Science Policy

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The Stour Academy Trust

At the Stour Academy Trust, we envision a holistic science education that fosters interconnected learning by integrating scientific concepts with other subjects to address real-world issues. Our inquiry-based approach encourages pupils to engage in scientific exploration, nurturing their curiosity and critical thinking skills.

Utilising the Cornerstones framework, we emphasise hands-on experiments and practical applications, making science lessons relevant while tackling global challenges like climate change and health issues. Our curriculum builds cumulatively sufficient knowledge and skills, allowing pupils to progress through a structured sequence that reinforces understanding of key scientific concepts.

We prioritise developing a robust scientific vocabulary, empowering pupils to articulate their understanding effectively. Inclusivity and adaptation are central to our vision, ensuring tailored support for all pupils, including those with SEND.

Ongoing formative assessment strategies enable teachers to gauge understanding and adapt their teaching, providing timely feedback to enhance learning. We celebrate pupils' scientific achievements, fostering a positive environment that encourages exploration and enthusiasm for science.

By combining these elements, we aim to create an engaging, inclusive, and effective science education experience that equips pupils with the knowledge and skills to navigate and contribute meaningfully to the world around them.

Intent

Our intent is to:

- **Inspire Curiosity**: Encourage pupils to ask questions, explore, and engage with scientific concepts through hands-on experiences.
- **Develop Knowledge and Skills**: Provide a curriculum that builds cumulatively, ensuring pupils develop a solid foundation in biology, chemistry, and physics.
- **Foster 21st Century Skills**: Equip pupils with critical thinking, problem-solving, collaboration, and communication skills essential for success in a rapidly changing world.
- **Promote Inclusivity**: Ensure that all pupils, including those with SEND and Pupil Premium, have access to a high-quality science education tailored to their individual needs.

Implementation

Curriculum Design

- **Cornerstones Framework**: Our science curriculum is structured around the Cornerstones framework, ensuring a coherent and sequenced approach to learning. Each unit is designed to connect scientific concepts to real-world applications, promoting relevance and engagement.
- **Working Scientifically**: The curriculum is designed to integrate the principles of working scientifically, ensuring that pupils develop both substantive knowledge and the skills necessary for scientific inquiry. This includes:
    - **Scientific Inquiry**: Pupils engage in scientific inquiry by asking questions, making observations, forming hypotheses, conducting experiments, and drawing conclusions.

    - **Experimental Skills**: Pupils learn to plan and conduct experiments, use appropriate techniques and apparatus, and evaluate methods and results.
    - **Analysis and Evaluation**: Pupils apply the cycle of collecting, presenting, and analysing data, interpreting results, and communicating their findings effectively.
    - **Scientific Vocabulary**: Pupils develop their use of scientific vocabulary and nomenclature, understanding the importance of units and symbols in scientific communication.
- **Practical Learning**: We prioritise hands-on investigations and experiments, ensuring that pupils have ample opportunities to engage in high-quality practical work that reinforces their learning.

Cornerstones Teaching Resources

Using teaching resources from Cornerstones effectively involves strategic planning and implementation to enhance pupil engagement and learning outcomes. Here's a structured approach to maximise the impact of these resources:

1. Align Resources with Learning Objectives

- **Identify Goals**: Before selecting resources, clarify the specific learning objectives for the lesson or unit. Ensure that the resources directly support these goals.
- **Curriculum Mapping**: Utilise the Cornerstones curriculum maps to identify resources that are relevant to the current topic, ensuring coherence in teaching.

2. Adaptation

- **Tailored Tasks**: Select resources that cater to the diverse learning needs of the children. Cornerstones often provides multiple versions of resources, allowing you to choose those that best meet the needs of all pupils, including those with SEND.
- **Flexible Grouping**: Implement resources in small groups or pairs, enabling pupils to collaborate and support each other.

3. Integrate Resources into Lesson Planning

- **Structured Activities**: Plan how and when to incorporate resources into your lessons. For example, use them as guided practice following direct instruction or as independent practice to reinforce learning.
- **Contextual Relevance**: Introduce resources by connecting them to real-world applications or previous lessons. This helps pupils see the relevance of what they are learning.

4. Encourage Active Engagement

- **Interactive Elements**: Motivate pupils to actively engage with the resources. This could involve annotating, highlighting key points, or discussing answers with peers.
- **Hands-On Activities**: Pair resources with hands-on activities that allow pupils to apply what they've learned in a practical context. For instance, if a resource covers a scientific concept, follow it with an experiment.

5. Use Resources for Assessment

- **Formative Assessment**: Utilise resources as tools for formative assessment. Review completed resources to gauge pupils' understanding and identify areas needing further support.
- **Feedback Opportunities**: Provide timely feedback on resource tasks. Highlight strengths and areas for improvement, encouraging pupils to reflect on their learning.

6. Promote Reflection and Discussion

- **Class Discussion**: After completing resources, facilitate a class discussion to review answers and clarify misconceptions. This reinforces learning and promotes critical thinking.
- **Reflection Activities**: Encourage pupils to reflect on their learning process after completing resources. This could involve writing a brief summary of what they learned or discussing how they approached the tasks.

7. Monitor Progress and Adapt

- **Track Performance**: Keep records of pupils' performance on resources to monitor progress over time. This data can inform future planning and instruction.
- **Adapt Resources**: Be flexible in your approach. If a particular resource isn't resonating with pupils, consider adapting it or selecting a different resource that might be more effective.

At Richmond Primary School, we utilise the Cornerstones Curriculum to enhance our science teaching in the Early Years Foundation Stage (EYFS). This structured approach allows us to deliver a rich and engaging science curriculum that aligns with our school values and meets the needs of all pupils, particularly those with SEND and Pupil Premium. The following outlines the structure for science teaching in EYFS using the Cornerstones framework.

Lesson Structure- EYFS

1. Theme-Based Learning

- **Cornerstones Themes**: Science lessons will be integrated into the Cornerstones themes, ensuring that scientific concepts are explored within a broader context. Each theme will provide opportunities for pupils to investigate and learn about the natural world, materials, and living things.
- **Example Themes**: "The Enchanted Woodland," "The Magic Toymaker," and "Why Do We Love to be Rude?" will serve as contexts for scientific exploration.

2. Learning Objectives

- **Clear Objectives**: Each lesson will have specific, measurable learning objectives that focus on key scientific concepts such as understanding living things, materials, and seasonal changes.
- **Alignment with EYFS Framework**: Objectives will align with the Early Years Foundation Stage Framework, particularly the "Understanding the World" area of learning.

3. Engagement Activities

- **Hands-On Exploration**: Lessons will begin with engaging, hands-on activities that stimulate curiosity. This may include outdoor exploration, sensory play, and interactive demonstrations related to the theme.

- **Use of Resources**: Incorporate a variety of resources such as natural materials, scientific tools, and digital media to enhance learning experiences.

4. Vocabulary Development

- **Focus on Vocabulary**: Each lesson will introduce new scientific vocabulary relevant to the theme. Teachers will model language through storytelling, songs, and discussions, reinforcing understanding through repetition.
- **Visual Aids**: Use visual aids, such as word walls and picture cards, to support vocabulary acquisition and retention.

5. Investigative Learning

- **Inquiry-Based Approach**: Encourage pupils to ask questions and make predictions related to the theme. Provide opportunities for them to conduct simple investigations, record observations, and share findings.
- **Structured Investigations**: Use structured investigations that guide pupils through the scientific process, including planning, observing, and concluding.

6. Reflection and Assessment

- **Reflective Practises**: At the end of each lesson, pupils will engage in reflection activities, such as sharing what they learned or creating a simple drawing related to the lesson.
- **Informal Assessment**: Teachers will assess understanding through observation and discussions, ensuring that misconceptions are addressed and that all pupils are making progress.

7. Inclusive Practises

- **Differentiated Activities**: Lessons will be tailored to meet the diverse needs of all pupils, including those with SEND. Differentiated tasks and support will be provided to ensure every pupil can engage meaningfully with the science curriculum.
- **Collaborative Learning**: Foster a collaborative learning environment where pupils can work together, share ideas, and support each other in their scientific explorations.

Lesson Structure- Year 1

Note: Year 1 lessons happen twice a week for 1 hour

1. Introduction to the Theme (5 minutes)

- **Context Setting**: Introduce the Cornerstones theme “The Enchanted Woodland.”
- **Engage Pupils**: Show a short video or images of different plants and trees to spark curiosity.

2. Learning Objectives (5 minutes)

- **Present Objectives**: Clearly outline the objectives for the lesson.
- **Discussion**: Ask pupils what they already know about plants and what questions they have.

3. Engagement Activity and Vocabulary Development (15 minutes)

- **Hands-On Exploration**: Take pupils outside to explore the school grounds or a nearby garden.

- **Observation Task**: Provide pupils with magnifying glasses to observe different plants and their parts.
- **Introduce Vocabulary**: Teach key vocabulary such as “roots,” “stem,” “leaves,” and “flowers.”
- **Visual Aids**: Use pictures and diagrams to reinforce understanding.

5. Investigative Learning and Enhanced Provision (30 minutes)

- **Group Activity**: Divide pupils into small groups and provide each group with a different plant.
- **Observation and Recording**: Ask pupils to observe their plant and draw it, labelling its parts.
- **Questions**: Encourage pupils to ask questions about their plant, such as:
    - What colour are the leaves?
    - How many flowers can you see?
    - What do you think the roots do?
- **Science Stations**: Set up stations with different activities related to plants:
    - **Observation Station**: Examine real plants and use magnifying glasses.
    - **Creative Station**: Create a collage of different plants using cut-out pictures.
    - **Measurement Station**: Measure the height of different plants using non-standard units (e.g., blocks).

6. Reflection and Assessment (5 minutes)

- **Class Discussion**: Gather pupils to share their observations and drawings.
- **Reflective Questions**: Ask pupils what they learned about plants and if their questions were answered.

Lesson Structure Year 2- 6

Note: Year 2-6 lessons happen once a week for 1hour 30mins.

The structure of a science lesson using the Cornerstones Curriculum is designed to promote engagement, understanding, and retention of scientific concepts. Here’s a suggested framework for structuring a science lesson, including approximate timings:

1. **Learning Objectives (5 minutes)**
    - **Clear Goals**: Start with specific learning objectives that outline what pupils should know and be able to do by the end of the lesson. These objectives should be communicated to pupils at the beginning of the lesson.
2. **Introduction (10 minutes)**
    - **Hook Activity**: Begin with an engaging question, scenario, or demonstration that captures pupils' interest. This could be a short experiment, a video clip, or a thought-provoking question related to the lesson topic.
    - **Activate Prior Knowledge (Do Now Task)**: Encourage pupils to share what they already know about the topic. This helps to build connections and prepares them for new information.

3. **Direct Instruction (15 minutes)**
    - **Clear Explanations**: Provide clear and concise explanations of key concepts. Use models, analogies, and visual aids to help pupils understand complex ideas.
    - **Introduce Vocabulary**: Introduce relevant scientific vocabulary and ensure pupils understand the terms. Revisit these terms throughout the lesson.
4. **Guided Practice (20 minutes)**
    - **Hands-On Activities**: Engage pupils in hands-on experiments or investigations that allow them to explore the concepts introduced. This could involve working in pairs or small groups to conduct experiments, collect data, or make observations.
    - **Facilitate Discussion**: Encourage pupils to discuss their findings and thoughts with peers. This collaborative approach enhances understanding and allows for the exchange of ideas.
5. **Independent Practice (15 minutes)**
    - **Individual Tasks**: Assign tasks that require pupils to apply what they have learned independently. This could include worksheets, project work, or further experiments that reinforce the concepts.
    - **Adaptation:** Tailor tasks to meet the diverse needs of pupils, including those with SEND, ensuring that all pupils can engage with the content meaningfully. This includes:
        1. **Accessibility Skills:** Utilise accessibility skills and tools to remove barriers to learning. This may involve providing alternative formats for tasks (e.g., visual aids, audio instructions) and using assistive technology to support pupils with different needs.
        2. **Adapted Resources:** Provide resources that are appropriately challenging for all pupils, ensuring that tasks are achievable and promote success for everyone.
6. **Assessment for Learning (10 minutes)**
    - **Formative Assessment**: Use questioning, quizzes, or peer assessments to gauge pupils' understanding throughout the lesson. Provide immediate feedback to help pupils identify areas for improvement.
    - **Reflection**: Encourage pupils to reflect on what they have learned and how it connects to previous knowledge. This could be done through a closing discussion or a reflective writing task.
7. **Conclusion (Review)**
    - **Recap Key Points**: Summarise the main concepts covered in the lesson, reinforcing the learning objectives.
    - **Preview Next Steps**: Briefly introduce what will be covered in the next lesson to create continuity and anticipation.
8. **Resources and Materials (Preparation)**
    - **Preparation**: Ensure that all resources and materials needed for the lesson are prepared in advance. This includes science equipment, worksheets, and visual aids.

Impact

The impact of our science policy will be measured through:

- **Pupil Progress**: Regular assessments will track pupils' understanding and retention of scientific knowledge, ensuring they make progress from their starting points.
- **Engagement and Enthusiasm**: We will monitor pupil engagement through observations, feedback, and participation in science-related extracurricular activities.
- **Quality of Teaching**: Ongoing professional development for staff will ensure high-quality teaching practises, with regular evaluations of lesson delivery and pupil outcomes.
- **Community Involvement**: We will foster partnerships with parents and the community to enhance the science curriculum, including educational trips, guest speakers, and science fairs.

Conclusion

This structured approach to science lessons using the Cornerstones Curriculum emphasises active learning, clear communication of concepts, and ongoing assessment. By following this framework, teachers can create an engaging and effective learning environment that supports pupils in developing a deep understanding of scientific principles. Through this science policy, Stour Academy Trust is dedicated to nurturing the next generation of scientists and informed citizens, ensuring that every pupil has the opportunity to thrive in their scientific education.