use materials and equipment safely is central to working scientifically. It is important for teachers to review each lesson in advance to identify and manage safety issues specific to a group of students. The risks should be identified and strategies adopted to remove or minimise them.

The following guidelines will help minimise risks:

- check students’ health records so that you are aware of potential problems, such as allergies
- be aware of potential dangers by trying out new activities before students do them
- Caution students about potential dangers before they begin an activity
- Clean up spills immediately
- Instruct students never to taste, smell or eat anything unless they are given permission
- Discuss safe practices for science activities.

The fundamentals of safe practice in science teaching are the same as those in any other teaching area. Teachers should refer to Education Queensland policy on HLS-PR-012: Curriculum Activity Risk Management at http://iwww.qed.qld.gov.au/strategic/eppr/health/hlspr012/ and also to our school policy on Occupational Health and Safety.

WHAT ASSUMPTIONS CAN WE MAKE ABOUT SCIENCE LEARNERS?

- Science learners bring with them prior experiences which teachers consider, and to which students make connections.
- Science learners benefit from immersion in science environments which recognise the importance and interdependence of the areas of science.
- Science learners require explicit instruction.
- Science learners respond to quality modelling and scaffolding experiences.
- Science learners benefit from social interaction.
- Science learners need to perceive science learning as adding value to their lives.
- Science learners need to engage with authentic purposes for using science.
Science learners need practice and frequent opportunities to investigate and explore science in order to become competent and confident science learners.

Science learners are more willing to risk-take and share their understandings where a safe, secure and accepting learning environment has been established.

Science learners are more likely to demonstrate commitment and continued interest in science tasks when they are provided with a range of choices.

Science learners have varied learning styles and capabilities which teachers are cognisant of and cater for.

WHAT DO GOOD SCIENCE LEARNERS DO?

- Display positive attitudes to science including self-motivation, confidence and a love of maths.
- Connect prior knowledge and experiences to the concepts presented.
- Use prior knowledge to prepare for new learning.
- Identify their purpose for engaging in science tasks.
- Bring a broad prior knowledge to their science learning.

WHAT HAPPENS IN EFFECTIVE SCIENCE CLASSROOMS?

- A very high level of academic engagement is evident.
- A varied and well-crafted range of resources are available in the classroom.
- An environment of rich interaction is evident.
- There is a high level of social interaction and cognitive collaboration.
- Learning purposes are clearly stated and connections are made between lesson purposes, lesson tasks and lesson conclusions.
- Explicit teaching of skills occurs.
- In place is an effective informal and formal assessment program which is analysed and directly related to pedagogy at a class and individual level.
Differentiated instruction occurs (grouping students and relating teaching to specific needs) based on deep understanding of student needs arising from assessment.

Scientific investigation is purposeful and authentic.

There is evidence of higher order questioning and an acceptance of divergent answers.

Students are learning to process information in investigations at a deeper level because of the problem solving conditions that are created.

Students are generating insightful questions about science.

Rich discussion and instructional conversations occur and students contribute ideas and hypotheses that shape conversations around science learning.

There is a balance of sharing across all students.

There is a consistent approach to science teaching and assessment across the whole school.

Ongoing professional development in the teaching of science is provided for all teachers and paraprofessionals.